APPENDIX C1: ECOLOGICAL IMPACT ASSESSMENT

Ecological Assessment

CES

ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES

Vredenburg Windfarm (PTY) Ltd

ECOLOGICAL IMPACT ASSESSMENT

Prepared for:

Vredenburg Windfarm (Pty) Ltd

18 Cavendish Street

Claremont,

Cape Town, 7708

South Africa

Prepared by:

CES

Cape Town

Suite 408, 4th Floor, The Point, 76 Regent Road

Sea Point

Cape Town

8000

South Africa

www.cesnet.co.za

January 2020

REVISIONS TRACKING TABLE

CES Report Revision and Tracking Schedule

Document Title:	**Ecological Assessment for the Vredenburg Windfarm Powerline**		
Client Name & Address:	Vredenburg Windfarm (Pty) Ltd, 18 Cavendish Street, Claremont, Cape Town, 7708, South Africa		
Status:	Final		
Issue Date:	January 2020		
Lead Author:	Ms Tarryn Martin	CES	
Reviewer:	Dr Greer Hawley (Internal) Ms Leigh-Ann De Wett (External)	CES Independent Specialist	
Study Leader/ Registered Environmental Assessment Practitioner – Approval:	Dr Ted Avis	CES	
Report Distribution	***Circulated to***	***No. of hard copies***	***No. electronic copies***
	DEFF DEADP	2 0	1 1
Report Version: Final	***Date***		
Draft *Final*	May 2020 January 2020		

CES
ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES
Info@cesnet.co.za
www.cesnet.co.za

THE AUTHORS AND SPECIALISTS

Ms Tarryn Martin, Principal Environmental Consultant and Botanical Specialist (Pri.Sci.Nat.)

Tarryn holds a BSc (Botany and Zoology), a BSc (Hons) in African Vertebrate Biodiversity and an MSc with distinction in Botany from Rhodes University. Tarryn's Master's thesis examined the impact of fire on the recovery of C_3 and C_4 Panicoid and non-Panicoid grasses within the context of climate change for which she won the Junior Captain Scott-Medal (Plant Science) for producing the top MSc of 2010 from the South African Academy of Science and Art as well as an Award for Outstanding Academic Achievement in Range and Forage Science from the Grassland Society of Southern Africa. Tarryn specialises in conducting vegetation assessments including vegetation and sensitivity mapping to guide developments and thereby minimise their impacts on sensitive vegetation. She has conducted a number of vegetation and impact assessments in South Africa for renewable energy EIAs and assisted with the botanical baseline survey for the Lesotho Highlands Development Authority Polihali Dam. She has also conducted a number of vegetation surveys, to IFC standards, in Mozambique, has also worked on a Critical Habitat Assessment for Sasol in Inhambane Province and has co-designed and implemented the Terrestrial Monitoring Program for Kenmare, MOMA, a heavy minerals mine in Mozambique.

Ms Amber Jackson, Senior Environmental Consultant and Faunal Specialist (Cand.Sci.Nat.)

Amber is a Senior Environmental Consultant and has been employed with EOH CES for the last 7 years. She has an MPhil in Environmental Management and has a background in both Social and Ecological work. Her undergraduate degrees focused on Ecology, Conservation and Environment with particular reference to landscape effects on Herpetofauna, while her masters focused on the environmental management of social and ecological systems. With a dissertation in food security that investigated the complex food system of informal and formal distribution markets. During her time at CES Amber has worked extensively in Mozambique managing a number of Environmental and Social Impact Assessment. Amongst which she has conducted two large scale faunal impact assessments for graphite mines in the north of Mozambique to both MICOA standards and International lenders standards in fulfilment with lender requirements (AfDB, EIB and IFC). As well as assisted Prof Bill Branch on five faunal assessments, four international (Mozambique & Lesotho) and one national during 2013-2015. Her interests include, ecological studies dealing with indigenous fauna and flora, as well as land use and natural resource management.

Dr Greer Hawley, Principal Consultant and Ecological Specialist (Pri.Sci.Nat.)

Dr Greer Hawley has a BSc degree in Botany and Zoology and a BSc Honours in Botany from the University of Cape Town. She completed her PhD thesis (Microbiology) at Rhodes University. Greer has been involved in a number of diverse activities. The core academic focus has been in the field of taxonomy both in the plant and fungal kingdom. Greer's research ranges from fresh water and marine algae, estuarine diatoms, plant species classification in the fynbos and forest vegetation and fungal species identification and ecology. Greer has been involved in environmental and biodiversity impact assessments and environmental and biodiversity management projects both in South Africa and other African countries. Greer has recently completed the Eastern Cape Biodiversity Conservation Plan, the Eastern Cape Biodiversity Strategy and Action Plan and assisted with the generation of the Western Cape

State of the Coast Report. She is currently involved with developing the Environmental Management Framework for the King Cetshwayo District Municipality.

LIST OF ACRONYMS

CBA	Critical Biodiversity Area
ECO	Environmental Control Officer
GIS	Geographical Information System
IUCN	International Union for Conservation of Nature
NEMBA	National Environmental Management Biodiversity Act
PNCO	Provincial Nature Conservation Ordinance
QDS	Quarter Degree Square
SA	South Africa
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
TOPS	Threatened and Protected Species

EXECUTIVE SUMMARY

Introduction

Vredenburg Wind Farm (Pty) Ltd proposes to develop a 132kV above-ground electricity distribution line located within and adjacent to the proposed Boulders Wind Farm, approximately 12km northeast of the commercial centre of Vredenburg in the Saldanha Bay Local Municipality, within the West Coast District Municipality in the Western Cape.

The proposed distribution line will be used to transmit electrical energy generated by the Boulders Wind Farm (up to 140 megawatt (MW)) to the existing Eskom Fransvlei-Aurora 132kV line for distribution via the national electrical grid network.

The WEF and other associated infrastructure has been applied for in a separate Environmental Impact Assessment process.

Methods

The study area and surrounding areas were described using a two-phased approach. Firstly, a desktop assessment of the site was conducted in terms of current vegetation classifications and biodiversity programmes and plans. This included the consideration of:

- The South African Vegetation Map (Mucina and Rutherford, 2012);
- The Western Cape Biodiversity Spatial Plan (WCBSP), 2017;
- Previous ecological studies undertaken for the Boulders Wind Farm by Simon Todd

Further to the above, a site visit was conducted on the 15 May 2019 (the very early wet season) to assess the site-specific ecological state, current land-use, identify potential sensitive ecosystems and identify plant species associated with the proposed project activities. The site visit also served to identify potential impacts of the proposed development and its impact on the surrounding ecological environment.

Information on the general area and plant species was also generated using historical records for the area. This information has been used to supplement the findings of this report.

Vegetation Types

The National Vegetation map describes the vegetation within the project area as Saldanha Granite Strandveld. The powerlines also come in close proximity to Saldanha Flats Strandveld and Langebaan Dune Strandveld.

The ecological assessment conducted for the Boulders Windfarm EIA describes the vegetation found within the proposed windfarm site, of which there is overlap with the study area.

Most of the study area has been transformed to agricultural land which is used for dryland cereal cropping. Very little indigenous vegetation remains in these areas with most vegetation being limited to drainage lines.

Three vegetation types have been described for the site: Degraded Strandveld, Intact Saldanha Granite Strandvel and Drainage Line Vegetation.

Degraded Strandveld

These fragments of vegetation are relatively degraded and occur as fragments within the site, the largest being approximately 20ha and the smallest being less than 2ha. They are therefore considered to be of moderate sensitivity. Only one patch will be affected by option 3 of the powerline.

Intact Saldanha Granite Strandveld

There is a large intact patch of Saldanha Granite Strandveld along the south west boundary of the project site with a few smaller patches south east of this. These patches of vegetation are characterised by low to moderately tall shrubland associated with granite outcrops and are reasonably intact. These patches of remaining vegetation are considered to be important since 70% of this vegetation type has already been transformed and these areas should therefore be considered as areas of very high sensitivity.

Drainage Line Vegetation

There is a fair amount of erosion in a number of the drainage lines within the site. The vegetation associated with these features is mostly degraded and support low diversity. Although degraded, these features are important hydrological features and ecological corridors for the movement of species. Consequently, they are considered to be areas of high sensitivity.

Fauna

The Western Cape Province is home to approximately 153 reptile species, 55 amphibian species, 172 mammal species and 674 bird species.

Of the 153 reptile's species that occur in the WC, 42 species have a distribution which coincides with the Boulders project area. The WC supports 21 threatened or near threatened reptile species and 22 endemic reptile species. The project area intersects six (6) reptile SCC distribution. One SCC (Black Girlded Lizard) has been confirmed in the general project area and one other (Large-Scale Girlded Lizard) could occur in the project area but is unlikely due to a lack of habitat and the remaining four are unlikely to occur due to the lack of habitat.

Of the 60 species of amphibians known to occur in the Western Cape, 10 species have a distribution which coincides with the Boulders project area. In total, 36 amphibian species are endemic to the Western Cape Province, and three of these have a distribution which includes the project area and could occur on site, namely the Cape Caco, Sand Rain Frog (*Breviceps rosei*) and Cape Sand Toad *(Vandijkophrynus angusticeps)*. Additionally, the WC supports 15 SCC, one (1) of which may occur within the project area, namely the Cape Caco (*Cacosternum capense*) and is listed as Near Threatened and endemic.

The WC is home to 172 mammal species, 74 of which have a distribution which includes the Boulders Project Area. Three mammal species were sited during the site visit in May 2019, namely, a herd of Springbok, approximately five Grey Rhebok individuals and a Steenbok skull. A Cape Rock Hyrax was also recorded by the Avifaunal specialist.

Four (4) vulnerable species and four (4) Near-Threatened species have a distribution which includes the project area. Of these one was confirmed to occur onsite Grey Rhebok (*Pelea capreolus)* (NT) and the Spectacled Dormouse (NT) (*Graphiurus ocularis)* could occur in the rocky outcrop habitat. The remaining six species are unlikely to occur due to lack of habitat availability.

Site Sensitivity

The 2017 WCBSP was assessed to determine whether the site falls within priority areas. It was determined that the powerlines cross areas designated as Critical Biodiversity Area 1 (CBA1), Ecological Support Area 1 (ESA1) and Ecological Support Area 2 (ESA2) (Figure 4-1). The groundtruthing survey confirmed that the CBA's on site are mostly intact and the ESA's on site are mostly degraded.

The sensitivity map was developed using available spatial planning tools as well as by identifying areas of high, medium and low sensitivity based on the site survey.
The Saldanha Granite Strandveld patches are nearly intact and have a high species diversity. Given that 70% of this vegetation type is transformed and because it is listed as Endangered, it has been assigned a sensitivity of "Very High". These areas should be considered no-go areas and infrastructure must not be placed in these areas.

Although degraded, the drainage lines within the site act as important ecological corridors that link areas of natural vegetation allowing for the movement of faunal species and dispersal of seeds.

The degraded Strandveld still has a relatively high species diversity and provides important refugia for the remaining fauna that occur within the site. This vegetation type has been assigned a moderate sensitivity.

The degraded croplands have been assigned a low sensitivity as these areas have been completely transformed.

Impacts

This ecological study assessed the impacts associated with each of the 5 alternative powerline routes (Table 1). Five main impacts were identified and assessed for each alternative before and after mitigation.

Alternatives 1, 2 and 3 had no impacts of high significance since these routes traverse areas that are mostly transformed. Most of the impacts for these three routes are low.

Alternatives 4 and 5 traverse an intact area of Saldanha Granite Strandveld. Given that this vegetation type is listed as endangered and most of it has already been transformed, impacts within this vegetation type are typically of high and moderate significance and are difficult to mitigate.

Table 1: Summary table of impacts

Impact	Before Mitigation	After Mitigation
Impact 1a: Loss of Degraded Strandveld		
Alternative 1 and 2	LOW NEGATIVE	LOW NEGATIVE
Alternative 3, 4 and 5	NEGLIGIBLE	NEGLIGIBLE
Impact 1b: Loss of Saldanha Granite Strandveld		
Alternative 1, 2 and 3	LOW NEGATIVE	LOW NEGATIVE
Alternative 4 and 5	HIGH NEGATIVE	HIGH NEGATIVE
Impact 1c: Loss of Drainage Line Vegetation		
Alternative 1 and 5	MODERATE NEGATIVE	MODERATE NEGATIVE
Alternative 2, 3 and 4	LOW NEGATIVE	LOW NEGATIVE
Impact 2: Loss of Biodiversity (Fauna and Flora)		
Alternative 1, 2 and 3	LOW NEGATIVE	LOW NEGATIVE
Alternative 4 and 5	HIGH NEGATIVE	HIGH NEGATIVE
Impact 3: Loss of Species of Conservation Concern (Flora and Fauna)		
Alternative 1, 2 and 3	LOW NEGATIVE	LOW NEGATIVE
Alternative 4 and 5	HIGH NEGATIVE	HIGH NEGATIVE
Impact 4: Habitat Fragmentation		
Alternative 1, 2 and 3	LOW NEGATIVE	LOW NEGATIVE
Alternative 4 and 5	HIGH NEGATIVE	HIGH NEGATIVE
Impact 5: Invasion of Alien Plant Species		
Alternative 1, 2 and 3	MODERATE NEGATIVE	LOW NEGATIVE
Alternative 4 and 5	HIGH NEGATIVE	MODERATE NEGATIVE

Alternative 1, 2 and 3 are acceptable from an ecological perspective. For these routes, it is recommended that where feasible the monopoles are positioned outside of the remaining natural vegetation and drainage lines in order to reduce the impact on these areas. These are the three preferred alternatives from an ecological perspective.

Alternatives 4 and 5 should be avoided and if they can't be avoided then should be realigned to avoid locating any infrastructure with the intact patch of Saldanha Granite Strandveld.

Specialist Recommendations

It is recommended that the following conditions are included as part of the Environmental Authorisation:

- An invasive alien species plan is implemented and monitored by the appointed ECO.
- No infrastructure or activities must not occur within the intact patch of Saldanha Granite Strandveld
- No powerline infrastructure must be located within drainage lines or within 20 metre buffers either side of the drainage line taken from the highest water level mark.

SPECIALIST CHECKLIST

Section	*NEMA 2014 Regs - Appendix 6(1) Requirement*	Position in report
1	A specialist report prepared in terms of these Regulations must contain—	
(a)	details of-	
	(i) the specialist who prepared the report; and	The Author and Specialist (page 2)
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	The Author and Specialist (page 2)
(b)	a declaration that the person is independent in a form as may be specified by the competent authority;	Declaration Form
(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Chapter 1, section 1.1 and 1.2
(d)	the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 2.1
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process;	Chapter 2
(f)	the specific identified sensitivities of the site related to the activity and its associated structures and infrastructure;	Chapter 4 and Chapter 5
(g)	an identification of any areas to be avoided, including buffers;	Chapter 4 and section 6.1.
(h)	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitive of the site including areas to be avoided, including buffers;	Chapter 4
(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, including identified alternatives on the environment;	Chapter 5 and 6
(k)	any mitigation measures for inclusion in the EMPr;	Chapter 5
(l)	any conditions for inclusion in the environmental authorization;	Chapter 5
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Chapter 5
(n)	a reasoned opinion- (i) as to whether the proposed activity or portions thereof should be authorized and (ii) if the opinion is that the proposed activity of portion thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Chapter 6
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	Refer to summary report.
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	None received that are specific to the ecological assessment
(q)	any other information requested by the competent authority.	Not Applicable

EXTERNAL REVIEW

This report was peer reviewed by an external specialist, Ms Leigh-Ann de Wet (Appendix F) in January 2020. Her recommendations and an explanation of how the specialist addressed these, are provided in the table below.

Action	Specialist Response
Provide a methodology for the impact assessment.	This has been added under section 2.6.
Provide a non-technical summary.	This has been included at the start of the report.
Ensure references are used and added to the reference list.	The inconsistencies have been addressed.
An impact table summary should be included in the non-technical summary.	This has been included in the non-technical summary.
Degree of confidence must be included for impact rating.	The degree of confidence for each impact has been included in the cause and comment section under chapter 5.
A summary table/list of management actions should be provided in the conclusions/non-technical summary .	This was already in the report under section 6.1.
If a POSA list was generated for the report as indicated in the methodology, this should be included in the appendices as faunal lists are included.	This list was added under Appendix A

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1.1 PROJECT DESCRIPTION AND LOCALITY

Vredenburg Wind Farm (Pty) Ltd proposes to develop a 132kV above-ground electricity distribution line located within and adjacent to the proposed Boulders Wind Farm, approximately 12km northeast of the commercial centre of Vredenburg in the Saldanha Bay Local Municipality, within the West Coast District Municipality in the Western Cape.

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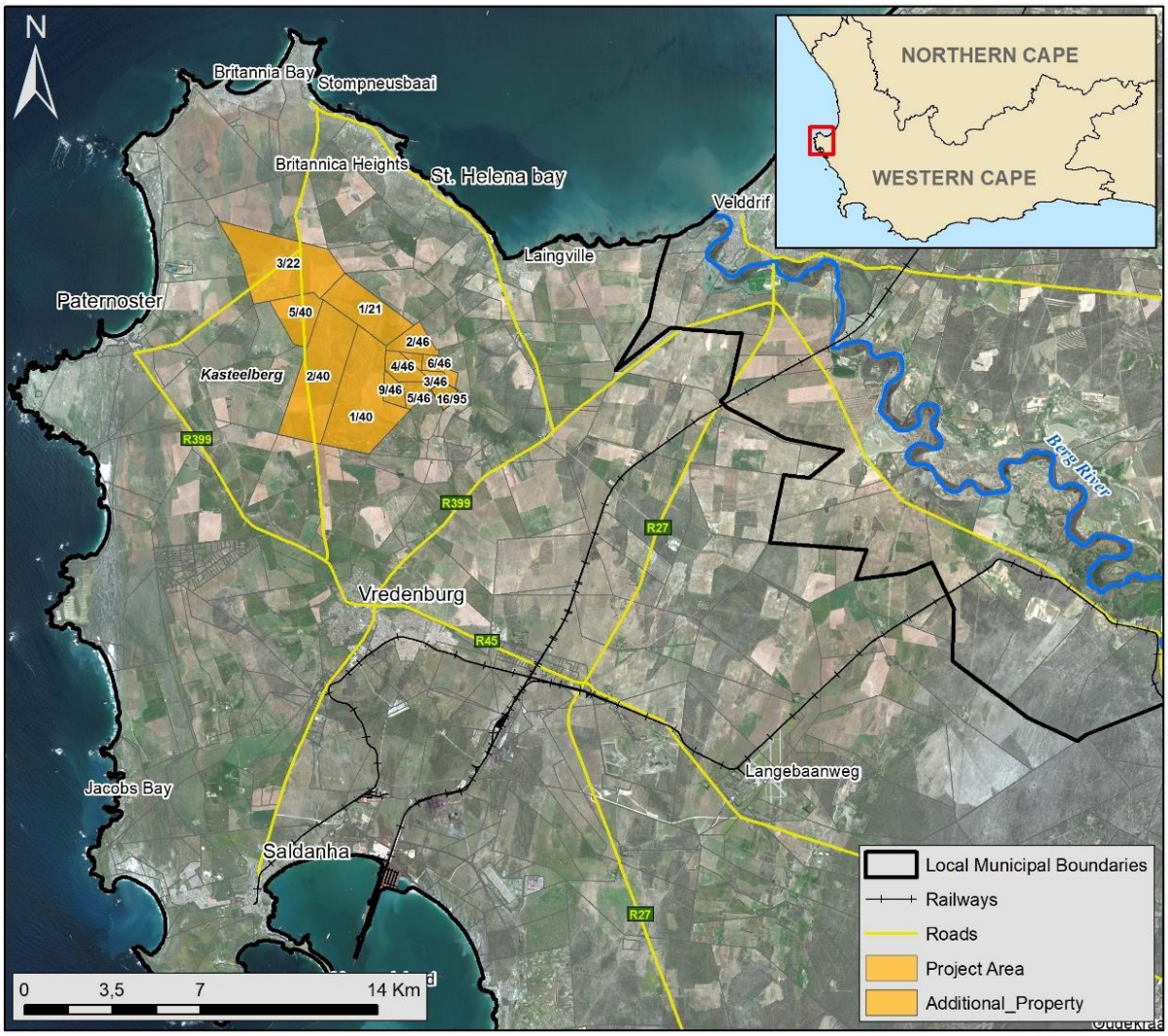


Figure 1-1: Locality map showing the location of the project site

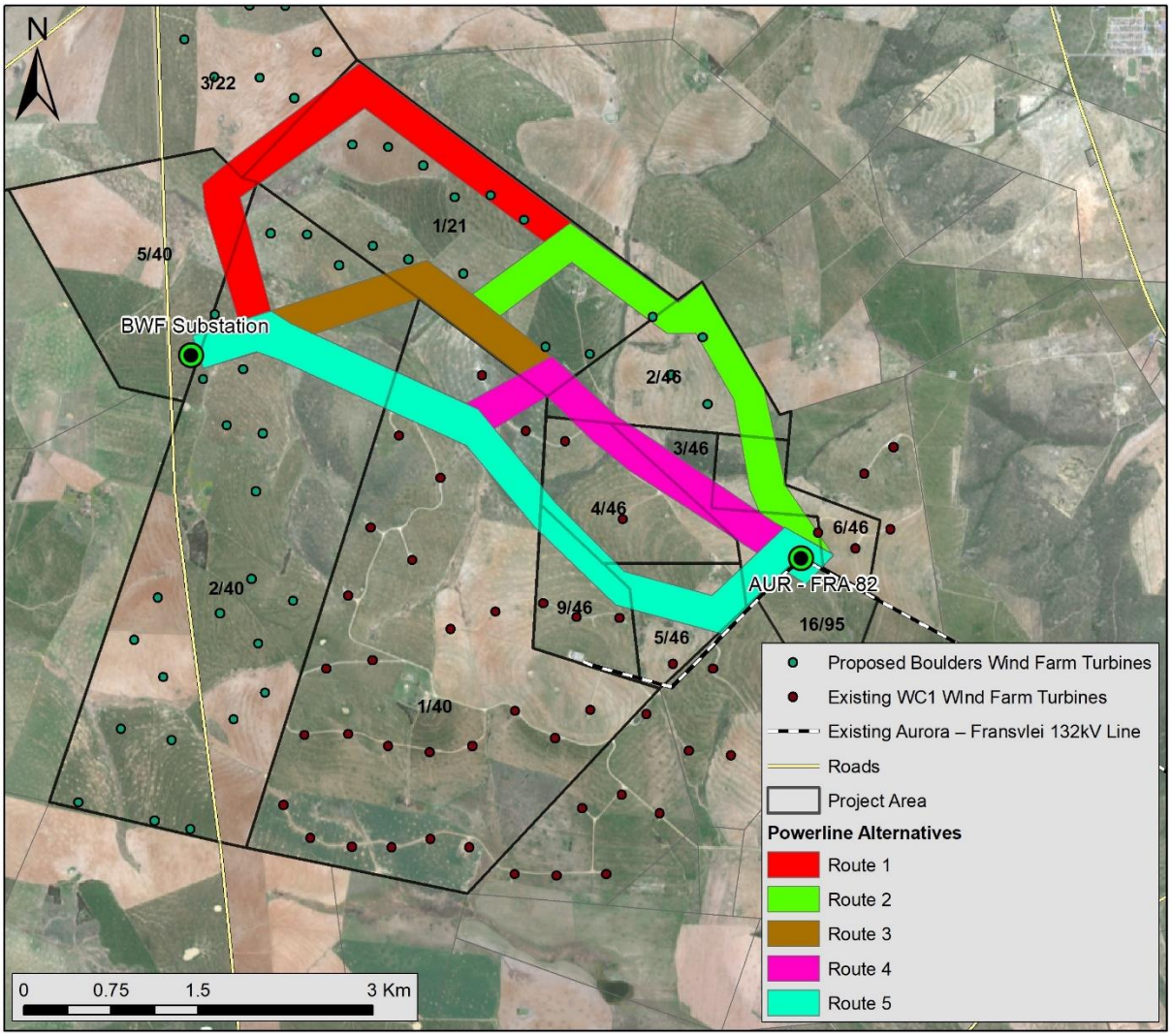


Figure 1-2: Map showing the five alternative powerline routes

1.2 OBJECTIVES AND TERMS OF REFERENCE

This study will provide a map showing areas of high, moderate and low sensitivity which is an indication of where development can and can't occur. A detailed ecological assessment of the site was undertaken for the EIA conducted for the Wind Farm and a sensitivity map provided by the ecologist. As such, detailed sampling was not repeated for this project site but rather a reconnaissance survey to understand the plant communities present and current sensitivities so that the impacts of the powerline on the site could be determined.

The specific terms of reference for the ecological assessment are as follows:

- Describe and map the vegetation types in the study area.
- Describe the biodiversity and ecological state of each vegetation unit.
- Establish and map sensitive vegetation areas showing the suitability for urban development, developable area and no-go areas.

- Identify plant and animal species of conservation concern (Red Data List, PNCO and TOPS lists). This was done using the previous ecological assessment for the site and in the case of the fauna, supplemented with available literature for the site.
- Identify alien plant species, assess the invasive potential and recommend management procedures.
- Identify and assess the impacts of development on the site's natural vegetation and faunal species in terms of habitat loss, fragmentation and degradation of key ecosystems and, where feasible, provide mitigation measures to reduce these impacts

1.3 LIMITATIONS AND ASSUMPTIONS

This report is based on current available information and, as a result, the following limitations and assumptions are implicit:

- The report is based on a project description received from the client.
- A detailed faunal survey was not conducted. The faunal survey was mainly a desktop study, using information from previous ecological surveys conducted in the area and available literature and this was supplemented by recording animal species that were observed during the site survey.
- Species of Conservation Concern (SCC) are difficult to find and difficult to identify, thus species described in this report do not comprise an exhaustive list. It is almost certain that additional SCCs will be found during construction and operation of the development.
- Sampling could only be carried out at one stage in the annual or seasonal cycle. The survey was conducted in late autumn and therefore some plants such as geophytes and herbs were not flowering and could not be identified without a flower. Consequently, some plant species may have gone undetected. However, the time available in the field, and information gathered during previous surveys, was sufficient to provide enough information to make a decision on the status of the affected area.
- The south eastern portion of the site could not be accessed as the neighbouring wind farm (West Coast 1 Wind Farm) denied specialists access to the site and to the ecological studies conducted as part of the EIA. Therefore, assumptions about the ecological state of the site were inferred using aerial imagery and what was recorded in other areas of the site.

2 METHODOLOGY

2.1 THE ASSESSMENT

The study area and surrounding areas were described using a two-phased approach. Firstly, a desktop assessment of the site was conducted in terms of current vegetation classifications and biodiversity programmes and plans. This included the consideration of:

- The South African Vegetation Map (Mucina and Rutherford, 2012);
- The Western Cape Biodiversity Spatial Plan (WCBSP), 2017;
- Previous ecological studies undertaken for the Boulders Wind Farm by Simon Todd

Further to the above, a site visit was conducted on the 15 May 2019 (the very early wet season) to assess the site-specific ecological state, current land-use, identify potential sensitive ecosystems and identify plant species associated with the proposed project activities. The site visit also served to identify potential impacts of the proposed development and its impact on the surrounding ecological environment.

Information on the general area and plant species was also generated using historical records for the area. This information has been used to supplement the findings of this report.

2.2 SPECIES OF CONSERVATION CONCERN

Data on the known distribution and conservation status for each potential species of conservation concern has to be obtained to develop a list of 'Species of Concern'. These species are those that may be impacted significantly by the proposed activity. In general these will be species that are already known to be threatened or at risk, or those that have restricted distributions (endemics) with a portion (at least 50%) of their known range falling within the study area i.e. strict endemic and near endemic species. Species that are afforded special protection, notably those that are protected by NEMBA (No. 10 of 2004), PNCO (1974), the National Forest Act or which occur on the South African Red Data List as species of conservation concern fall within this category.

2.3 SAMPLE SITE SELECTION

A sampling protocol was developed that would enable us to evaluate the existing desktop interpretations of the vegetation of the study area, to improve on them if necessary, and to add detailed information on the plant communities present. The protocol took into account the amount of time available for the study, the accessibility of different parts of the area, and limitations such as the seasonality of the vegetation.

A stratified random sampling approach was adopted, whereby initial assumptions were made about the diversity of vegetation, based on Google Earth, spatial planning tools and available literature and the area stratified into these basic types. In this way the time available was used much more efficiently than in random sampling, but there is a risk of bias and the eventual results may simply 'prove' the assumptions.

In general, the stratification of the site was influenced by obvious features of the vegetation, such as the presence of conspicuous species or vegetation structure. These factors may be largely independent of the floristic make-up of the vegetation, and by definition the biological communities present. Sample plots were analysed by determining the dominant species in each plot, as well as any alien invasive species and potential SCC occurring within the plots. Vegetation communities were then described according to the dominant species recorded from each type, and these mapped and assigned a sensitivity score.

2.4 VEGETATION MAPPING

Vegetation is usually mapped from satellite images, and related to data gathered on the ground.

2.5 SENSITIVITY ASSESSMENT

This section of the report explains the approach to determining the ecological sensitivity of the study area on a broad scale. The approach identifies zones of high, medium and low sensitivity according to a system developed by CES and used in numerous proposed development studies. It must be noted that the sensitivity zonings in this study are based solely on ecological (primarily vegetation) characteristics and social and economic factors have not been taken into consideration. The sensitivity analysis described here is based on 10 criteria which are considered to be of importance in determining ecosystem and landscape sensitivity. The method predominantly involves identifying sensitive vegetation or habitat types, topography and land transformation (Table 2-1).

Although very simple, this method of analysis provides a good, yet conservative and precautionary assessment of the ecological sensitivity.

Table 2-1: Criteria used for the analysis of the sensitivity of the area.

CRITERIA		LOW SENSITIVITY 1	MODERATE SENSITIVITY 5	HIGH SENSITIVITY 10
1	**Topography**	Level, or even	Undulating; fairly steep slopes	Complex and uneven with steep slopes
2	**Vegetation** - Extent or habitat type in the region	Extensive	Restricted to a particular region/zone	Restricted to a specific locality / site
3	**Conservation status** of fauna/ flora or habitats	Well conserved independent of conservation value	Not well conserved, moderate conservation value	Not conserved - has a high conservation value
4	**Species of conservation concern** - Presence and number	None, although occasional regional endemics	No endangered or vulnerable species, some indeterminate or rare endemics	One or more endangered and vulnerable species, or more than 2 endemics or rare species

CRITERIA		LOW SENSITIVITY 1	MODERATE SENSITIVITY 5	HIGH SENSITIVITY 10
5	**Habitat fragmentation** leading to loss of viable populations	Extensive areas of preferred habitat present elsewhere in region not susceptible to fragmentation	Reasonably extensive areas of preferred habitat elsewhere and habitat susceptible to fragmentation	Limited areas of this habitat, susceptible to fragmentation
6	**Biodiversity** contribution	Low diversity, or species richness	Moderate diversity, and moderately high species richness	High species diversity, complex plant and animal communities
7	**Visibility** of the site or landscape from other vantage points	Site is hidden or barely visible from any vantage points with the exception in some cases from the sea.	Site is visible from some or a few vantage points but is not obtrusive or very conspicuous.	Site is visible from many or all angles or vantage points.
8	**Erosion potential** or instability of the region	Very stable and an area not subjected to erosion.	Some possibility of erosion or change due to episodic events.	Large possibility of erosion, change to the site or destruction due to climatic or other factors.
9	**Rehabilitation** potential of the area or region	Site is easily rehabilitated.	There is some degree of difficulty in rehabilitation of the site.	Site is difficult to rehabilitate due to the terrain, type of habitat or species required to reintroduce.
10	**Disturbance** due to human habitation or other influences (Alien invasives)	Site is very disturbed or degraded.	There is some degree of disturbance of the site.	The site is hardly or very slightly impacted upon by human disturbance.

A Geographical Information System (GIS) map was drawn up and with the aid of a satellite image the sensitive regions and vegetation types could be plotted. The description of the sample plots helped to map the vegetation, and these descriptions as well as sensitivity ratings were illustrated on the resultant maps.

2.6 IMPACT ASSESSMENT METHODOLOGY

To ensure a balanced and objective approach to assessing the significance of potential impacts, a standardised rating scale was adopted which allows for the direct comparison of specialist studies. This rating scale has been developed in accordance with the requirements outlined in Appendix 1 of the EIA Regulations (2014 and subsequent 2017 amendments).

Impact significance pre-mitigation

This rating scale adopts four key factors to determine the overall significance of the impact prior to mitigation:

1. **Temporal Scale**: This scale defines the duration of any given impact over time. This may extend from the short-term (less than 5 years, equivalent to the construction phase) to permanent. Generally, the longer the impact occurs the more significance it is.
2. **Spatial Scale:** This scale defines the spatial extent of any given impact. This may extend from the local area to an impact that crosses international boundaries. The wider the impact extends the more significant it is considered to be.
3. **Severity/Benefits Scale:** This scale defines how severe negative impacts would be, or how beneficial positive impacts would be. This negative/positive scale is critical in determining the overall significance of any impacts.
4. **Likelihood Scale:** This scale defines the risk or chance of any given impact occurring. While many impacts generally do occur, there is considerable uncertainty in terms of others. The scale varies from unlikely to definite, with the overall impact significance increasing as the likelihood increases.

For each impact, these four scales are ranked and assigned a score. These scores are combined and used to determine the overall impact significance prior to mitigation.

Table 2-2: Pre-mitigation Evaluation Criteria

Temporal Scale		
Short term	*Less than 5 years*	
Medium term	*Between 5-20 years*	
Long term	*Between 20 and 40 years (a generation) and from a human perspective also permanent*	
Permanent	*Over 40 years and resulting in a permanent and lasting change that will always be there*	
Spatial Scale		
Localised	*At localised scale and a few hectares in extent*	
Study Area	*The proposed site and its immediate environs*	
Regional	*District and Provincial level*	
National	*Country*	
International	*Internationally*	
Severity Scale	*Severity*	*Benefit*
Slight	*Slight impacts on the affected system(s) or party(ies)*	*Slightly beneficial to the affected system(s) and party(ies)*
Moderate	*Moderate impacts on the affected system(s) or party(ies)*	*Moderately beneficial to the affected system(s) and party(ies)*
Severe/ Beneficial	*Severe impacts on the affected system(s) or party(ies)*	*A substantial benefit to the affected system(s) and party(ies)*
Very Severe/ Beneficial	*Very severe change to the affected system(s) or party(ies)*	*A very substantial benefit to the affected system(s) and party(ies)*
Likelihood Scale		
Unlikely	*The likelihood of these impacts occurring is slight*	
May Occur	*The likelihood of these impacts occurring is possible*	
Probable	*The likelihood of these impacts occurring is probable*	
Definite	*The likelihood is that this impact will definitely occur*	

** In certain cases, it may not be possible to determine the severity of an impact thus it may be determined: Don't know/Can't know.*

Table 2-3: Description of Overall Significance Rating

Significance Rate	***Description***
Low	*Impacts of low significance are typically acceptable impacts for which mitigation is desirable but not essential. The impact by itself is insufficient, even in combination with other low impacts, to prevent the development being approved. These impacts will result in negative medium to short term effects on the natural environment or on social systems.*
Moderate	*Impacts of moderate significance are impacts that require mitigation. The impact is insufficient by itself to prevent the implementation of the project but in conjunction with other impacts may prevent its implementation. These impacts will usually result in a negative medium to long-term effect on the natural environment or on social systems.*
High	*Impacts that are rated as being high are serious impacts and may prevent the implementation of the project if no mitigation measures are implemented, or the impact is very difficult to mitigate. These impacts would be considered by society as constituting a major and usually long-term change to the environment or social systems and result in severe effects.*
Very High	*Impacts that are rated as very high are very serious impact which may be sufficient by itself to prevent the implementation of the project. The impact may result in permanent change. Very often these impacts are unmitigable and usually result in very severe effects or very beneficial effects.*

Impact significance post-mitigation

Once mitigation measures are proposed, the following three factors are then considered to determine the overall significance of the impact after mitigation.

1. **Reversibility Scale**: This scale defines the degree to which an environment can be returned to its original/partially original state.
2. **Irreplaceable loss Scale:** This scale defines the degree of loss which an impact may cause.
3. **Mitigation potential Scale:** This scale defines the degree of difficulty of reversing and/or mitigating the various impacts ranges from very difficult to easily achievable. Both the practical feasibility of the measure, the potential cost and the potential effectiveness is taken into consideration when determining the appropriate degree of difficulty.

Table 2-4: Post-mitigation Evaluation Criteria

Reversibility	
Reversible	*The activity will lead to an impact that can be reversed provided appropriate mitigation measures are implemented.*
Irreversible	*The activity will lead to an impact that is permanent regardless of the implementation of mitigation measures.*
Irreplaceable loss	
Resource will not be lost	*The resource will not be lost/destroyed provided mitigation measures are implemented.*
Resource will be partly lost	*The resource will be partially destroyed even though mitigation measures are implemented.*
Resource will be lost	*The resource will be lost despite the implementation of mitigation measures.*
Mitigation potential	
Easily achievable	*The impact can be easily, effectively and cost effectively mitigated/reversed.*
Achievable	*The impact can be effectively mitigated/reversed without much difficulty or cost.*
Difficult	*The impact could be mitigated/reversed but there will be some difficultly in ensuring effectiveness and/or implementation, and significant costs.*
Very Difficult	*The impact could be mitigated/reversed but it would be very difficult to ensure effectiveness, technically very challenging and financially very costly.*

3 DESCRIPTION OF THE ENVIRONMENT

3.1 DESCRIPTION OF THE BIOPHYSICAL ENVIRONMENT

3.1.1 Climate

The average precipitation in this region of the Western Cape is 408mm per annum, with peak rainfall in the winter months. Vredenburg receives the lowest rainfall (1mm) in the month of February and the highest (45mm) in June. The average midday temperatures for Vredenburg range from 16.5°C in July to 25.6°C in February. The area is the coldest during July with low temperatures of 8°C on average during the night.

3.1.2 Topography

The broader study area is located on land that ranges in elevation from sea level at the coast to approximately 270m above sea level at the top of the hills. The dominant terrain of the project site and the surrounding areas is moderately undulating plains to the west and plains to the east. A number of rolling hills occur within the area, with the Patrysberg, adjacent to the R399 being the largest of these. Other smaller hills include the Klipheuwel and the Kasteelberg.

3.1.3 Geology

The project site is dominated by successions of sandy layers that mantle the underlying granitic Vredenburg Pluton. The study area is characterised by undulating agricultural fields, interspersed with numerous outcrops of the underlying granite in the form of small koppies.

3.1.4 Soils

The entire project site is underlain by very coarse-grained Cape Granites. Due to the resistance to weathering combined with a relatively low rainfall in the area the base rock is not deeply weathered and rocky outcrops are common in the more erodible landscapes. This is very obvious in the sandy colluviated topsoil layer especially on lower slope soils.

The occurrence of red/yellow apedal soils with relict hard plinthite, which usually occurs on pre-weathered granite, is evident on the highest crest and near mid-slope remnants of an older (possibly Tertiary) land surface.

Shallow pans are also common in these landscapes. Some of the steeper mid-slopes have many exposed granite outcrops, illustrating incision since the Tertiary period, thereby creating a younger landscape with shallower soils.

Another very common micro-relief feature throughout almost all areas is the abundant occurrence of mounds or “heuweltjies”. These are termite mounds and cover between 20%

and 30% of the land surface. Due to the termite activity the “heuweltjie” soils differ in chemical composition and structure from the surrounding non-”heuweltjie” soils. They are normally calcareous and, especially in the lower parts of the landscape, a hardpan carbonate horizon has developed. In eroded sections, these hardpans are exposed at the surface.

3.2 THE CURRENT LAND USE

The project site is used predominantly to cultivate crops, such as wheat, although livestock grazing was also observed.

Figure 3-1: Photo illustrating the current land use showing recently tilled fields ready to be planted

3.3 DESCRIPTION OF THE VEGETATION

3.3.1 National Vegetation Map: Expected Vegetation Types

The National Vegetation map (Mucina and Rutherford, 2012) describes the vegetation within the project area as Saldanha Granite Strandveld. The powerlines also come in close proximity to Saldanha Flats Strandveld and Langebaan Dune Strandveld (Figure 3-2):

3.3.2 Saldanha Granite Strandveld

This vegetation type occurs in the Western Cape Province as granite domes from Vredenberg to St Helena Bay. It is estimated that 91.89% of this vegetation type occurs in the Saldanha Bay Municipality alone (Maree and Vromans, 2010).

Saldanha Granite Strandveld is characterised by low to medium shrubland containing some succulent elements that alternate with grassy and herb-rich areas that are rich in geophytes. Records indicate that there are 15 endemics associated with this vegetation type.

This vegetation type is listed as **Endangered** with a conservation target of 24%. Almost 10% is conserved in the West Coast National Park, SAS Saldanha Reserves and Columbine Nature Reserves. It is estimated that approximately 70% of the original 23 000ha has been transformed for cultivation or by urban development. It is also threatened by alien invasive species (WCBSP, 2017). The remnant patches of vegetation that remain on site was reminiscent of this vegetation type.

3.3.3 Saldanha Flats Strandveld

This extensive vegetation type also occurs in the Western Cape and stretches 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 southern most extension near Yzerfontein and Rietduin.

This vegetation type is also listed as **Endangered** with a conservation target of 24% and only 11% conserved in the West Coast National Park and Yzerfontein Nature Reserve. It is estimated that over half has been transformed for cultivation, road building or by urban development. Additionally, the vegetation type is severely affected by extensive alien infestation caused by species such as *Acacia cyclops* and *Acacia saligna.*

3.3.4 Langebaan Dune Strandveld

This vegetation type occurs as three large disconnected patches:

1. A narrow coastal strip from Elands Bay to the mouth of the Great Berg River at Velddrif
2. Parts of Britannia Bay past Paternoster to Danger Bay near Saldanha Bay
3. Langebaan Lagoon down to Silverstroomstrand at Bokbaai

This vegetation type is characterised by closed, evergreen, sclerophyllous shrubland that gets up to 2m tall, with a prominent annual herbaceous layer occurring in the gaps.

This vegetation type is listed as **Vulnerable** with a conservation target of 24%. Almost 30% is statutorily conserved in the West Coast National Park and in Rocherpan, SAS Saldanha, Columbine and Yzerfontein Nature Reserves. Approximately 35% of this vegetation type has been transformed for cultivation and urban sprawl and *Acacia cyclops* and *Acacia salgina* have infested broad stretches.

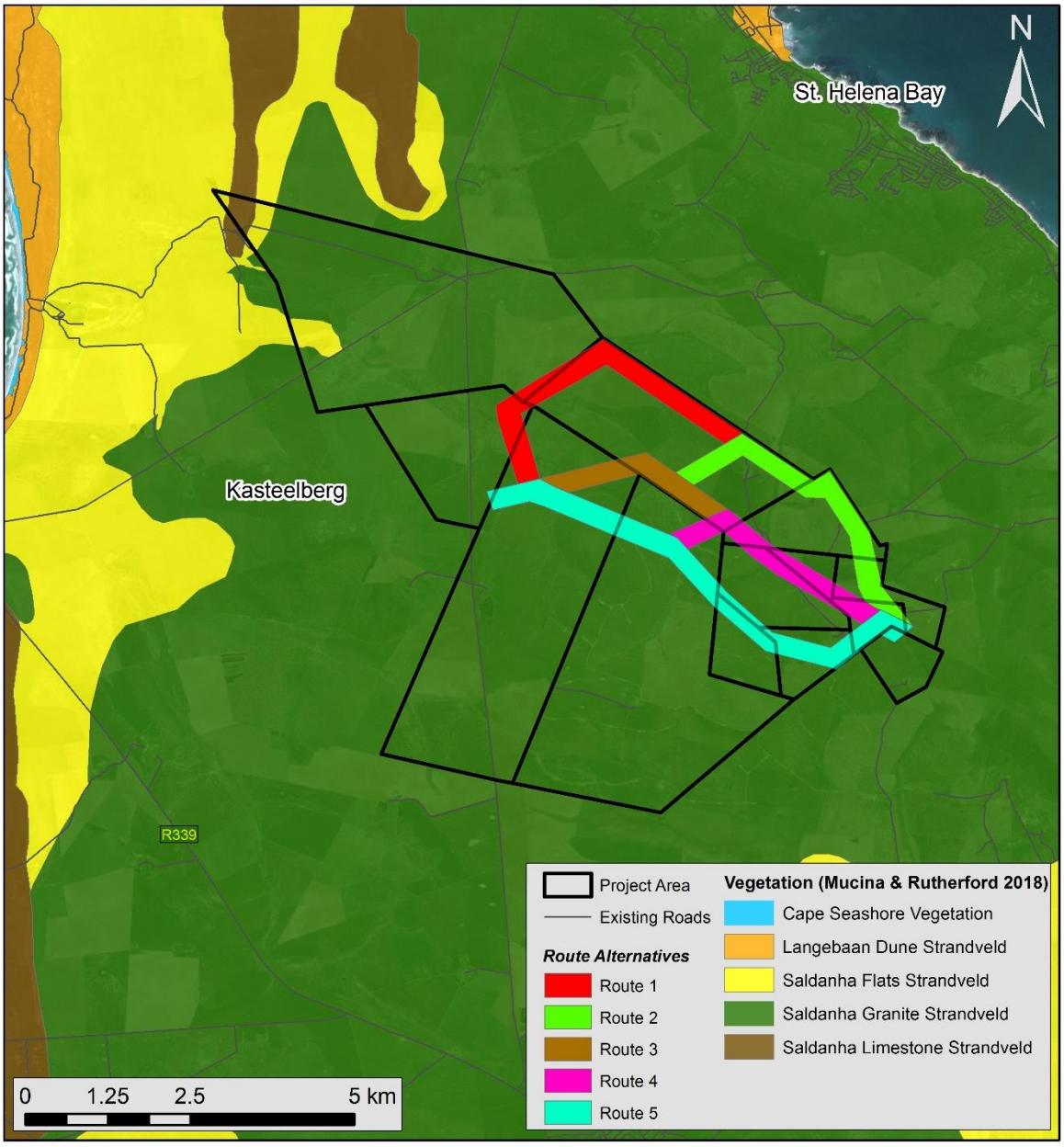


Figure 3-2: National Vegetation Map (SANBI, 2018)

3.3.5 Vegetation types recorded on site

The ecological assessment conducted for the Boulders Windfarm EIA describes the vegetation found within the proposed windfarm site, of which there is overlap with the study area.

Most of the study area has been transformed to agricultural land which is used for dryland cereal cropping. Very little indigenous vegetation remains in these areas with most vegetation being limited to drainage lines.

Two vegetation types have been described for the site: Degraded Strandveld and Intact Saldanha Granite Strandveld.

Degraded Strandveld

A few small patches of this vegetation type occur within the study area and only one patch will be affected by option 3 of the powerline.

This vegetation type is characterised by bushclumps interspersed with low growing shrubland. Common species recorded on site include *Searsia glauca, Searsia incisa, Asparagus capensis, Trachyandra falcata, Galenia fruticosa Lycium ferocissimum, Solanum guineense, Chenopodium carinatum* and *Cissempelos capensis.* The previous study conducted for the associated wind farm that was carried out by Todd (2018) also recorded *Putterlickia pyracantha, Haemanthus coccineus, 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* and *Oxalis purpurea.*

These fragments of vegetation are relatively degraded and occur as fragments within the site, the largest being approximately 20ha and the smallest being less than 2ha. They are therefore considered to be of moderate sensitivity.

Intact Saldanha Granite Strandveld

There is a large intact patch of Saldanha Granite Strandveld along the south west boundary of the project site with a few smaller patches south east of this. These patches of vegetation are characterised by low to moderately tall shrubland associated with granite outcrops and are reasonably intact (Plate 3-1 and 3-2). Common species recorded during the survey include *Searsia glauca, Searsia incisa, Ruschia tecta, Passerina filiformis, Roepera morgsana, Nenax hirta subsp. calciphila (NT), Lycium ferocissimum, Aspalathus hispida subsp hispida, Calobota cytisoides, Euclea racemosa subsp. racemosa, Euphorbia burmannii, Pteronia divaricata, Seriphium plumosum, Pterocelastrus tricuspidatus, Putterlickia pyracantha, Olea exasperata, Eriocephalus racemosus var. racemosus, Asparagus declinatus, Asparagus capensis* and *Asparagus aethiopicus.* The previous study conducted for the wind farm that was carried out by Todd (2018) also recorded ***Oscularia vredenburgensis*** *(VU), Gnidia geminiflora,* ***Muraltia harveyana*** *(VU), Stipagrostis zeyheri, Tylecodon paniculatus, Maytenus oleoides, Drimia capensis, Asparagus rubicundus* and *Asparagus asparagoides.*

These patches of remaining vegetation are considered to be important since 70% of this vegetation type has already been transformed and these areas should therefore be considered as areas of very high sensitivity.

Drainage Line Vegetation

There is a fair amount of erosion in a number of the drainage lines within the site. The vegetation associated with these features is mostly degraded and support low diversity. Dominant species include *Sarcocornia* spp. *Atriplex cinerea*, *Lycium cinereum*, *Suaeda inflata*, *Limonium equisetinum* and *Sporobolus virginicus (Plate 3-1)* (personal observations and Todd, 2018).

Although degraded, these features are important hydrological features and ecological corridors for the movement of species. Consequently they are considered to be areas of high sensitivity.

Plate 3-1: Photograph illustrating the vegetation associated with the drainage line in the foreground and the Saldanha Granite Strandveld on the slopes.

Plate 3-2: Photograph illustrating a patch of Saldanha Granite Strandveld on the left and croplands on the right.

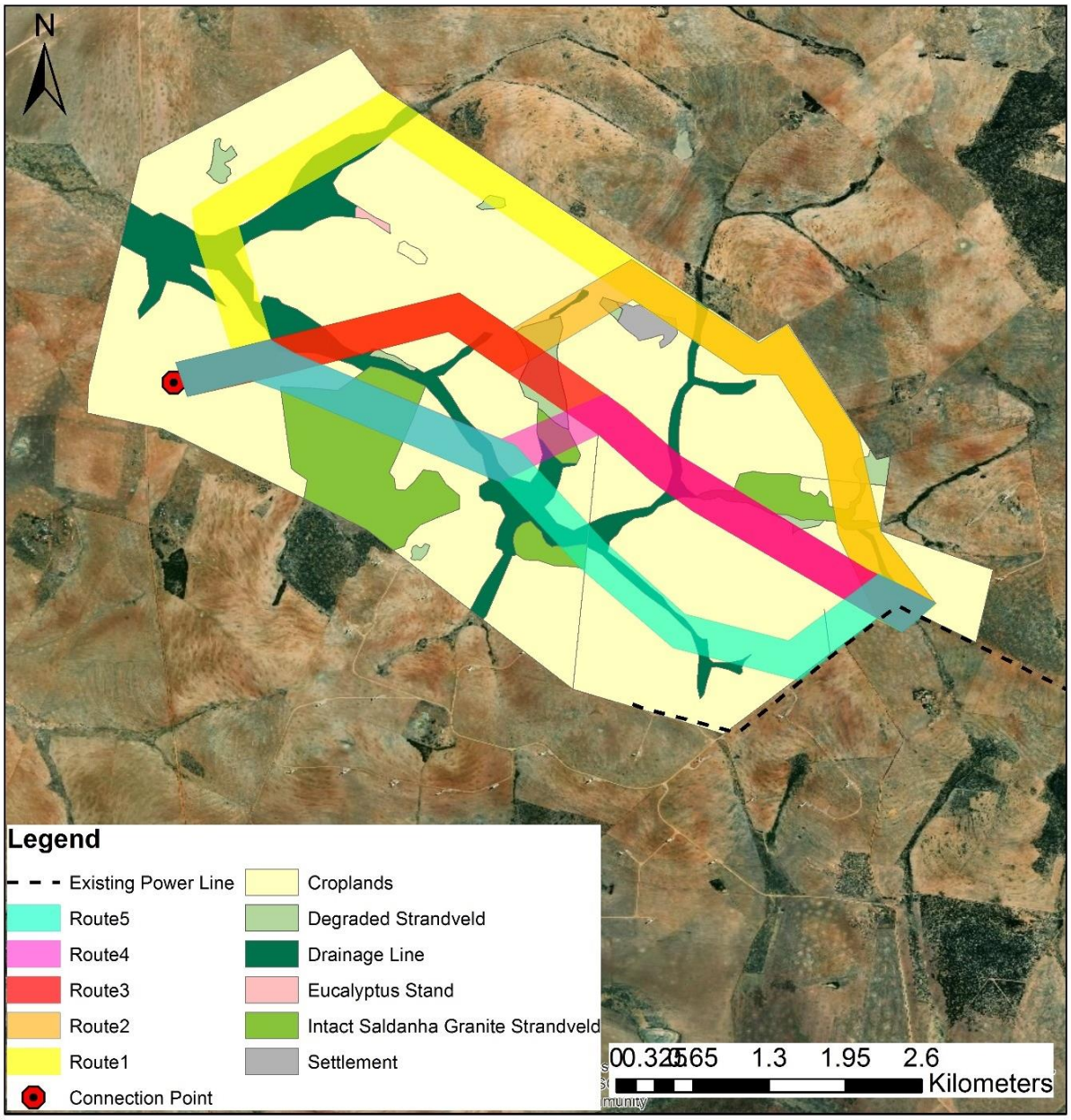


Figure 3-3: The vegetation types found on site.

3.4 SPECIES OF CONSERVATION CONCERN

A species list for the broader project area was generated using the Plants of southern Africa (POSA) database and this was compared to the species recorded on site.

Due to the time of the field survey, early flowering species may have not been detected however, details from the previous study conducted for the Boulders Wind Farm EIA indicate that *Oxalis suavis* (VU), *Romulea saldanhensisis* (EN), *Oscularia vredenburgensis (VU), Adenogramma teretifolia (VU) and Muraltia harveyana (VU)* were observed in near natural and natural fragments in the western part of the Boulders WEF site.

3.5 ALIEN SPECIES

Species listed as invasive alien plants on the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004): Alien and Invasive Species Lists, 2016 were recorded in the broader study area (Table 3.1). Four species are listed as category 1b species; *Acacia saligna* (Port Jackson), *Acacia cyclops* (Rooikrans) and *Acacia longifolia* (long-leaf wattle) and *Eucalyptus* sp. Although not recorded on site due to the time of year, it is likely that *Echium plantagineum* (Patterson's curse), listed as a category 2 species, is also present.

Table 3-1: A list of alien species recorded on site.

Species	Common Name	Category
Acacia saligna	Port Jackson	1b
Echium plantagineum	Patterson's Curse	2
Eucalyptus sp.	Eucalyptus	1b
Acacia longifolia	Long-leaf wattle	1b
Acacia cyclops	Rooikrans	1b

The law requires that the landowner is responsible for preventing the spread of any species listed as Category 1b and 2. As such, these species must be removed from site.

3.6 DESCRIPTION OF THE FAUNA

South Africa is a diverse country, with approximately 1,663 terrestrial vertebrate faunal species of which 850 species are birds, 343 species are mammals, 350 species are reptiles and 120 species are amphibians spread across seven biomes and 122 million km². The Western Cape Province is home to approximately 153 reptile species, 55 amphibian species, 172 mammal species and 674 bird species (Turner & de Villers, 2017).

3.6.1 Reptiles

Of the 153 reptile's species that occur in the WC, 42 species have a distribution which coincides with the Boulders project area (Turner & de Villers, 2017). Approximately 29 of these have been recorded in QDS 3217DB and 3218CC within which the site is located (ADU, 2019) (Table 3.2).

The WC supports 21 threatened or near threatened reptile species and 22 endemic reptile species (Turner & Villiers, 2017). The project area intersects six (6) reptile SCC distribution (Table 3.2). One SCC has been confirmed and one other could occur in the project area (A-D; Figure 3-4), the remaining four are unlikely to occur due to the lack of habitat.

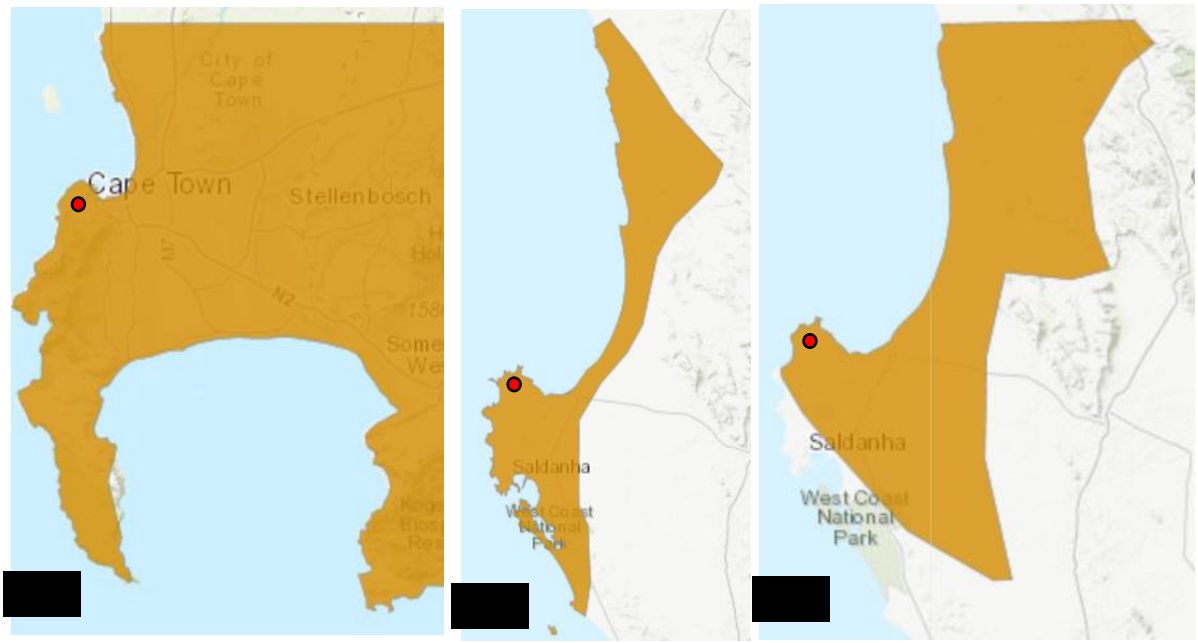
The Black Girdled Lizard (*Cordylus niger)* (**NT**) does not have a distribution that includes the site, it was however recorded on large granite outcrops dispersed throughout the project site (Todd, 2018).

Although recorded in 60km^2 of the project area (QDS 3217DB; 3218CC) the Cape Dwarf Chameleon, Gronovi's Dwarf Burrowing Skink and Kasner's Dwarf Burrowing Skink are unlikely to occur in the project area given the lack of habitat availability. The Cape Dwarf Chameleon (*Bradypodion pumilum)* (**VU**) is likely to be found in lowland and montane fynbos and renosterveld (Tolley, 2014), neither occurs on site and is thus considered unlikely to occur. Gronovi's Dwarf Burrowing Skink (*Scelotes gronovii)* (**NT**) and the Kasner's Dwarf Burrowing Skink (*Scelotes kasneri)* (**NT**) are associated with coastal dune habitat which does not occur in the project area. The Large-Scale Girdled Lizard (*Cordylus macropholis*) (**NT**) is endemic

to three isolated locations along the west coast was recorded at the Berg River Estuary IBA (BirdLife, 2019) (blue dot Figure 3-4E) and thus could possibly have a distribution that includes the project area, however, they prefer to use *Euphorbia* species and calcrete rocks as shelter (Bates, *et. al*. 2018) given only granite outcrops were recorded on site these are unlikely to occur.

Table 3-2: Reptile SCC

	Common name	Scientific name	Red list category	Endemic
A.	Cape Dwarf Chameleon	*Bradypodion pumilum*	Vulnerable	WC
B.	Gronovi's dwarf burrowing skink	*Scelotes gronovii*	Near Threatened	WC
C.	Kasner's dwarf burrowing skink	*Scelotes kasneri*	Near Threatened	WC
D	Cape Sand Skink	*Psammophis leightoni*	Least Concern	WC
E.	Large Scale Girdled Lizard	*Cordylus macropholis*	Least Concern	West Coast
F.	Black Girdled Lizard	*Cordylus niger*	Near Threatened	



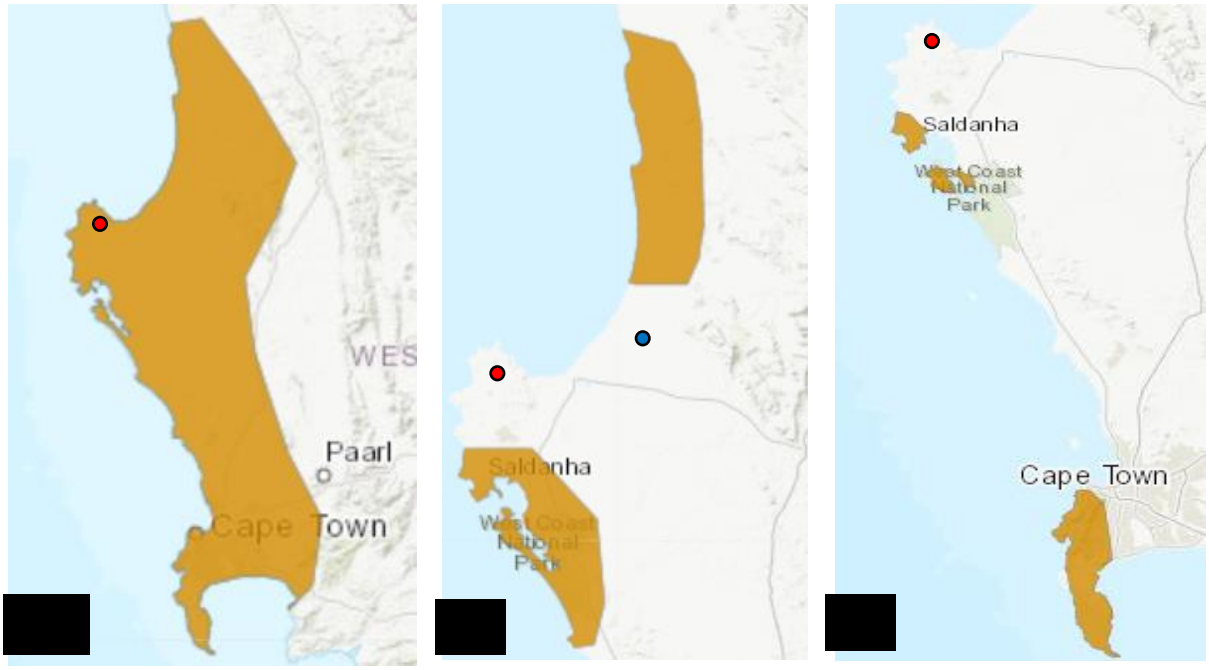


Figure 3-4: Reptiles Endemic to the Western Cape Province in relation to the project area (red circle) (IUCN, 2019).

3.6.2 Amphibians

Of the 60 species of amphibians known to occur in the Western Cape (Turner & de Villiers, 2017), 10 species have a distribution which coincides with the Boulders project area. Approximately 6 of these 10 species have been recorded within a 60km^2 area (QDS, 3217DB and 3218CC) within which the project area is located (ADU, 2019). The Cape River Frog (*Amietia fuscigula)* was recorded from a rock pool during the ecological study for the windfarm (Todd, 2018).

In total, 36 amphibian species are endemic to the Western Cape Province (Turner & de Villiers, 2017), and three of these have a distribution which includes the project area and could occur on site, namely the Cape Caco, Sand Rain Frog (*Breviceps rosei*) and Cape Sand Toad *(Vandijkophrynus angusticeps)* (Table 3-3).

The WC supports 15 SCC, one (1) of which may occur within the project area, namely the Cape Caco (*Cacosternum capense*) and is listed as Near Threatened and endemic. The ADU (2019) have two confirmed recordings of the Cape Caco within a 30km^2 radius of the site (QDS 3218CC). The Cape Caco is restricted to low-lying, flat or gently undulating areas with poorly drained clay or loamy soils such as shallow, temporary rain-filled depressions, pans or cultivated land. This habitat type is present on site and is described as Inland Pans vegetation type and can be seen in Plate 3-1 above.

Table 3-3: Threatened & Endemic Amphibians species with a distribution that includes the site

	Common name	Scientific name	Red list category	Endemic
A.	Cape Caco	*Cacosternum capense*	Vulnerable	X
B.	Sand Rain Frog	*Breviceps rosei*	Least Concern	X
C.	Cape Sand Toad	*Vandijkophrynus angusticeps*	Least Concern	X

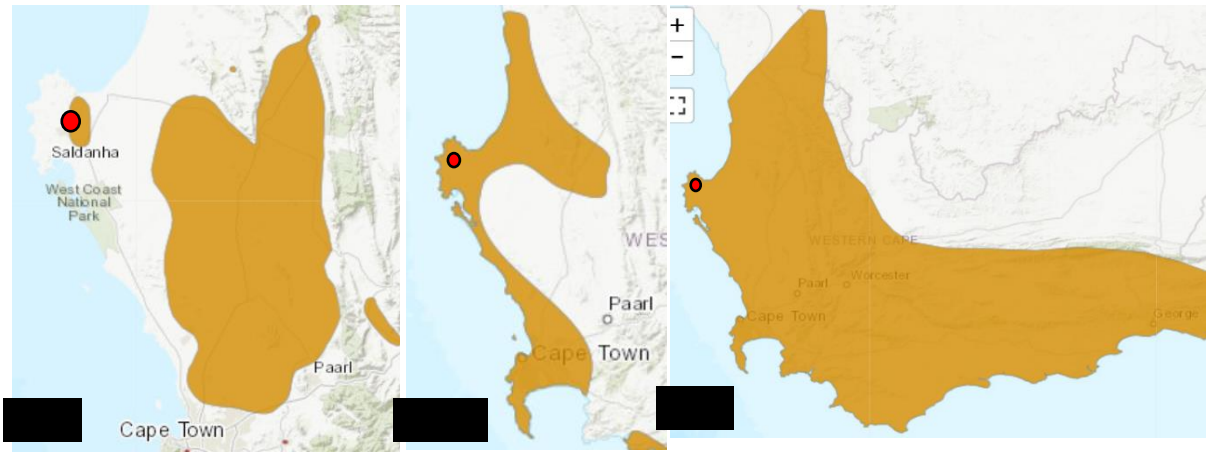


Figure 3-5: Amphibians Endemic to the Western Cape Province in relation to the project area (red circle) (IUCN, 2019).

3.6.3 Mammals

The WC is home to 172 mammal species, 74 of which have a distribution which includes the Boulders Project Area. Approximately 48 mammal species have been recorded in QDS 3217DB and 3218CC within which the project area is located (ADU, 2018). Three mammal species were sited during the site visit in May 2019, namely, a herd of Springbok, approximately five Grey Rhebok individuals and a Steenbok skull. A Cape Rock Hyrax was by the Avifaunal specialist (Arcus, 2019).

The Western Cape has 24 threatened mammal species and 13 near threatened species (Birss, 2017). Four (4) vulnerable species and four (4) Near-Threatened species have a distribution which includes the project area (Table 3-4). Of these one was confirmed to occur onsite Grey Rhebok (*Pelea capreolus)* (NT) and the Spectacled Dormouse (NT) (*Graphiurus ocularis)* could occur in the rocky outcrop habitat. The remaining six species are unlikely to occur due to lack of habitat availability.

Table 3-4: Threatened Mammal Species with a distribution that includes the site

Common name	Species name	Conservation status (IUCN/CITES)
Leopard	*Panther pardus*	Vulnerable C1
Bontebok	*Damaliscus pygargus pygargus*	VU (B2ab(ii)+DI)
Grant's golden mole	*Eremitalpa granti*	VU (B1ab(iii) + B2ab(iii))
White-tailed rat	*Mystromys albicaudatus*	VU (C2a(i))
Grey Rhebok	*Pelea capreolus*	Near threatened A2b
Spectacled Dormouse	*Graphiurus ocularis*	Near threatened A2bc
Serval	*Leptailurus serval*	Near threatened B2ab(ii,iii,iv,v) + C2a(i)
African Clawless Otter	*Aonyx capensis*	Near threatened c2A(i)

Eight (8) mammal species are endemic to the Western Cape and ten (10) are near endemic. Two (2) endemic and four (4) near endemic mammal species have distribution ranges that

extent through the project site (Table 3-5), however, only the Cape Golden Mole (*Chrysochloris asiatica)* is expected to occur in the project area.

Table 3-5: Endemic and Near-endemics WC Mammals with a distribution that includes the site

Common name	Species name	Conservation status
Endemic to Western Cape		
Cape Spiny Mouse	*Acomys subspinosus*	Least Concern
Cape Dune Mole Rat	*Bathyergus suillus*	Least Concern
Near-endemic to Western Cape		
Cape Golden Mole	*Chrysochloris asiatica*	Least Concern
Grant's golden mole	*Eremitalpa granti granti*	Vulnerable
Cape Molerat	*Georychus capensis*	Least Concern
Verreaux's Mouse	*Myomyscus verreauxi*	Least Concern

4 SENSITIVITY

4.1 CRITICAL BIODIVERSITY AREAS

The Western Cape Biodiversity Spatial Plan (WCBSP) is a spatial tool used to identify biodiversity priority areas in the Western Cape and provide information and land use guidelines that should be used to aid in conserving biodiversity features of the Western Cape.

The 2017 WCBSP was assessed to determine whether the site falls within priority areas. It was determined that the powerlines cross areas designated as Critical Biodiversity Area 1 (CBA1), Ecological Support Area 1 (ESA1) and Ecological Support Area 2 (ESA2) (Figure 4-1).

CBA's are defined as "*areas of high biodiversity and ecological value and need to be kept in a natural or near-natural state, with no further loss of habitat or species*" (WCBSP Handbook, 2017). The provided map distinguishes between CBA 1 areas, which are those that are likely to be in a natural condition, and CBA 2 areas, which are areas that are potentially degraded or represent secondary vegetation. The ground truthing survey confirmed that the CBA areas are CBA 1 areas as they are mostly intact.

ESA's are *"Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs and are often vital for delivering ecosystem services. They support landscape connectivity, encompass the ecological infrastructure from which ecosystem goods and services flow, and strengthen resilience to climate change."* ESA's should be maintained in a functional and natural state although some habitat loss may be acceptable. As with the CBAs, a distinction is made between ESA 1 that are areas in a natural, near natural or moderately degraded condition and ESA 2 which are degraded and need to be restored. The groundtruthing survey confirmed that the majority of the ESA's are ESA 2 areas as they mostly degraded.

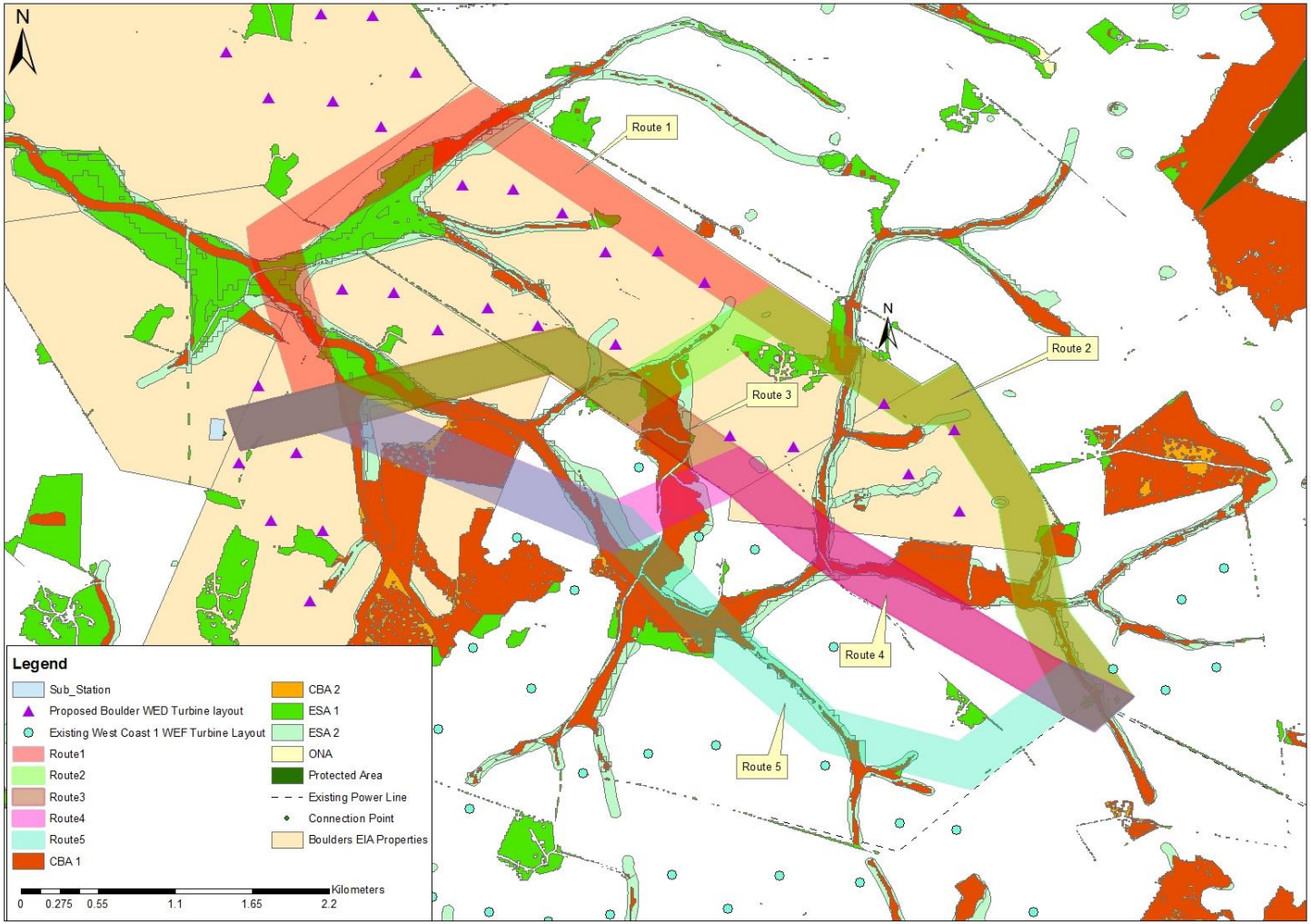


Figure 4-1: Map illustrating the Critical Biodiversity Areas and Ecological Support Areas within the study area.

4.2 SENSITIVITY ANALYSIS

The sensitivity map was developed using available spatial planning tools as well as by identifying areas of high, medium and low sensitivity based on the site survey (Figure 4-1).

Areas of **high sensitivity** include:

- Process areas such as rivers, wetlands and streams that are important for ecosystem functioning, including surface and ground water as well as animal and plant dispersal;
- Areas that have a high species richness;
- Areas that are not significantly impacted, transformed or degraded by current land use; and
- Areas that contain the majority of species of conservation concern found in the area and may contain high numbers of globally important species, or comprise part of a globally important vegetation type.

Areas of **medium sensitivity** include:

- Areas that still provide a valuable contribution to biodiversity and ecosystem functioning despite being degraded;
- Degraded areas that still have a relatively high species richness; and
- Degraded areas that still contain species of conservation concern.

Areas of **low sensitivity** include:

- Areas that are highly impacted by current land use and provide little value to the ecosystem; and
- Highly degraded areas that are unlikely to harbour any species of conservation concern.

4.3 SITE SENSITIVITY

The Saldanha Granite Strandveld patches are nearly intact and have a high species diversity. Given that 70% of this vegetation type is transformed and because it is listed as Endangered, it has been assigned a sensitivity of “Very High”. These areas should be considered no-go areas and infrastructure must not be placed in these areas.

Although degraded, the drainage lines within the site act as important ecological corridors that link areas of natural vegetation allowing for the movement of faunal species and dispersal of seeds.

The degraded Strandveld still has a relatively high species diversity and provides important refugia for the remaining fauna that occur within the site. This vegetation type has been assigned a moderate sensitivity.

The degraded croplands have been assigned a low sensitivity as these areas have been completely transformed.

Figure 4-1 illustrates the location of areas with a very high, high, moderate and low sensitivity.

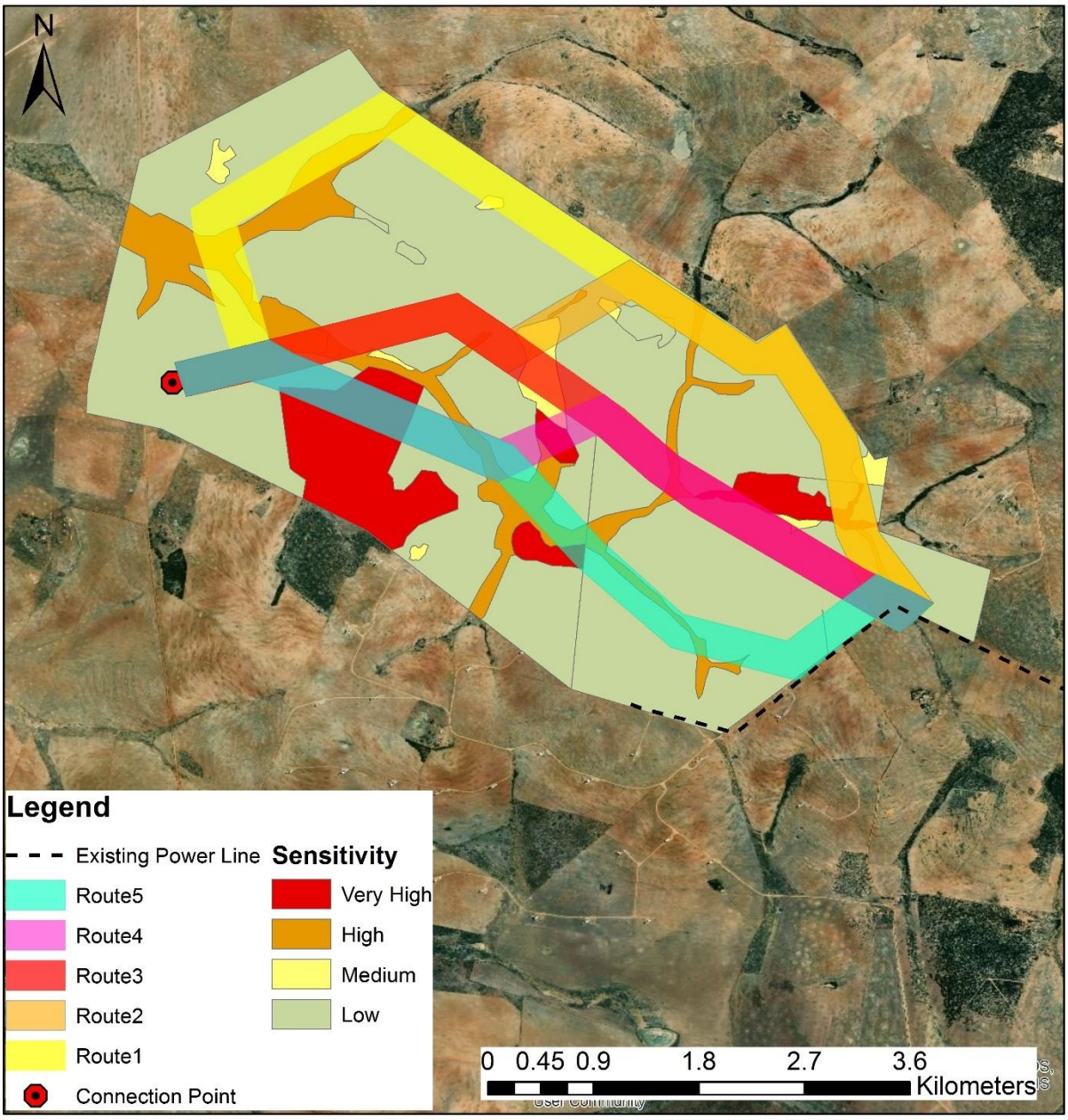


Figure 4-2: Sensitivity map showing areas of high, moderate and low sensitivity.

5 IMPACT IDENTIFICATION AND ASSESSMENT

The study that has been undertaken provides the necessary information to assess the impacts of the project on the ecology of the area at the appropriate spatial and temporal scales. The full impacts table has been included in Appendix E.

5.1 CONSTRUCTION PHASE

This phase assesses the impacts associated with the construction of the 132kv powerline that will link the proposed WEF to the national grid.

5.1.1 Impact 1: Loss of Vegetation Communities

There will be some loss of vegetation along the selected route alternative as a result of clearing for the powerline pylons. However, the impacts will differ for each route and vegetation type and consequently these have been assessed separately.

Cause and comment:

Impact 1a: Loss of Degraded Strandveld

Alternatives 1, and 2 might result in the small loss of this vegetation type in the north east portion of the site, the loss of which will be slight and localised, resulting in an impact of LOW NEGATIVE Significance.

Alternatives 3, 4 and 5 will result in a negligible loss of this vegetation type as these alternatives do not cross this vegetation type.

Impact 1b: Loss of Saldanha Granite Strandveld

Alternatives 1, 2 and 3 may have a very slight impact on small patches of Saldanha Granite Stranveld at a localised level. The overall impact of these lines on this vegetation type will be LOW NEGATIVE.

Alternatives 4 and 5 will traverse through a large patch of intact Saldanha Granite Strandveld which, given its conservation status, will have a severe impact at the scale of the study area. The overall impact of these two alternatives will be HIGH NEGATIVE. Mitigation measures are difficult to achieve for these two routes and the impact will therefore remain HIGH NEGATIVE even after mitigation measures have been implemented.

Impact 1c: Loss of Drainage line vegetation

Alternatives 1 and 5 will have a moderate impact on this vegetation type at a localised scale, as these powerlines will cross a number of drainage lines. The overall significance of this impact will be MODERATE NEGATIVE.

Alternatives 2, 3 and 4 will have a slight impact at a localised scale. The overall significance of this impact will be LOW NEGATIVE.

These impacts have been assessed with a high level of confidence.

Impact	Before Mitigation	After Mitigation
Impact 1a: Loss of Degraded Strandveld		
Alternative 1 and 2	LOW NEGATIVE	LOW NEGATIVE
Alternative 3, 4 and 5	NEGLIGIBLE	NEGLIGIBLE
Impact 1b: Loss of Saldanha Granite Strandveld		
Alternative 1, 2 and 3	LOW NEGATIVE	LOW NEGATIVE
Alternative 4 and 5	HIGH NEGATIVE	HIGH NEGATIVE
Impact 1c: Loss of Drainage Line Vegetation		
Alternative 1 and 5	MODERATE NEGATIVE	MODERATE NEGATIVE
Alternative 2, 3 and 4	LOW NEGATIVE	LOW NEGATIVE

Mitigation and Management:
Although the loss of vegetation will be permanent, the following recommendations during construction will mitigate further loss:

- For all alternatives, the monopoles must be located outside of the Saldanha Granite Strandveld patches to reduce the impact of the infrastructure on this vegetation type.
- Where feasible, all monopoles must be located outside of natural vegetation.
- Clearing must be kept to a minimum.
- Top soil (20 cm, where possible) must be collected and used elsewhere on the property and for the rehabilitation of lay down areas and construction footprints no longer required during the operational phase.
- Lay down areas must not be located in the Saldanha Granite Strandveld, Drainage Line vegetation or Degraded Strandveld.
- Employees must be prohibited from making fires.
- An alien management plan must be designed and implemented to prevent the spread of alien species.

5.1.2 Impact 2: Loss of Biodiversity

Cause and comment:
Clearing for the construction of the monopoles will result in the loss of biodiversity. The loss of biodiversity will vary for each alternative and these have therefore been assessed separately.

Alternatives 1, 2 and 3 will result in the least loss of biodiversity as these routes traverse mainly croplands and the monopoles can be positioned to avoid areas of indigenous vegetation.

Since alternatives 4 and 5 traverse the patch of intact Saldanha Granite Strandveld, the construction of the monopoles within this vegetation type will result in the direct loss of biodiversity and faunal habitat. This will also cause further fragmentation which will indirectly result in the further loss of biodiversity.

This impact has been assessed with a high level of confidence for each alternative.

Impact 2: Loss of Biodiversity (Fauna and Flora)		
	Before mitigation	**After mitigation**
Alternative 1, 2 and 3	LOW NEGATIVE	LOW NEGATIVE
Alternative 4 and 5	HIGH NEGATIVE	HIGH NEGATIVE

Mitigation Measures:

- Where feasible, pylons should be located outside of the remaining vegetation fragments, specifically the Saldanha Granite Strandveld.
- Alternatives 4 and 5 should be avoided;
- Prohibit all employees from harvesting plants;
- Prohibit open fires;
- An ECO must be employed to demarcate areas for use during construction, and to ensure that the construction activities remain within the designated area and that no unauthorised activities occur outside of the construction footprint.
- All clearing activities must deploy search and rescue teams in front of clearing machinery to assist in relocating slower moving faunal species e.g. tortoises out of the clearing path and relocating to No-Go zone.
- Speed restrictions for all project vehicles (40km/h is recommended) should be in place to reduce road kills of fauna killed on the project roads.
- Prevent employees from killing snakes through environmental training and awareness.
- Any trenches built must have slopes that allow fauna that fall in to escape and must be backfilled.
- Any contractor employed for development work must ensure that no faunal species are disturbed, trapped, hunted or killed by them and their team during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.

5.1.3 Impact 3: Loss of Species of Conservation Concern

Cause and comment:

Although no SCC were recorded during the site visit, the previous survey which took place during the flowering period, recorded five species of conservation concern. These species are highly likely to occur within the fragments of natural vegetation remaining on the site and probably went undetected due to the time of year this survey was conducted.

For reasons discussed above under impact 2, alternatives 1, 2 and 3 are unlikely to result in the loss of species of conservation concern given that these powerline options cross small fragments of indigenous vegetation and during the design phase, the monopoles can be positioned to avoid these areas. The significance of this impact on these routes is therefore LOW NEGATIVE.

Alternatives 4 and 5 cross through the Saldanha Granite Strandveld and it is probable that this will result in the permanent loss of some SCC within the study area. and as such the significance of the impact is likely to be HIGH NEGATIVE.

This impact has been assessed with a high level of confidence for each alternative.

Impact 3: Loss of Species of Conservation Concern (Flora and Fauna)		
	Before mitigation	**After mitigation**
Alternative 1, 2 and 3	LOW NEGATIVE	LOW NEGATIVE
Alternative 4 and 5	HIGH NEGATIVE	HIGH NEGATIVE

Mitigation Measures:

Impacts on these species can be avoided by ensuring the that project infrastructure does not occur within any areas of high and very high sensitivity.

Refer to mitigation measures listed under impact 2.

5.1.4 Impact 4: Habitat Fragmentation

Cause and comment:
Fragmentation is one of the most significant impacts on biodiversity as it creates breaks in previously continuous vegetation, causing a reduction in the gene pool and a decrease in species richness and diversity. This impact occurs when more and more areas are cleared for agriculture and development resulting in the isolation of functional ecosystems, which results in reduced biodiversity and reduced movement due to the absence of ecological corridors.

Edge effects may occur along the boundary of development and roads which may further compound the impacts associated with fragmentation and further reduce population numbers to below sustainable thresholds, potentially causing local extinctions.
The proposed development occurs within a highly fragmented system with remnant patches of vegetation scattered throughout the general area. However, although degraded, the drainage lines function as important ecological corridors linking these fragmented patches of vegetation ensuring that seed dispersal and faunal movement between areas is still possible. It is also important to note that although cultivation fields are no longer natural, they still permit and facilitate the movement of faunal and in some cases act as sources of food. The cultivated areas therefore still contribute towards the ecological function of the landscape.

The overall impact significance alternative of routes 1, 2 and 3 will be LOW NEGATIVE as these routes are located mostly through transformed areas. However, the impact associated with alternatives 4 and 5 will be HIGH NEGATIVE before and after mitigation.

This impact has been assessed with a high level of confidence for each alternative.

Impact 4: Habitat Fragmentation		
	Before mitigation	**After mitigation**
Alternative 1, 2 and 3	LOW NEGATIVE	LOW NEGATIVE
Alternative 4 and 5	HIGH NEGATIVE	HIGH NEGATIVE

Mitigation Measures:

- Connectivity between patches of natural vegetation must be maintained. Project infrastructure such as the monopoles must therefore not be located within any drainage lines.
- It is recommended that a buffer of 20m be placed around the drainage lines and infrastructure be placed outside of these areas.
- Project infrastructure should not cause further fragmentation within the remaining patches of vegetation. Infrastructure must therefore not be located in areas designated as having a very high sensitivity and must avoid areas of high and moderate sensitivity where feasible.

5.2 Operation Phase

5.2.1 Impact 5: Invasion of Alien Plant Species

Cause and comment:
The site is already infested with invasive alien species and other weedy species. Further disruption of the site could exacerbate the infestation of alien species unless these are controlled. Areas that are disturbed during the construction phase are vulnerable to infestations unless rehabilitated to prevent invasive alien plant species from becoming established.

The impact of alien invasive plants on areas traversed by alternatives 1, 2 and 3 will be moderately severe with an overall significance of MODERATE NEGATIVE before mitigation. However, mitigation measures are easily achievable and if implemented this can be reduced to a significance of LOW NEGATIVE.

The impact of alien invasive plants on areas traversed by alternative routes 4 and 5 will be severe and will have an overall significance of HIGH NEGATIVE before mitigation. However, mitigation is easily achievable for this impact and if measures are implemented correctly this can be reduced to MODERATE NEGATIVE.

This impact has been assessed with a high level of confidence for each alternative.

Impact 5: Invasion of Alien Plant Species		
	Before mitigation	**After mitigation**
Alternative 1, 2 and 3	MODERATE NEGATIVE	LOW NEGATIVE
Alternative 4 and 5	HIGH NEGATIVE	MODERATE NEGATIVE

Mitigation Measures:

- An invasive alien plant management plan must be designed and implemented to remove the alien species within the areas disturbed by construction activities. This plan must designate management units and prescribe the most effective method of removing the species.

5.3 CUMULATIVE IMPACTS

Cumulative impacts are defined as those "*that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impact identification process is conducted*." (IFC, 2012).

To assess the cumulative impacts the powerline will have on the animal and plant species it is necessary to identify developments that are similar in nature. The following projects and proposed developments have been identified:

- Boulders Wind Energy Facility
- West Coast 1 Wind Farm and associated infrastructure (powerlines, substation etc)

The *unmitigated* cumulative impacts associated with the powerline include the following:

- Loss of vegetation communities (through direct clearing) at a regional scale will be exacerbated;
- Loss of biodiversity and Species of Conservation Concern will be exacerbated to the point where local extinctions in the province could be expected;
- Invasion of alien plant species will be exacerbated.
- Habitat fragmentation will be exacerbated a regional scale.

6 IMPACT STATEMENT, CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSIONS AND RECOMMENDATIONS

This ecological study assessed the impacts associated with each of the 5 alternative powerline routes. A summary showing the number of impacts for each alternative has been included in Table 6-1 below.

Alternatives 1, 2 and 3 had no impacts of high significance since these routes traverse areas that are mostly transformed. Most of the impacts for these three routes are low.

Alternatives 4 and 5 traverse an intact area of Saldanha Granite Strandveld. Given that this vegetation type is listed as endangered and most of it has already been transformed, impacts within this vegetation type are typically of high and moderate significance and are difficult to mitigate.

Table 6-1: Summary of impacts for each powerline alternative pre- and post-mitigation

Alternative	No. of High Impacts		No. of Moderate Impacts		No. of Low Impacts	
	Pre	Post	Pre	Post	Pre	Post
Alternative 1	0	0	2	1	5	6
Alternative 2	0	0	1	0	6	7
Alternative 3	0	0	1	0	5	6
Alternative 4	5	4	0	1	1	1
Alternative 5	5	4	1	2	0	0

6.2 OPINION OF THE SPECIALIST

Alternative 1, 2 and 3 are acceptable from an ecological perspective. For these routes, it is recommended that where feasible the monopoles are positioned outside of the remaining natural vegetation and drainage lines in order to reduce the impact on these areas. These are the three preferred alternatives from an ecological perspective.

Alternatives 4 and 5 should be avoided and if they can't be avoided then should be realigned to avoid locating any infrastructure with the intact patch of Saldanha Granite Strandveld.

It is recommended that the following conditions are included as part of the Environmental Authorisation:

- An invasive alien species plan is implemented and monitored by the appointed ECO.
- No infrastructure or activities must not occur within the intact patch of Saldanha Granite Strandveld
- No powerline infrastructure must be located within drainage lines or within 20 metre buffers either side of the drainage line taken from the highest water level mark.

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APPENDIX A: PLANT SPECIES LIST

Family	***Scientific Name***	**Conservation Status**
Aizoaceae	*Lampranthus vernalis*	NT
Aizoaceae	*Mesembryanthemum canaliculatum*	
Apocynaceae	*Quaqua incarnata*	LC
Iridaceae	*Moraea calcicola*	EN
Scrophulariaceae	*Manulea rubra*	LC
Brassicaceae	*Heliophila sp.*	
Asteraceae	*Didelta carnosa*	LC
Iridaceae	*Romulea flava*	
Aizoaceae	*Ruschia sp.*	
Aizoaceae	*Apatesia helianthoides*	LC
Aizoaceae	*Lampranthus scaber*	EN
Boraginaceae	*Echiostachys spicatus*	EN
Apiaceae	*Capnophyllum africanum*	NT
Aizoaceae	*Tetragonia fruticosa*	LC
Poaceae	*Spartina maritima*	LC
Restionaceae	*Willdenowia incurvata*	LC
Hypoxidaceae	*Pauridia longituba*	EN
Proteaceae	*Serruria decipiens*	VU
Fabaceae	*Aspalathus ericifolia*	LC
Crassulaceae	*Crassula dejecta*	
Hyacinthaceae	*Lachenalia longibracteata*	
Crassulaceae	*Crassula thunbergiana*	
Plumbaginaceae	*Limonium acuminatum*	VU
Asteraceae	*Osteospermum grandiflorum*	LC
Aizoaceae	*Antimima sp.*	
Asteraceae	*Arctotheca calendula*	LC
Poaceae	*Polypogon monspeliensis*	NE
Asteraceae	*Rhynchopsidium pumilum*	LC
Anacardiaceae	*Searsia glauca*	
Poaceae	*Dactylis glomerata*	NE
Lamiaceae	*Stachys arvensis*	
Asteraceae	*Cotula pusilla*	VU
Primulaceae	*Anagallis arvensis*	
Asteraceae	*Dimorphotheca pluvialis*	LC
Iridaceae	*Babiana tubulosa*	NT
Aizoaceae	*Lampranthus stipulaceus*	LC
Rutaceae	*Diosma aspalathoides*	NT
Poaceae	*Pennisetum clandestinum*	NE
Fabaceae	*Aspalathus hispida*	
Restionaceae	*Thamnochortus spicigerus*	LC

Asteraceae	*Senecio maritimus*	LC
Ricciaceae	*Riccia purpurascens*	
Malvaceae	*Anisodontea sp.*	
Aizoaceae	*Conicosia sp.*	
Hyacinthaceae	*Ornithogalum rupestre*	LC
Asteraceae	*Dimorphotheca acutifolia*	LC
Asteraceae	*Poecilolepis ficoidea*	LC
Plantaginaceae	*Plantago lanceolata*	LC
Nyctaginaceae	*Mirabilis jalapa*	
Iridaceae	*Ferraria densepunctulata*	VU
Campanulaceae	*Wahlenbergia hispidula*	LC
Asteraceae	*Felicia elongata*	VU
Cytinaceae	*Cytinus sanguineus*	LC
Apiaceae	*Arctopus echinatus*	LC
Iridaceae	*Moraea filicaulis*	LC
Hyacinthaceae	*Lachenalia sp.*	
Geraniaceae	*Pelargonium chelidonium*	EN
Asparagaceae	*Asparagus kraussianus*	LC
Poaceae	*Hordeum geniculatum*	NE
Asteraceae	*Senecio littoreus*	LC
Asteraceae	*Senecio sarcoides*	LC
Asphodelaceae	*Trachyandra revoluta*	LC
Aizoaceae	*Mesembryanthemum pallens*	
Ebenaceae	*Diospyros austro-africana*	
Rhamnaceae	*Phylica cephalantha*	LC
Asteraceae	*Arctotis hirsuta*	LC
Aizoaceae	*Mesembryanthemum crystallinum*	LC
Aizoaceae	*Oscularia steenbergensis*	LC
Cyperaceae	*Bolboschoenus maritimus*	LC
Malvaceae	*Hermannia litoralis*	LC
Iridaceae	*Romulea tabularis*	LC
Asteraceae	*Cotula filifolia*	NT
Asteraceae	*Cotula eckloniana*	VU
Fabaceae	*Lessertia sp.*	
Zygophyllaceae	*Roepera pygmaea*	
Celastraceae	*Putterlickia pyracantha*	LC
Asteraceae	*Euryops linifolius*	LC
Poaceae	*Tribolium acutiflorum*	LC
Araliaceae	*Hydrocotyle sp.*	
Scrophulariaceae	*Phyllopodium heterophyllum*	LC
Apiaceae	*Arctopus dregei*	NT
Aizoaceae	*Oscularia vredenburgensis*	VU
Fabaceae	*Aspalathus spinosa*	LC
Proteaceae	*Serruria fucifolia*	EN

Aizoaceae	*Ruschia klipbergensis*	DD
Asteraceae	*Pseudognaphalium luteoalbum*	LC
Asteraceae	*Dimorphotheca sinuata*	LC
Molluginaceae	*Pharnaceum elongatum*	LC
Asteraceae	*Othonna arborescens*	LC
Juncaginaceae	*Triglochin buchenaui*	
Hyacinthaceae	*Lachenalia paucifolia*	
Onagraceae	*Oenothera rosea*	
Aizoaceae	*Mesembryanthemum articulatum*	
Asphodelaceae	*Bulbine praemorsa*	LC
Campanulaceae	*Wahlenbergia sp.*	
Fabaceae	*Podalyria sericea*	VU
Fabaceae	*Lotus corniculatus*	
Verbenaceae	*Verbena officinalis*	
Salicaceae	*Populus sp.*	
Asteraceae	*Arctotis acaulis*	LC
Plantaginaceae	*Veronica agrestis*	NE
Theophrastaceae	*Samolus porosus*	LC
Rubiaceae	*Nenax hirta*	NT
Geraniaceae	*Pelargonium lobatum*	LC
Poaceae	*Paspalum sp.*	
Oxalidaceae	*Oxalis hirta*	
Juncaginaceae	*Triglochin bulbosa*	
Fabaceae	*Otholobium bolusii*	NT
Amaranthaceae	*Sarcocornia perennis*	
Aizoaceae	*Galenia africana*	LC
Aizoaceae	*Drosanthemum floribundum*	LC
Proteaceae	*Leucadendron stellare*	CR
Asteraceae	*Leucanthemum vulgare*	
Asteraceae	*Eriocephalus racemosus*	LC
Iridaceae	*Moraea albiflora*	LC
Solanaceae	*Physalis peruviana*	
Proteaceae	*Leucospermum tomentosum*	VU
Aizoaceae	*Antimima aristulata*	VU
Fabaceae	*Wiborgia sp.*	
Iridaceae	*Gladiolus orchidiflorus*	LC
Asteraceae	*Helichrysum cochleariforme*	NT
Santalaceae	*Thesium sp.*	
Hyacinthaceae	*Ornithogalum juncifolium*	
Malvaceae	*Hermannia sp.*	
Hyacinthaceae	*Albuca sp.*	
Iridaceae	*Babiana ringens*	LC
Asteraceae	*Pteronia divaricata*	LC
Scrophulariaceae	*Nemesia affinis*	LC

Iridaceae	*Freesia viridis*	NT
Asteraceae	*Felicia filifolia*	LC
Valerianaceae	*Centranthus ruber*	
Amaranthaceae	*Halopeplis sp.*	
Zygophyllaceae	*Roepera flexuosa*	
Asteraceae	*Oedera uniflora*	LC
Oxalidaceae	*Oxalis multicaulis*	LC
Iridaceae	*Babiana ambigua*	LC
Juncaginaceae	*Triglochin sp.*	
Asteraceae	*Gnaphalium sp.*	
Orchidaceae	*Pterygodium catholicum*	LC
Amaryllidaceae	*Gethyllis afra*	LC
Poaceae	*Aira cupaniana*	NE
Orchidaceae	*Satyrium odorum*	LC
Molluginaceae	*Adenogramma teretifolia*	VU
Asteraceae	*Bolandia elongata*	LC
Melianthaceae	*Melianthus elongatus*	LC
Campanulaceae	*Wahlenbergia adpressa*	LC
Campanulaceae	*Wahlenbergia androsacea*	LC
Anacardiaceae	*Searsia undulata*	
Hyacinthaceae	*Lachenalia pusilla*	
Hypoxidaceae	*Empodium veratrifolium*	EN
Rubiaceae	*Galium tomentosum*	LC
Scrophulariaceae	*Zaluzianskya parviflora*	NT
Iridaceae	*Watsonia tabularis*	LC
Asphodelaceae	*Trachyandra scabra*	LC
Caryophyllaceae	*Silene ornata*	
Fabaceae	*Indigofera incana*	LC
Scrophulariaceae	*Oftia revoluta*	LC
Aizoaceae	*Ruschia tumidula*	LC
Asteraceae	*Helichrysum bachmannii*	VU
Asphodelaceae	*Trachyandra muricata*	LC
Plumbaginaceae	*Limonium peregrinum*	LC
Brassicaceae	*Barbarea verna*	
Asteraceae	*Gazania sp.*	
Fabaceae	*Otholobium sp.*	
Crassulaceae	*Crassula expansa*	
Scrophulariaceae	*Pseudoselago spuria*	LC
Fabaceae	*Calobota lotononoides*	NT
Aizoaceae	*Mesembryanthemum junceum*	
Poaceae	*Ehrharta calycina*	LC
Apiaceae	*Dasispermum suffruticosum*	LC
Aizoaceae	*Disphyma crassifolium*	LC
Poaceae	*Tribolium echinatum*	LC

Cytinaceae	*Cytinus capensis*	CR
Hypoxidaceae	*Pauridia serrata*	LC
Fabaceae	*Aspalathus spinescens*	LC
Hyacinthaceae	*Eucomis regia*	
Asteraceae	*Steirodiscus tagetes*	VU
Asteraceae	*Oedera genistifolia*	LC
Proteaceae	*Leucadendron foedum*	VU
Asteraceae	*Athanasia sp.*	
Hyacinthaceae	*Albuca suaveolens*	
Asteraceae	*Chrysocoma longifolia*	LC
Iridaceae	*Ixia purpureorosea*	VU
Scrophulariaceae	*Chaenostoma uncinatum*	LC
Fabaceae	*Lotononis involucrata*	LC
Asteraceae	*Cotula vulgaris*	LC
Asteraceae	*Cotula coronopifolia*	LC
Plumbaginaceae	*Limonium depauperatum*	EN
Anacardiaceae	*Searsia incisa*	
Asparagaceae	*Asparagus fasciculatus*	LC
Haemodoraceae	*Wachendorfia multiflora*	LC
Iridaceae	*Moraea saldanhensis*	CR
Poaceae	*Cladoraphis cyperoides*	LC
Iridaceae	*Ferraria foliosa*	NT
Poaceae	*Stipagrostis zeyheri*	LC
Limeaceae	*Limeum africanum*	LC
Poaceae	*Phalaris minor*	NE
Fabaceae	*Rafnia angulata*	LC
Aizoaceae	*Drosanthemum intermedium*	LC
Fabaceae	*Aspalathus sp.*	
Poaceae	*Bromus diandrus*	NE
Aizoaceae	*Drosanthemum sp.*	
Aizoaceae	*Tetragonia rosea*	LC
Iridaceae	*Gladiolus alatus*	LC
Scrophulariaceae	*Selago scabribractea*	LC
Scrophulariaceae	*Selago inaequifolia*	EN
Ericaceae	*Erica flacca*	LC
Rutaceae	*Agathosma bisulca*	LC
Asparagaceae	*Asparagus declinatus*	LC
Aizoaceae	*Carpobrotus acinaciformis*	LC
Fabaceae	*Calobota cytisoides*	LC
Aizoaceae	*Amphibolia rupis-arcuatae*	
Amaranthaceae	*Salsola sp.*	
Brassicaceae	*Heliophila macowaniana*	LC
Aizoaceae	*Ruschia tribracteata*	DD
Aizoaceae	*Amphibolia laevis*	

Asteraceae	*Amellus tenuifolius*	LC
Hyacinthaceae	*Lachenalia mutabilis*	
Crassulaceae	*Crassula expansa*	
Iridaceae	*Babiana nana*	EN
Asteraceae	*Helichrysum tricostatum*	NT
Amaranthaceae	*Sarcocornia perennis*	LC
Plumbaginaceae	*Limonium kraussianum*	LC
Salicaceae	*Salix mucronata*	LC
Asteraceae	*Arctotis sp.*	
Amaranthaceae	*Sarcocornia mossiana*	LC
Lamiaceae	*Salvia africana*	
Gentianaceae	*Orphium frutescens*	LC
Poaceae	*Lolium rigidum*	NE
Colchicaceae	*Colchicum capense*	
Scrophulariaceae	*Selago glabrata*	LC
Asteraceae	*Senecio arenarius*	LC
Apiaceae	*Annesorhiza grandiflora*	LC
Fabaceae	*Melolobium candicans*	LC
Scrophulariaceae	*Hebenstretia dentata*	LC
Aizoaceae	*Cheiridopsis rostrata*	VU
Santalaceae	*Thesium elatius*	LC
Poaceae	*Parapholis incurva*	NE
Iridaceae	*Romulea elliptica*	EN
Thymelaeaceae	*Passerina corymbosa*	LC
Amaranthaceae	*Chenolea diffusa*	
Scrophulariaceae	*Hebenstretia parviflora*	LC
Brassicaceae	*Raphanus raphanistrum*	
Asteraceae	*Leysera gnaphalodes*	LC
Anacardiaceae	*Searsia dissecta*	
Oxalidaceae	*Oxalis burtoniae*	VU
Fabaceae	*Calobota angustifolia*	LC
Asparagaceae	*Asparagus rubicundus*	LC
Santalaceae	*Thesium patulum*	LC
Iridaceae	*Romulea barkerae*	EN
Asteraceae	*Arctotheca populifolia*	LC
Proteaceae	*Leucadendron thymifolium*	CR
Orchidaceae	*Pterygodium orobanchoides*	LC
Iridaceae	*Moraea macrocarpa*	LC
Fabaceae	*Melolobium aethiopicum*	LC
Scrophulariaceae	*Hebenstretia repens*	LC
Asteraceae	*Cotula sp.*	
Poaceae	*Bromus pectinatus*	LC
Aizoaceae	*Mesembryanthemum pallens*	
Asteraceae	*Cotula bipinnata*	LC

Asteraceae	*Amellus asteroides*	LC
Juncaginaceae	*Triglochin striata*	
Aizoaceae	*Apatesia pillansii*	LC
Hypoxidaceae	*Pauridia minuta*	NT
Rutaceae	*Diosma guthriei*	NT
Fabaceae	*Melilotus indicus*	NE
Asteraceae	*Ifloga verticillata*	LC
Scrophulariaceae	*Diascia collina*	VU
Aizoaceae	*Ruschia langebaanensis*	VU
Asteraceae	*Felicia tenella*	LC
Fabaceae	*Lessertia meyeri*	LC
Aizoaceae	*Ruschia curta*	DD
Fabaceae	*Lessertia herbacea*	LC
Polygalaceae	*Muraltia macropetala*	VU
Colchicaceae	*Colchicum capense*	
Poaceae	*Chaetobromus involucratus*	LC
Scrophulariaceae	*Manulea corymbosa*	VU
Aizoaceae	*Ruschia fugitans*	DD
Hyacinthaceae	*Lachenalia orchioides*	
Amaranthaceae	*Salicornia sp.*	
Ericaceae	*Erica plumosa*	LC
Aizoaceae	*Drosanthemum marinum*	NT
Asteraceae	*Metalasia densa*	LC
Aizoaceae	*Mesembryanthemum pallens*	
Scrophulariaceae	*Phyllopodium phyllopodioides*	LC
Rutaceae	*Macrostylis squarrosa*	LC
Fabaceae	*Aspalathus lotoides*	VU
Crassulaceae	*Crassula glomerata*	LC
Apiaceae	*Torilis arvensis*	
Asteraceae	*Didelta carnosa*	LC
Amaranthaceae	*Salicornia meyeriana*	LC
Juncaceae	*Juncus effusus*	LC
Asteraceae	*Felicia dregei*	LC
Fumariaceae	*Cysticapnos vesicaria*	LC
Rhamnaceae	*Phylica stenopetala*	
Iridaceae	*Lapeirousia anceps*	LC
Campanulaceae	*Prismatocarpus pedunculatus*	LC
Cyperaceae	*Isolepis levynsiana*	LC
Poaceae	*Paspalum urvillei*	NE
Scrophulariaceae	*Zaluzianskya villosa*	LC
Poaceae	*Sphenopus divaricatus*	NE
Caryophyllaceae	*Silene dewinteri*	
Iridaceae	*Babiana tubiflora*	LC
Iridaceae	*Geissorhiza monanthos*	EN

Asphodelaceae	*Aloe framesii*	NT
Hyacinthaceae	*Ornithogalum maculatum*	
Boraginaceae	*Myosotis discolor*	
Fabaceae	*Indigofera venusta*	LC
Hypoxidaceae	*Pauridia alba*	VU
Aizoaceae	*Ruschia pungens*	DD
Malvaceae	*Anisodontea biflora*	VU
Aizoaceae	*Jordaaniella dubia*	LC
Plumbaginaceae	*Limonium sp.*	
Poaceae	*Poa annua*	NE
Fabaceae	*Lessertia frutescens*	LC
Caryophyllaceae	*Silene rigens*	NT
Iridaceae	*Gladiolus jonquilliodorus*	EN
Aizoaceae	*Carpobrotus edulis*	
Ranunculaceae	*Ranunculus multifidus*	LC
Caryophyllaceae	*Spergularia media*	
Apocynaceae	*Orbea variegata*	LC
Poaceae	*Lophochloa pumila*	NE
Aizoaceae	*Aizoon rigidum*	LC
Asteraceae	*Berkheya heterophylla*	
Malvaceae	*Hermannia pinnata*	LC
Iridaceae	*Ixia calendulacea*	LC
Aizoaceae	*Lampranthus variabilis*	DD
Aizoaceae	*Lampranthus amoenus*	EN
Amaryllidaceae	*Gethyllis lanuginosa*	LC
Fabaceae	*Rhynchosia ferulifolia*	LC
Aizoaceae	*Tetragonia chenopodioides*	LC
Iridaceae	*Romulea rosea*	
Haemodoraceae	*Wachendorfia paniculata*	LC
Rutaceae	*Agathosma sp.*	
Iridaceae	*Ferraria parva*	EN
Poaceae	*Holcus lanatus*	NE
Poaceae	*Phalaris aquatica*	NE
Malvaceae	*Hermannia scordifolia*	LC
Geraniaceae	*Pelargonium hirtum*	LC
Apiaceae	*Cynorhiza typica*	LC
Scrophulariaceae	*Nemesia bicornis*	LC
Asparagaceae	*Asparagus exuvialis*	NE
Poaceae	*Lolium perenne*	NE
Asparagaceae	*Asparagus lignosus*	LC
Scrophulariaceae	*Diascia diffusa*	LC
Orthotrichaceae	*Orthotrichum diaphanum*	
Fabaceae	*Podalyria sp.*	
Scrophulariaceae	*Oftia africana*	LC

Apiaceae	*Cynorhiza meifolia*	DD
Aizoaceae	*Carpobrotus quadrifidus*	LC
Fabaceae	*Wiborgia leptoptera*	LC
Poaceae	*Puccinellia angusta*	LC
Molluginaceae	*Pharnaceum aurantium*	LC
Pteridaceae	*Cheilanthes multifida*	LC
Fabaceae	*Aspalathus albens*	LC
Polygalaceae	*Muraltia scoparia*	LC
Polygonaceae	*Polygonum maritimum*	
Asteraceae	*Pteronia onobromoides*	LC
Gentianaceae	*Sebaea aurea*	LC
Fabaceae	*Acacia mearnsii*	NE
Polygalaceae	*Polygala myrtifolia*	LC
Fabaceae	*Indigofera psoraloides*	EN
Iridaceae	*Gladiolus floribundus*	LC
Asphodelaceae	*Bulbine minima*	LC
Poaceae	*Stipa capensis*	LC
Fabaceae	*Lotononis sabulosa*	LC
Poaceae	*Capeochloa arundinacea*	LC
Commelinaceae	*Tradescantia fluminensis*	
Aizoaceae	*Conicosia pugioniformis*	LC
Iridaceae	*Gladiolus gracilis*	LC
Fabaceae	*Crotalaria excisa*	LC
Asparagaceae	*Asparagus undulatus*	LC
Malvaceae	*Hermannia heterophylla*	LC
Rutaceae	*Macrostylis crassifolia*	VU
Iridaceae	*Hesperantha erecta*	NT
Hyacinthaceae	*Daubenya zeyheri*	VU
Scrophulariaceae	*Phyllopodium capillare*	NT
Hypoxidaceae	*Pauridia linearis*	VU
Asphodelaceae	*Asphodelus fistulosus*	
Iridaceae	*Babiana angustifolia*	NT
Rutaceae	*Diosma hirsuta*	LC
Rutaceae	*Diosma pedicellata*	NT
Iridaceae	*Babiana sp.*	
Aizoaceae	*Ruschia subpaniculata*	LC
Lamiaceae	*Salvia lanceolata*	LC
Fabaceae	*Lessertia rigida*	LC
Proteaceae	*Leucadendron cinereum*	VU
Iridaceae	*Babiana mucronata*	LC
Agavaceae	*Chlorophytum comosum*	
Asteraceae	*Foveolina tenella*	LC
Aizoaceae	*Aizoon paniculatum*	LC
Scrophulariaceae	*Jamesbrittenia atropurpurea*	LC

Iridaceae	*Hesperantha saldanhae*	CR
Poaceae	*Pentameris barbata*	LC
Fabaceae	*Wiborgia obcordata*	LC
Aizoaceae	*Tetragonia spicata*	LC
Cyperaceae	*Carex sp.*	
Juncaceae	*Juncus tenuis*	
Poaceae	*Ehrharta brevifolia*	LC
Scrophulariaceae	*Manulea thyrsiflora*	LC
Asphodelaceae	*Trachyandra ciliata*	LC
Zygophyllaceae	*Roepera morgsana*	
Crassulaceae	*Crassula decumbens*	
Brassicaceae	*Heliophila refracta*	LC
Polygalaceae	*Muraltia sp.*	
Lobeliaceae	*Lobelia setacea*	LC
Euphorbiaceae	*Euphorbia peplus*	NE
Ericaceae	*Erica inaequalis*	LC
Poaceae	*Agrostis sp.*	
Zygophyllaceae	*Roepera spinosa*	
Poaceae	*Bromus catharticus*	NE
Thymelaeaceae	*Struthiola fasciata*	LC
Asteraceae	*Helichrysum litorale*	LC
Fabaceae	*Vicia benghalensis*	NE
Asphodelaceae	*Kniphofia uvaria*	LC
Caryophyllaceae	*Sagina procumbens*	
Geraniaceae	*Pelargonium carnosum*	LC
Bruniaceae	*Staavia radiata*	LC
Asteraceae	*Senecio littoreus*	LC
Aizoaceae	*Cephalophyllum rostellum*	EN
Asteraceae	*Osteospermum incanum*	LC
Rhamnaceae	*Phylica greyii*	
Campanulaceae	*Wahlenbergia obovata*	LC
Aizoaceae	*Mesembryanthemum nodiflorum*	LC
Iridaceae	*Lapeirousia jacquinii*	LC
Amaranthaceae	*Dysphania ambrosioides*	
Malvaceae	*Hermannia trifurca*	LC
Fabaceae	*Aspalathus hispida*	LC
Hyacinthaceae	*Lachenalia pallida*	
Fabaceae	*Rafnia capensis*	LC
Asteraceae	*Gymnodiscus capillaris*	LC
Plumbaginaceae	*Limonium capense*	NT
Malvaceae	*Hermannia prismatocarpa*	LC
Malvaceae	*Hermannia procumbens*	EN
Amaranthaceae	*Atriplex cinerea*	NE
Amaranthaceae	*Sarcocornia sp.*	

Oxalidaceae	*Oxalis hirsuta*	DD
Poaceae	*Pentameris airoides*	LC
Asteraceae	*Felicia hyssopifolia*	
Fabaceae	*Aspalathus ternata*	NT
Asteraceae	*Arctotis laciniata*	
Aizoaceae	*Galenia crystallina*	
Iridaceae	*Gladiolus caeruleus*	NT
Iridaceae	*Romulea saldanhensis*	EN
Convolvulaceae	*Cuscuta nitida*	LC
Oxalidaceae	*Oxalis suavis*	VU
Polygalaceae	*Muraltia dumosa*	LC
Asteraceae	*Berkheya rigida*	LC
Asteraceae	*Helichrysum revolutum*	LC
Apiaceae	*Capnophyllum leiocarpon*	LC
Asteraceae	*Felicia merxmuelleri*	LC
Polygalaceae	*Muraltia spinosa*	LC
Poaceae	*Schismus barbatus*	LC
Scrophulariaceae	*Nemesia ligulata*	LC
Iridaceae	*Hesperantha radiata*	LC
Neuradaceae	*Grielum humifusum*	LC
Aizoaceae	*Conicosia pugioniformis*	
Scrophulariaceae	*Manulea augei*	EN
Asteraceae	*Oncosiphon suffruticosus*	LC
Poaceae	*Sporobolus virginicus*	LC
Asteraceae	*Cotula duckittiae*	VU
Aizoaceae	*Mesembryanthemum gariusanum*	LC
Fabaceae	*Vicia eriocarpa*	
Poaceae	*Briza maxima*	NE
Poaceae	*Avena fatua*	NE
Fabaceae	*Argyrolobium sp.*	
Fabaceae	*Lessertia falciformis*	LC
Poaceae	*Vulpia bromoides*	NE
Aizoaceae	*Cephalophyllum sp.*	
Asteraceae	*Senecio rosmarinifolius*	LC
Asphodelaceae	*Bulbine sedifolia*	LC
Scrophulariaceae	*Diascia capensis*	LC
Cyperaceae	*Schoenoplectus corymbosus*	LC
Myrtaceae	*Leptospermum laevigatum*	
Rutaceae	*Diosma acmaeophylla*	LC
Plumbaginaceae	*Limonium purpuratum*	EN
Scrophulariaceae	*Hebenstretia cordata*	LC
Iridaceae	*Freesia viridis*	
Amaryllidaceae	*Hessea mathewsii*	CR
Thymelaeaceae	*Passerina filiformis*	NT

Asteraceae	*Ursinia anthemoides*	LC
Thymelaeaceae	*Struthiola leptantha*	LC
Asteraceae	*Helichrysum rosum*	LC
Iridaceae	*Geissorhiza lewisiae*	VU
Fabaceae	*Wiborgia fusca*	EN
Pteridaceae	*Cheilanthes hastata*	LC
Hyacinthaceae	*Lachenalia mathewsii*	
Aizoaceae	*Mesembryanthemum dinteri*	
Aizoaceae	*Drosanthemum calycinum*	NT
Amaranthaceae	*Sarcocornia pillansii*	LC
Rutaceae	*Diosma haelkraalensis*	EN
Cucurbitaceae	*Kedrostis psammophylla*	LC
Fabaceae	*Indigofera procumbens*	LC
Iridaceae	*Chasmanthe aethiopica*	LC

APPENDIX B: MAMMAL SPECIES LIST

	Scientific Name	Common Name	Threatened status (IUCN)	3217 DB 3218 CC	Confirmed on and near site	iNaturalist
	Artiodactyla					
1	Alcelaphus buselaphus	Hartebeest	LC			
2	Antidorcas marsupialis	Springbok	LC	1	1	1
3	Cephalophus natalensis	Red Duiker	LC	1		
4	Damaliscus pygargus pygargus	Bontebok	VU (B2ab(ii)+DI)	1		
5	Oreotragus oreotragus	Klipspringer	LC			
6	Raphicerus campestris	Steenbok	LC	1		1
7	Raphicerus melanotis	Cape Grysbok	LC	1		
8	Sylvicapra grimmia	Bush Duiker	LC	1		
9	Tragelaphus oryx	Common Eland	LC	1		
10	Pelea capreolus	Grey Rhebok	NT (A2b)		1	
	PRIMATES					
11	Papio ursinus	Chacma Baboon	LC			
	Carnivores					

12	Aonyx capensis	African Clawless Otter	NT (C2a(i))	1		
13	Atilax paludinosus	Marsh Mongoose	LC	1		
14	Canis mesomelas	Black-backed jackal	LC			
15	Caracal caracal	Caracal	LC			
16	Cynictis penicillata	Yellow Mongoose	LC	1		
17	Felis silvestris	Wildcat	LC	1		
18	Genetta genetta	Common Genet	LC	1		
19	Genetta tigrina	Cape Genet (Cape Large-spotted Genet)	LC	1		
20	Herpestes ichneumon	Egyptian Mongoose	LC	1		
21	Herpestes pulverulentus	Cape Gray Mongoose	LC	1		1
22	Ictonyx striatus	Striped Polecat	LC	1		
23	Leptailurus serval	Serval	NT (B2ab(ii,iii,iv,v)+C2a(i))			
24	Mellivora capensis	Honey Badger	LC	1		
25	Otocyon megalotis	Bat-eared Fox	LC	1		
26	Panthera pardus	Leopard	VU			
27	Proteles cristata	Striped Hyena	LC			
28	Suricata suricatta	Meerkat	LC			
29	Vulpes chama	Cape Fox	LC	1		
	Lagomorpha					
30	Lepus capensis	Cape Hare	LC	1		
31	Lepus saxatilis	Scrub Hare	LC			1
	Rodentia					
32	Acomys subspinosus	Cape Spiny Mouse	LC			
33	Bathyergus suillus	Cape Dune Mole-rat	LC	1		
34	Chrysochloris asiatica	Cape golden mole	LC	1		

35	Crocidura cyanea	Reddish-gray Musk Shrew	LC	1		
36	Crocidura flavescens	Greater Red Musk Shrew	LC	1		
37	Cryptomys hottentotus	Southern African Mole-rat	LC	1		
38	Dendromus melanotis	Gray African Climbing Mouse	LC			
39	Dendromus mesomelas	Brants's climbing mouse	LC			
40	Desmodillus auricularis	Cape short-eared gerbil	LC	1		
41	Eremitalpa granti	Grant's golden mole	VU (B1ab(iii) + B2ab(iii))	1		
42	Georychus capensis	Cape Mole-rat	LC	1		
43	Gerbilliscus afra	Cape Gerbil	LC	1		
44	Gerbilliscus vallinus	Brush-tailed Hairy-footed Gerbil	LC	1		
45	Gerbillurus paeba	Paeba Hairy-footed gerbil	LC	1		
46	Graphiurus ocularis	Spectacled dormouse	NT A2bc			
47	Hystrix africaeaustralis	Cape Porcupine	LC	1		
48	Malacothrix typica	Gerbil mouse	LC			
49	Micaelamys granti	Grant's rock mouse	LC	1		
50	Micaelamys namaquensis	Namaqua rock rat	LC	1		
51	Mus minutoides	Southern African Pygmy Mouse	LC			
52	Mus musculus	House mouse	LC			
53	Myomyscus verreauxii	Verreaux's Mouse	LC	1		
54	Myosorex varius	Forest Shrew	LC	1		
55	Mystromys albicaudatus	White-tailed rat	VU (C2a(i))			
56	Otomys irroratus	Southern African Vlei Rat	LC	1		
57	Otomys karoensis	Saunder's vlei rat	LC			
58	Otomys unisulcatus	Bush vlei rat	LC	1		1
59	Parotomys brantsii	Brants's whistling rat	LC	1		

60	Rattus rattus	Roof Rat	LC	1		
61	Rhabdomys pumilio	Xeric Four-striped Grass Rat	LC	1		1
62	Steatomys krebsii	Kreb's African Fat Mouse	LC			
63	Suncus varilla	Lesser dwarf shrew	LC	1		
	Tubulidentata					
64	Orycteropus afer	Aardvark	LC			
	Hyracoidea					
65	Procavia capensis	Cape Rock Hyrax	LC	1		
	Chiroptera					
66	Cistugo lesueuri	Lesueur's hairy bat	LC			
67	Eptesicus hottentotus	Long-tailed house bat	LC	1		
68	Miniopterus natalensis	Natal Long-fingered Bat	LC	1		
69	Myotis tricolor	Temminck's Myotis	LC			
70	Neoromicia capensis	Cape Serotine	LC	1		
71	Nycteris thebaica	Egyptian Slit-faced Bat	LC	1		
72	Rhinolophus capensis	Cape Horseshoe Bat	LC			
73	Rhinolophus clivosus	Geoffroy's horseshoe bat	LC			
74	Tadarida aegyptiaca	Egyptian Free-tailed Bat	LC	1		
				48	**2**	**6**

APPENDIX C: AMPHIBIAN SPECIES LIST

	Scientific Name	Common Name	Threatened status (IUCN)	3217DB 3218CC	Endemic
	BUFONIDAE				
1	*Vandijkophrynus angusticeps*	Cape Sand Toad	**LC**	1	1
	BREVICIPITIDAE				
2	*Breviceps namaquensis*	Namaqua rain frog	**LC**	1	
3	*Breviceps rosei*	Sand Rain Frog	**LC**	1	1

	PIPIDAE				
4	*Xenopus laevis*	Common Platanna	**LC**		
	PYXICEPHALIDAE				
5	*Amietia delalandii*	Delalande's River Frog	**LC**		
6	*Amietia fuscigula*	Cape River Frog	**LC**		
7	*Amietia poyntoni*	Poynton's River Frog	**LC**		
8	*Cacosternum capense*	Cape Dainty Frog	**NT**	1	1
9	*Strongylopus grayii*	Clicking Stream Frog	**LC**	1	
10	*Tomopterna delalandii*	Cape Sand Frog	**LC**	1	
				6	**3**

APPENDIX D: REPTILES SPECIES LIST

	Scientific Name	Common name	Threatened status (IUCN)	3217DB 3218CC	iNaturalist	Endemic
	PSAMMOPHIIDAE					
1	Psammophis crucifer	Cross-marked Grass Snake	LC			
	LEPTOTYPHLOPIDAE					
2	Leptotyphlops nigricans	Black Thread Snake	LC			
	LAMPROPHIIDAE					
3	Psammophis notostictus	Karoo Sand Snake	LC	1		
4	Psammophis leightoni	Cape Sand Snake	LC	1		
5	Homoroselaps lacteus	Spotted Harlequin Snake	LC	1		
6	Lamprophis aurora	Aurora House Snake	LC			
7	Lamprophis guttatus	Spotted House Snake	LC			
8	Psammophylax rhombeatus	Spotted Grass Snake	LC	1		
9	Pseudaspis cana	Mole Snake	LC	1		
	COLUBRIDAE					
10	Dasypeltis scabra	Rhombic Egg-eater	LC	1		
11	Dispholidus typus typus	Boomslang		1		
	ELAPIDAE					
12	Naja nivea	Cape Cobra		1	1	
	PROSYMNIDAE					

13	Prosymna sundevallii	Sundevall's Shovel-snout	LC			
	LACERTIDAE					
14	Meroles knoxii	Knox's Desert Lizard	LC	1		
15	Pedioplanis lineoocellata pulchella	Common Sand Lizard		1		
	AGAMIDAE					
16	Agama hispida	Spiny Ground Agama	LC	1	1	
17	Agama atra	Southern Rock Agama	LC			
	CORDYLIDAE					
18	Karusasaurus polyzonus	Karoo Girdled Lizard	LC	1		
19	Cordylus cordylus	Cape Girdled Lizard	LC	1		
	SCINCIDAE					
20	Scelotes gronovii	Gronovi's dwarf burrowing skink	NT	1		Endemic
21	Acontias grayi	Gray's Dwarf Legless Skink		1		
22	Acontias meleagris	Cape Legless Skink	LC	1		
23	Scelotes kasneri	Kasner's dwarf burrowing skink	NT	1		Endemic
24	Scelotes sexlineatus	Striped Dwarf Burrowing Skink	LC			
25	Trachylepis capensis	Cape Skink		1		
26	Trachylepis homalocephala	Red-sided Skink	LC			
27	Trachylepis variegata	Variegated Skink		1		
28	Typhlosaurus caecus	Cuvier's Blind Legless Skink	LC	1		
	GERRHOSAURIDAE					
29	Tetradactylus seps	Short legged seps	LC			
	GEKKONIDAE					
30	Pachydactylus geitje	Ocellated Gecko	LC	1		
31	Pachydactylus austeni	Austen Thick-toed Gecko	LC			
32	Chondrodactylus angulifer	Giant Ground gecko	LC			
33	Afrogecko porphyreus	Marbled Leaf-toed Gecko	LC	1		

34	Goggia incognita	Southern Striped Pygmy Gecko	LC	1	1	
35	Goggia lineata	Northern Striped Pygmy Gecko	LC	1		
	CHAMAELEONIDAE					
36	Bradypodion occidentale	Namaqua dwarf chameleon	LC			
37	Bradypodion occidentale	Western Dwarf Chameleon	LC	1		
38	Bradypodion pumilum	Cape Dwarf Chameleon	VU	1		Endemic
	Testudinidae					
39	Chersina angulata	Angulate Tortoise	LC	1	1	
40	Homopus areolatus	Parrot-beaked Tortoise	LC	1		
41	Stigmochelys pardalis	Leopard Tortoise	LC	1		
				29	**4**	**3**

APPENDIX E: IMPACTS TABLE

	Nature	Temporal Scale	Spatial Scale	Severity	Probability	Overall Significance before mitigation	Reversibility	Irreplaceable Loss	Mitigation Potential	Overall Significance after mitigation
Impact 1a: Loss of Degraded Strandveld										
Alternative 1	Negative	Permanent	Localised	Slight/ Slightly Beneficial	Probable	LOW NEGATIVE	Irreversible	Resource will be lost	Achievable	LOW
Alternative 2	Negative	Permanent	Localised	Slight/ Slightly Beneficial	Probable	LOW NEGATIVE	Irreversible	Resource will be lost	Achievable	LOW NEGATIVE
Alternative 3	Negative	Permanent	Localised	Slight/ Slightly Beneficial	Probable	LOW NEGATIVE	Irreversible	Resource will be lost	Achievable	LOW NEGATIVE
Alternative 4	Negligible. This route will have a no impact on this vegetation type.					NEGLIGIBLE				NEGLIGIBLE
Alternative 5	Negligible. This route will have a no impact on this vegetation type.					NEGLIGIBLE				NEGLIGIBLE
Impact 1b: Loss of Saldanha Granite Strandveld										
Alternative 1	Negative	Permanent	Localised	Slight/ Slightly Beneficial	Probable	LOW NEGATIVE	Irreversible	Resource will be partly lost	Achievable	LOW NEGATIVE
Alternative 2	Negative	Permanent	Localised	Slight/ Slightly Beneficial	Probable	LOW NEGATIVE	Irreversible	Resource will be partly lost	Achievable	LOW NEGATIVE
Alternative 3	Negative	Permanent	Localised	Slight/ Slightly Beneficial	Probable	LOW NEGATIVE	Irreversible	Resource will be partly lost	Easily achievable	LOW NEGATIVE
Alternative 4	Negative	Permanent	Study area	Severe/ Beneficial	Definite	HIGH NEGATIVE	Irreversible	Resource will be partly lost	Difficult	HIGH NEGATIVE
Alternative 5	Negative	Permanent	Study area	Severe/ Beneficial	Definite	HIGH NEGATIVE	Irreversible	Resource will be partly lost	Difficult	HIGH NEGATIVE
Impact 1c: Loss of Drainage Line Vegetation										
Alternative 1	Negative	Permanent	Localised	Moderate / Moderately Beneficial	Probable	MODERATE NEGATIVE	Irreversible	Resource will be lost	Achievable	MODERATE NEGATIVE
Alternative 2	Negative	Permanent	Localised	Slight/ Slightly Beneficial	Probable	LOW NEGATIVE	Irreversible	Resource will be partly lost	Easily achievable	LOW NEGATIVE
Alternative 3	Negative	Permanent	Localised	Slight/ Slightly Beneficial	Probable	LOW NEGATIVE	Irreversible	Resource will be partly lost	Easily achievable	LOW NEGATIVE
Alternative 4	Negative	Permanent	Localised	Slight/ Slightly Beneficial	Probable	LOW NEGATIVE	Irreversible	Resource will be partly lost	Easily achievable	LOW NEGATIVE
Alternative 5	Negative	Permanent	Localised	Moderate / Moderately Beneficial	Probable	MODERATE NEGATIVE	Irreversible	Resource will be lost	Achievable	MODERATE NEGATIVE
Impact 2: Loss of Biodiversity (Fauna and Flora)										
Alternative 1	Negative	Permanent	Localised	Slight/ Slightly Beneficial	Probable	LOW NEGATIVE	Irreversible	Resource will be lost	Achievable	LOW NEGATIVE
Alternative 2	Negative	Permanent	Localised	Slight/ Slightly Beneficial	Probable	LOW NEGATIVE	Irreversible	Resource will be lost	Achievable	LOW NEGATIVE
Alternative 3	Negative	Permanent	Localised	Slight/ Slightly Beneficial	Probable	LOW NEGATIVE	Irreversible	Resource will be lost	Achievable	LOW NEGATIVE
Alternative 4	Negative	Permanent	Municipal	Severe/ Beneficial	Probable	HIGH NEGATIVE	Irreversible	Resource will be lost	Difficult	HIGH NEGATIVE
Alternative 5	Negative	Permanent	Municipal	Severe/ Beneficial	Probable	HIGH NEGATIVE	Irreversible	Resource will be lost	Difficult	HIGH NEGATIVE
Impact 3: Loss of Species of Conservation Concern										
Alternative 1	Negative	Long term	Localised	Slight/ Slightly Beneficial	May Occur	LOW NEGATIVE	Reversible	Resource will be partly lost	Achievable	LOW NEGATIVE
Alternative 2	Negative	Long term	Localised	Slight/ Slightly Beneficial	May Occur	LOW NEGATIVE	Reversible	Resource will be partly lost	Achievable	LOW NEGATIVE
Alternative 3	Negative	Long term	Localised	Moderate / Moderately Beneficial	Probable	LOW NEGATIVE	Reversible	Resource will be lost	Achievable	LOW NEGATIVE
Alternative 4	Negative	Permanent	Study area	Severe/ Beneficial	Probable	HIGH NEGATIVE	Reversible	Resource will be lost	Achievable	HIGH NEGATIVE

Alternative 5	Negative	Permanent	Study area	Severe/ Beneficial	Probable	HIGH NEGATIVE	Reversible	Resource will be lost	Achievable	HIGH NEGATIVE
Impact 4: Habitat Fragmentation										
Alternative 1	Negative	Permanent	Localised	Slight/ Slightly Beneficial	Unlikely	LOW NEGATIVE	Reversible	Resource will not be lost	Easily achievable	LOW NEGATIVE
Alternative 2	Negative	Permanent	Localised	Slight/ Slightly Beneficial	Probable	LOW NEGATIVE	Reversible	Resource will be partly lost	Achievable	LOW NEGATIVE
Alternative 3	Negative	Permanent	Localised	Slight/ Slightly Beneficial	Probable	LOW NEGATIVE	Reversible	Resource will be partly lost	Achievable	LOW NEGATIVE
Alternative 4	Negative	Permanent	Study area	Severe/ Beneficial	Probable	HIGH NEGATIVE	Reversible	Resource will be partly lost	Difficult	HIGH NEGATIVE
Alternative 5	Negative	Permanent	Study area	Severe/ Beneficial	Probable	HIGH NEGATIVE	Reversible	Resource will be partly lost	Difficult	HIGH NEGATIVE
Impact 5: Invasion of Alien Plant Species										
Alternative 1	Negative	Permanent	Study area	Moderate / Moderately Beneficial	Probable	MODERATE NEGATIVE	Reversible	Resource will be partly lost	Easily achievable	LOW NEGATIVE
Alternative 2	Negative	Permanent	Study area	Moderate / Moderately Beneficial	Probable	MODERATE NEGATIVE	Reversible	Resource will be partly lost	Easily achievable	LOW NEGATIVE
Alternative 3	Negative	Permanent	Study area	Moderate / Moderately Beneficial	Probable	MODERATE NEGATIVE	Reversible	Resource will be partly lost	Easily achievable	LOW NEGATIVE
Alternative 4	Negative	Permanent	Study area	Severe/ Beneficial	Probable	HIGH NEGATIVE	Reversible	Resource will be partly lost	Easily achievable	MODERATE NEGATIVE
Alternative 5	Negative	Permanent	Study area	Severe/ Beneficial	Probable	HIGH NEGATIVE	Reversible	Resource will be partly lost	Easily achievable	MODERATE NEGATIVE

APPENDIX F: EXTERNAL SPECIALIST REVIEW

Ecological Assessment Peer Review, Vredenburg Windfarm powerline, Western Cape, South Africa.

Prepared by

Leigh-Ann de Wet

(M.Sc., Pri. Sci. Nat)

For

January 2020

Leigh-Ann de Wet
Biodiversity Assessments, Baseline surveys and Impact Assessments and Integrated Biodiversity Management Solutions.

leighann.dewet@gmail.com
083 352 1936

Appointment of Specialist

Leigh-Ann de Wet was commissioned by CES to conduct a peer review for the Ecological Impact Assessment for the proposed Vredenburg Windfarm Powerline, Western Cape, South Africa.

Expertise of the specialist

- M.Sc. in Botany from Rhodes University.
- Registered Professional Natural Scientist with the South African Council for Natural Scientific Professionals (Ecological Science).
- Ecological Consultant since 2009.
- Conducted, or have been involved in over 100 Ecological Impact Assessments, Baseline surveys, Biodiversity Action Plans and Offset Plans.
- Published four scientific papers, two popular articles and have three scientific papers in preparation.
- Presented 7 international conference presentations, and at two Botanical Society meetings.
- Lectured methods for specialist assessment for the Rhodes University short course on EIA.

Independence

Leigh-Ann de Wet has no connection with Boulders Wind Farm and is not a subsidiary of any kind of the applicant. The remuneration for services by CES in relation to this report and associated studies is unrelated to approval by decision-making authorities responsible for authorization of any proposed activity.

Scope and Purpose of Report

The scope and purpose of the report is described in the section on Terms and Reference within this report.

Contents

1 Introduction

1.1 Project Description

A 132kV above-ground powerline is proposed to be constructed by Vredenburg Wind Farm (Pty) Ltd within and near to the proposed Boulders Wind Farm, which is situated about 12km northeast of Vredenburg in the Saldanha Bay Local Municipality, within the West Coast District Municipality on the Western Cape (Martin 2019).

The Wind Energy Facility and associated infrastructure has been applied for in a separate Environmental Impact Assessment Process (Martin 2019).

NEMA requires that reports are produced "independently". The term *"independent"* is defined in EIA Regulation 1 to mean: *"In relation to an EAP or a person compiling a specialist report, or undertaking a specialised process, or appointed as a member of an appeal panel… - (a) that such EAP or person has no business, financial, personal or other interest in the activity, application or appeal in respect of which the EAP or person is appointed in terms of these Regulations other than fair remuneration for work performed in connection with that activity, application, or appeal; or (b) that there are no circumstances that may compromise the objectivity of that EAP or person in performing such work"*.

Selected specialist reports for the Proposed Boulders 132 kV sub-transmission line were undertaken in-house by CES. The regulatory authority has requested an external peer review of these specialist reports, including the Ecological Assessment report.

The role of the independent specialist peer reviewer is to evaluate the terms of reference for the specialist study, the appropriateness of the spatial and temporal boundaries, the adequacy of the information used, the adequacy of the process used to asses impacts, and the adequacy of the mitigation measures. The review should also consider the consistency of the conclusions, and identify any ethical issues that my need specific attention.

This report provides the results of a peer review of the ecological impact assessment conducted by Ms Tarryn Martin, submitted in May 2019.

1.2 Terms of Reference

The intention of the review is not to provide a detailed analysis of all work prepared by the specialist, and will therefore not require a site visit. The review must focus on a number of specific components of the work, namely:

1. Is the report scientifically accurate, and does it contain the most relevant and recent information, date and literature?
2. Was the field work undertaken for the study, or the desktop research, undertaken to an appropriate level of detail to adequately describe the context of the site?
3. Does the report provide sufficient scientific information to use as a basis for identifying

and assessing impact significance?

4. Were all relevant impacts identified and assessed, and in the opinion of the reviewer was this assessment undertaken objectively and impartially.
5. The reviewer is referred to the review criteria presented in section 7 of the "Guidelines for the review of specialist input into the EIA process" produced by the Provincial Government the Western Cape: Department of Environmental Affairs and Development Planning. April 2005.

1.3 Assumptions and limitations

- The review was conducted on the report as provided by CES and it is assumed this is the final report that was submitted to the authorities.
- Reviews are by nature subjective. Every effort has been made to remain objective, however some recommendations may not be included by the author. This is acceptable where reasoned rebuttals to the recommendations are provided.

2 Methodology

The methodology for this review is based on the checklists provided for ecological assessments by NEMA and the Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning. A general review has also been done to identify any layout, design and general issues. Gaps have been identified and recommendations made to close these gaps.

2.1 Checklists

Two checklists were developed from requirements documents for specialist assessments. The first is derived from the NEMA 2014 regs, Appendix 6(1)[1]. The second list is derived from section 7 of the Guidelines for the review of specialist input into the EIA process by the Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning (April 2015). Both of these requirements documents are relevant to the site at Vredenburg. NEMA requirements can be considered as being legal requirements for such reports and each of the listed items must be included in all specialist reports. As such, two checklists have been developed:

1) NEMA checklist for specialist assessments;
2) Western Cape DEADP checklist for Biodiversity Assessments

2.2 Gap Analysis

After the development of the checklists and their completion, a gap analysis was conducted. This gap analysis was done to condense absent checklist items into a list of requirements that still need to be completed in order to submit the report to the authorities. The gap analysis also indicates if there are any general comments that need to be looked at prior to report submission. The results of the gap analysis are a list of action items that can be completed.

[1] Derived from the list provided in Appendix 6 of the NEMA, 1998 (Act no. 107 of 1998) Amendments to the Environmental Impact Assessment Regulations, 2014, Government Gazette, 07 April 2017. No. 40772.

3 Results

The results are presented in tabular format, with section 3.1, below showing the outcome of the NEMA and DEADP checklists. This is then followed by general comments on the report and lately, the results of the Gap Analysis.

3.1 Checklists

3.1.1 NEMA checklist

Requirement	Present	Location	Notes
Details of the specialist	Yes	Page iii	
Expertise of the specialist including the CV	Yes	Included with submission	
Declaration of independence	Yes	Included with submission	
Indication of Scope of Work	Yes	Section 1.2, pg 3	
Indication of age and data quality	Yes	Section 1.3, pg 4 and Section 2, pg 5	
Description of existing impacts, cumulative impacts and levels of acceptable change	Yes	Section 5, pg 18	
Duration, date and season of the site visit and relevance of this to the assessment	Yes	Section 2.1, pg 1	
Description of methodology including equipment and modelling used	Yes, inadequate	Section 2, pg 5	No methodology is supplied for impact rating, it is recommended that this is included.

Requirement	Present	Location	Notes
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.	Yes	Section 4, pg 16, a map is provided on pg 19	
An identification of any areas to be avoided, including buffers	Yes	Sections 4 (pg 14) and 6	Recommendations are made as to which option would be the least destructive and buffer recommendations are made. Although covered, it would be helpful to have these areas specifically identified in a map for those options that are recommended by the specialist, including recommendations for avoidance of impacts to drainage areas.
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	Yes	Figure 4-2, pg 19	
A description of any assumptions made and any uncertainties or gaps in knowledge	Yes	Section 1.3, pg 4	
A description of findings and potential implications of such findings on the impact of the proposed activity or activities	Yes	Section 3 (pg 4), 4 (pg 16) and 5 (pg 18)	
Any mitigation measures for inclusion into the EMPr	Yes	Section 5, pg 18	For clarification and ease of transposing mitigation measures into the EMPr, it is recommended that a consolidated table of all of the recommended mitigation measures is included either in the conclusion chapter or included as an appendix.
Any conditions for inclusion in the environmental authorisation	Yes	Section 6.2, pg 25	

Requirement	Present	Location	Notes
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Yes	Section 6.2	
A reasoned opinion whether the proposed activity, activities or portions thereof should be authorised	Yes	Section 6.2	
A reasoned opinion regarding the acceptability of the proposed activity or activities	Yes	Section 6.2	
If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and were applicable, the closure plan	Yes	Sections 5 (pg 18) and 6	

3.1.2 DEADP Checklist

Requirement	Present	Location	Notes
Ethics			
The specialist has the necessary expertise and experience to assess competently the significant issues	Yes		CV Included with submission
Has there been unethical behaviour in the way the issues have been treated, or whether an unethical relationship between the specialist and the proponent or funding agency	No unethical behaviour		A declaration form is included with submission

Requirement	Present	Location	Notes
Is there bias or inappropriate emphasis, unwarranted assumptions, and/or emotive, irrational or unsubstantiated statements in the specialist's work.	None found, all assumptions clearly stated, no emotive or irrational ratings and no unsubstantiated statements found.		It is recommended that a methodology for the impact assessment is provided in the methodology section.
Adequacy of information			
The study contains only the information that is required to inform decisions, and is at an adequate level of detail to answer the key questions of the study with a high level of confidence.	Yes	Section 3 (pg 4) and Section 4 (pg 16)	All information and references are supplied, along with field data, allowing for adequate rating of impacts and decision making.
Is the information provided sufficient to justify the conclusions drawn for impartial decision-making	Yes	Section 3 (pg 4)	Detailed information is given based on both desktop research as well as field-based data and previous field-based studies.
Are the assumptions in the assessment, evaluation and mitigation valid	Yes	Section 1.3 and throughout the report	Assumptions are clearly laid out and provided not only in section 1.3 but throughout the report. Each is carefully justified and related to the conclusions drawn.
Clarity of the report			
Inclusion of a clearly written, non-technical summary, which is written in a way that assists a stakeholder or decision-maker to fully understand the findings of the report, and which enables a decision-maker to fully understand the findings of the report, and which enables a decision-maker to make an impartial decision.	No		An executive summary must be provided.

Requirement	Present	Location	Notes
Referencing all sources of information used in the assessment	No	The list can be found in Section 7 (pg 26)	The list does not match up with the text and there are referencing inconsistencies. These should be fixed. Sections (such as vegetation type descriptions, climate and geology require references).
The inclusion of a summary impact assessment table, where relevant, using a defined impact assessment and significance rating criteria (These criteria need to be agreed upon with the EIA practitioner and should conform to accepted standards of professional EIA practice).	Yes, inadequate	A summary is provided in Appendix B	A brief summary table should be included in an executive summary. The methodology of the impact assessment must be included.
Clear and unambiguous indication of the consequences of the predicted impacts.	Yes	Section 5, page 20	
Clear, unambiguous and practical recommendations for appropriate mitigation and/or compensation actions to reduce or minimize adverse impacts and enhance positive impacts	Yes	Section 5, page 20	The report could benefit from a table or list of all mitigation measures in one place

Requirement	Present	Location	Notes
The provision of a statement of impact significance for each issue, which specifies whether or not some specified level of acceptable (e.g. a threshold limit specified in law) change has been exceeded, and whether or not the impact presents a potential fatal flaw or not. This statement of significance should be provided for anticipated project impacts before and after application of mitigatory actions.	Yes	Section 5, page 20	Impacts are carefully described, impact statements given and the mitigation measures given.
Indication of whether or not impacts are wholly or partially irreversible, or result in an irreplaceable loss to the ecosystem and/or society	Yes	Section 5, page 20	
Specification of the key risks and uncertainties that ay influence the validity if the impact assessment findings, or which may reduce the degree of confidence that is placed on them.	Yes	Section 1.3, pg 4	
Clear statement of the likely beneficiaries of the project, and those parties that would 'lose' from the project	Not relevant for an ecological assessment		
Clear specification of the degree of confidence in the impact assessment predictions	No		It is recommended that this be added to the cause and comment section for each impact
The provision of a summary of key management actions that fundamentally affect impact significance	Yes, inadequate	Section 5, pg 20	It is recommended that a summary table or list of mitigation measures is provided in the conclusions section

Requirement	Present	Location	Notes
The identification of the best practical environmental option (with reasons given)	Yes	Section 6.2	
Alternatives			
Are alternatives assessed	Yes	Throuout the report and specifically considered in Sections 4 (pg 16), 5 (pg 20), and 6 (pg 25).	
Components of the specialist study[2]			
A clear description of the project and affected environment	Yes	Section 1.1 (pg 1) and Section 3 (pg 4)	The project description could be more in depth however, it is assumed that this is provided in the EIR and its addition to this report would be unnecessarily repetitive.
A description of the relevant legislation, policies and plans	Yes	These are provided throughout the report and when required	An individual section would be redundant but could be provided.
An evaluation of all the key issues identified during scoping, to inform the impact assessment	Yes	Section 5 (pg 20)	Key issues are discussed and assessed although not specifically related to scoping including this would be unnecessarily bulky.
Assessment and evaluation of potentially significant positive and negative impacts.	Yes	Section 5 (pg 20)	

[2] Although lists are specified under each of these aspects, these have been considered and not explicitly listed here.

Requirement	Present	Location	Notes
Mitigation options for negative impacts and enhanced options for positive impacts, as well as practical recommendations for management actions and monitoring proposals.	Yes	Section 5 (pg 20)	A section describing the methodology used for impact rating must be supplied.
Highlight risks, uncertainties, gaps in information, irreversible impacts of irreplaceable loss of resources, and should give the main beneficiaries and losers from the proposed project.	Yes	Throughout the report	

3.2 General comments

General comments on the report include the following:

- An executive summary is needed
- A methodology for the impact assessment is required
- If a POSA species list was generated as indicated in the methodology, this should be included as an appendix in the report as are the faunal lists
- Overall the report is excellent and meets all requirements for both NEMA and DEADP

3.3 Gap Analysis

Gap	Action
Description of methodology including equipment and modelling used	A methodology for impact assessment must be provided
Presence of a non-technical summary	One should be provided in the report
Referencing	Inconsistencies and absences of references should be addressed.
Summary of an impact table	A brief summarised impact table should be provided in the non-technical summary
Degree of confidence provided for each impact rating	This should be included in the cause and comments section for each of the impacts rated.

Gap	Action
Summary of management actions	A summary in the form of a list or table of all mitigation measures should be provided in the conclusions section

4 Conclusions and Recommendations

It is required that the following actions be taken prior to the report being submitted to the authorities:

Num	Action
1	Provide a methodology for the impact assessment
2	Provide a non-technical summary
3	Ensure references are used and added to the reference list
4	An impact table summary should be included in the non-technical summary
5	Degree of confidence must be included for impact rating
6	A summary table/list of management actions should be provided in the conclusions/non-technical summary

The following recommendations are made but are not requirements for the report:

Num	Action
1	If a POSA list was generated for the report as indicated in the methodology, this should be included in the appendices as faunal lists are included.

5 APPENDIX 1: Specialist CV

6 Kinloch Crescent
Durban North

Leigh-Ann de Wet
MSc | Pri. Sci. Nat.
Biodiversity Specialist

leighann.dewet@gmail.com
083 352 1936

Profile

A biodiversity specialist with a history in botanical research, biodiversity assessments and associated planning in developing countries. Possesses experience in classification of ecosystems and development of management and monitoring plans for a variety of ecosystems from the spiny thicket of Madagascar to the Rainforests of West and Central Africa. Experience also includes Biodiversity Assessments (comprising classification and mapping of ecosystems and habitats) of ecosystems and vegetation types throughout Southern Africa including grasslands, forests, thicket, bushveld and fynbos with associated conservation and management recommendations.

Key Expertise

- Ecological research methodology development
- Ecological research
- Habitat and vegetation mapping
- Habitat and vegetation classification
- Report and paper writing
- Synthesis of specialist work into integrated assessments
- Ecological statistics
- Environmental Management and Monitoring

Education

2005 - 2007	**MSc** in Botany – Rhodes University
2005	**BSc Honours** in Botany (with Distinction) – Rhodes University
2001 - 2004	**BSc** (Botany and Entomology) – Rhodes University

Courses

2013	Wetland Management: Introduction to Law – University of the Free State
2013	Wetland Management: Introduction and Delineation Short Course – University of the Free State
2011	Land Degradation Short Course – Rhodes University
2009	EIA Short Course – Rhodes University and Coastal and Environmental Services

Membership

2012 – Present	Professional Natural Scientist with SACNASP: Ecological Science (No. 400233/12)
2012 – 2018	High Conservation Value Assessor (plants) with the Round Table of Sustainable Palm Oil.

2013 – Present	South African Association of Botanists
2013 – Present	Botanical Society of South Africa
2013 – Present	Wildlife and Environment Society of South Africa
2013	Grasslands Society of Southern Africa

Professional experience

2014 - Current Owner of LD Biodiversity Consulting – Biodiversity Specialist

Started own company (Sole Proprietor) to focus on Ecological Assessments including baseline assessments (habitat and ecosystem classification) as well as Management and Monitoring for large projects. Responsibilities include:

- Ecological Surveys including Baseline Assessments, Biodiversity Management and Monitoring Plans and Spatial Planning for biodiversity goals to meet international standards
- Offset design
- Strategic Environmental Planning
- Mapping (QGIS)
- Research
- Financial Management

2012 - 2014 Digby Wells Environmental – Unity Manager: Biophysical

Management of the Biophysical Department, specifically Flora and Fauna although included the overseeing and review of both Freshwater Ecology and Wetlands as well. Responsibilities included:

- Conducting and management of Ecological Baseline and Impact Assessments to meet international standards
- Biodiversity Management and Monitoring Plans
- Management of a team of between four and seven colleagues and specialists

2009 – 2012 Coastal and Environmental Services – Senior Environmental Consultant and Ecological Specialist

Ecological specialist responsible for conducting ecological assessments including baseline and impact assessments for Fauna and Flora. Later in this time for overseeing junior ecologists and training. Key responsibilities included:

- Conducting Ecological Baseline and Impact Assessments to international standards
- Strategic environmental planning
- Managing teams of specialists
- Mapping (Arc)
- Research

2007 - 2009 Rhodes University (South Africa) and Sheffield University (England) – NERC Research Assistant

Design and conducting of a large common or garden experiment looking at the effects of global climate change on grassland composition. Key responsibilities included:

- Experimental design
- Experiment implementation
- Data analyses

Awards

2005	Best Young Botanist second prize for a presentation entitled: "Population biology and effects of harvesting on *Pelargonoium reniforme* (Geraniaceae) in Grahamstown and surrounding areas" at the SAAB conference. Dean's list, Academic Colours, Masters Scholarship.
2004	Putterill Prize for conservation in the Eastern Cape, Dean's list, Academic Half Colours, Honours Scholarship.
2001 - 2003	Dean's List

Publications

de Wet, L., Downsborough, L., Reimers, B., and Weah, C. (in prep). Traditional ecological knowledge and social survey as a proxy for large mammal scientific survey in Liberia.

de Wet, L., Downsborough, L., Reimers, B., and Weah, C (in prep). Traditional ecological knowledge and presence of large mammals in Liberia: a case study.

de Wet, L., and Downsborough, L. (in prep). A case for using traditional knowledge for community managed multiple use conservation areas in Liberia.

Taylor, S, Ripley, B, Martin, T, **de Wet, L,** Woodward, I and Osborne, C (2014.) Physiological advantages of C4 grasses in the field: a comparative experiment demonstrating the importance of drought. Global Change Biology – in Press.

Ripley BS, **de Wet, L** and Hill MP (2008). Herbivory-induced reduction in photosynthetic productivity of water hyacinth, *Eichhornia crassipes* (Martius) Solms-Laubach (Pontederiaceae), is not directly related to reduction in photosynthetic leaf area. African Entomology 16(1): 140-142.

de Wet LR, Barker NP and Peter CI (2008). The long and the short of gene flow and reproductive isolation: Inter-Simple Sequence Repeat (ISSR) markers support the recognition of two floral forms in *Pelargonium reniforme* (Geraniaceae). Biochemical Systematics and Ecology 36: 684-690.

de Wet L, NP Barker and CI Peter (2006). Beetles and Bobartia: an interesting herbivore-plant relationship. Veld & flora. September: 150 – 151.

de Wet LR and Botha CEJ (2007). Resistance or tolerance: An examination of aphid (*Sitobion yakini*) phloem feeding on Betta and Betta-Dn wheat (*Triticum aestivum* L.). South African Journal of Botany 73(1): 35-39.

de Wet L (2005). Is *Pelargonium reniforme* in danger? The effects of harvesting on *Pelargonium reniforme*. Veld & Flora. December: 182-184.

Presentations

2013	LR de Wet – Biodiversity Actions Plans for existing mines: Making them Work for Grassland Conservation - Grassland Society of Southern Africa Congress, Limpopo
2011	LR de Wet - Finding Ecological Benefits of Windfarms – Thicket Forum, Grahamstown
2010	Lubke, RA, N Davenport, LR de Wet and C Fordham – The ecology and distribution of endorheic pans in the subtropical thicket vegetation near Port Elizabeth, Eastern Cape, South Africa – International Association for Vegetation Science, 53rd Annual Symposium, Ensenada, Mexico.
2006	LR de Wet, Barker, N and Peter, C – Pollinator-mediated selection in *Pelargonium reniforme* as described by Inter Simple Sequence Repeat markers. – South African Association of Botanists (SAAB) conference.
2006	LR de Wet, Barker, N and Peter, C– Pollinator-mediated selection of *Pelargonium reniforme* and two floral morphs described by inter simple sequence repeat markers – Southern African Society for Systematic Biology (SASSB) conference.
2005	LR de Wet and Vetter, S – Population biology and effects of harvesting on *Pelargonium reniforme* (Geraniaceae) in Grahamstown and surrounding areas, Eastern Cape, South Africa – South African Association of Botanists (SAAB) conference.
2005	LR de Wet and Vetter, S – Harvesting of *Pelargonium reniforme* in Grahamstown; what are the implications for populations of the plant? – Thicket Forum
2005	LR de Wet – Harvesting of *Pelargonium reniforme* in Grahamstown; what are the implications for populations of the plant? – Annual general meeting. Botanical Society of South Africa, Albany Branch.
2004	LR de Wet – Population biology of *Pelargonium reniforme* – Annual general meeting. Botanical Society of South Africa, Albany Branch.

CONTACT DETAILS

Name of Company	**CES – Environmental and Social Advisory Services**
Designation	Cape Town Branch
Profession	Principal Environmental Consultant, Botanical Specialist and Branch Manager
Years with firm	Seven (7) years
E-mail	t.martin@cesnet.co.za
Office number	+27 (0)21 045 0900
Nationality	**South African**
Professional Body	**SACNASP**: South African Council for Natural Scientific Profession: Professional Natural Scientist (400018/14) **SAAB**: Member of the South African Association of Botanists **IAIASa**: Member of the International Association for Impact Assessments South Africa Member of Golden Key International Honour Society
Key areas of expertise	• Biodiversity Surveys and Impact Assessments • Environmental Impact Assessments • Critical Habitat Assessments • Biodiversity Monitoring

PROFILE

Ms Tarryn Martin

Tarryn holds a BSc (Botany and Zoology), a BSc (Hons) in African Vertebrate Biodiversity and an MSc with distinction in Botany from Rhodes University. Tarryn's Master's thesis examined the impact of fire on the recovery of C_3 and C_4 Panicoid and non-Panicoid grasses within the context of climate change for which she won the Junior Captain Scott-Medal (Plant Science) for producing the top MSc of 2010 from the South African Academy of Science and Art as well as an Award for Outstanding Academic Achievement in Range and Forage Science from the Grassland Society of Southern Africa. Tarryn specialises in conducting vegetation assessments in South Africa, Mozambique and other African countries. These assessments are often to IFC standards, specifically Performance Standard 6. Tarryn has also undertaken critical habitat assessments for areas requiring biodiversity offsets. Other botanical related work includes, developing alien management plans as well as implementing a terrestrial monitoring plan, which includes monitoring forest health, at Kenmare Moma Heavy Minerals Mine.

EMPLOYMENT EXPERIENCE

Environmental Consultant and Botanical Specialist, EOH Coastal and Environmental Services

May 2012-Present

- Conducting botanical and ecological assessment for local and international EIAs in Southern Africa
- Identifying and mapping vegetation communities and sensitive areas
- Designing and implementing monitoring plans
- Designing rehabilitation and biodiversity offset plans
- Designing alien management plans
- Critical Habitat Assessments
- Managing budgets
- Managing the Cape Town branch
- Coordinating specialists and site visits

Accounts Manager, Green Route DMC

October 2011- January 2012

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients
- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction.

Camp Administrator and Project Co-ordinator, Windsor Mountain International Summer Camp, USA

April 2011 - September 2012

- Co-ordinated staff and camper travel arrangements
- Coordinated main camp events
- Assisted with marketing the camp to prospective families.

Freelance Project Manager, Green Route DMC

June 2010 - April 2011

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients
- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction.

Camp Counselor, Windsor Mountain Summer Camp, USA

June 2010 - October 2010

NERC Research Assistant, Botany Department, Rhodes University, Grahamstown in collaboration with Sheffield University, Sheffield, England

April 2009 - May 2009

- Set up and maintained experiments within a common garden plot experiment
- collected, collated and entered data

- Assisted with the analysis of the data and writing of journal articles

Head Demonstrator, Botany Department, Rhodes University
March 2007 - October 2008

Operations Assistant, Green Route DMC
September 2005 - February 2007

- Co-ordination

PUBLICATIONS

1. Ripley, B.; Visser, V.; Christin, PA.; Archibald, S.; Martin, T and Osborne, C. Fire ecology of C_3 and C_4 grasses depends on evolutionary history and frequency of burning but not photosynthetic type. *Ecology.* 96 (10): 2679-2691. 2015
2. Taylor, S.; Ripley, B.S.; Martin, T.; De Wet, L-A.; Woodward, F.I.; Osborne, C.P. Physiological advantages of C_4 grasses in the field: a comparative experiment demonstrating the importance of drought. *Global Change Biology*. 20 (6): 1992-2003. 2014
3. Ripley, B; Donald, G; Osborne, C; Abraham, T and Martin, T. Experimental investigation of fire ecology in the C3 and C4 subspecies of *Alloteropsis semialata. Journal of Ecology.* 98 (5): 1196 - 1203. 2010
4. South African Association of Botanists (SAAB) conference, Grahamstown. Title: Responses of C3 and C4 Panicoid and non-Panicoid grasses to fire. January 2010
5. South African Association of Botanists (SAAB) conference, Drakensberg. Title: Photosynthetic and Evolutionary determinants of the response of selected C3 and C4 (NADP-ME) grasses to fire. January 2008

COURSES

1. Rhodes University and CES, Grahamstown
   EIA Short Course *2012*
2. Fynbos identification course, Kirstenbosch, 2015.
3. Photography Short Course, Cape Town School of Photography, 2015.
4. Using Organized Reasoning to Improve Environmental Impact Assessment, 2018, International IAIA conference, Durban

CONSULTING EXPERIENCE

International Projects

1. 2019: Undertook the Kenmare Road and Infrastructure Botanical Baseline Survey and Impact Assessment for an infrastructure corridor that will link the existing mine at Moma to the new proposed mine at Pillivilli in Nampula Province, Mozambique. This assessment was to IFC standards.

2. 2012 – 2019: Kenmare Terrestrial Monitoring Program Project Manager and Specialist Survey, Nampula Province, Mozambique.
3. 2018: Conducted a field survey and wrote a botanical report to IFC standards for the proposed Balama Graphite Mine Environmental and Social Impact Assessment (ESIA) in Cabo Delgado Province, Mozambique.
4. 2018: Co-authored the critical habitat assessment chapter for the proposed Kenmare Pilivilli Heavy Minerals Mine.
5. 2018: Authored the Conservation Efforts chapter for the Kenmare Pilivilli Heavy Minerals Mine.
6. 2017-2018: Co-authored and analysed data for the Kenmare Bioregional Survey of *Icuria dunensis* (species trigger for critical habitat) in Nampula Province, Mozambique. This was for a mining project that needed to be IFC compliant.
7. 2017: Conducted a field survey and wrote a botanical report to IFC standards for the proposed Ancuabe Graphite Mine Environmental and Social Impact Assessment (ESIA) in Cabo Delgado Province, Mozambique.
8. 2017-2018: Managed the Suni Resources Montepuez Graphite Mine Environmental Impact Assessment. This included the management of ten specialists, the co-ordination of their field surveys, regular client liaison and the writing of the Environmental Impact Assessment Report which summarised the specialists findings, assessed the impacts of the proposed mine on the environment and provided mitigation measures to reduce the impact.
   I was also the lead botanist for this baseline survey and impact assessment and undertook the required field work and analysed the data and wrote the report.
9. 2017: Undertook the botanical baseline survey and impact assessment for the proposed Kenmare Pilivili Heavy Mineral Mine in Nampula Province, Mozambique. This was to IFC Standards.
10. 2017: Ecological Survey for the Megaruma Mining Limitada Ruby Mine Exploration License, Cabo Delgado, Mozambique.
11. 2016: Undertook the botanical baseline survey and impact assessment, wrote an alien invasive management plan and co-authored the biodeiveristy monitoring plan for this farm. The project was located in Zambezia Province, Mozambique.
12. 2015-2016: Conducted the Triton Minerals Nicanda Hills Graphite Mine Botanical Survey and Impact Assessment. Was also the project manager and specialist co-ordinator for this project. The project was located in Cabo Delgado Province, Mozambique.
13. 2015: Was part of the team that undertook a Critical Habitat Assessment for the Nhangonzo Coastal Stream site at Inhassora in Mozambique that Sasol intend to establish drill pads at. This project needed to meet the IFC standards.
14. 2014: Lurio Green Resources Wood Chip Mill and Medium Density Fibre-board Plant, Project Manager and Ecological Specialist, Nampula Province, Mozambique. 2014-2015.
15. 2013-2014: LHDA Botanical Survey, Baseline and Impact assessment, Lesotho.

16. 2014: Biotherm Solar Voltaic Ecological Assessment, Zambia.
17. 2013-2014: Lurio Green Resources Plantation Botanical Assessment, Vegetation and Sensitivity Mapping, Specialist Co-ordination, Nampula Province, Mozambique.
18. 2013: Syrah Resources Botanical Baseline Survey and Ecological Assessment., Cabo Delgado Mozambique.
19. 2013-2014: Baobab Mining Ecological Baseline Survey and Impact Assessment, Tete, Mozambique.

South African Projects

20. 2019: Undertook the Cape Agulhas Municipality Botanical Assessment for the expansion of industrial zone, Western Cape, South Africa, 2019.
21. 2018: Undertook an Ecological Assessment for the construction of a farm dam in Greyton, Western Cape.
22. 2018: Conducted the Ecological Survey for a housing development in Noordhoek, Cape Town
23. 2018: Conducted the field survey and developed an alien invasive management plan for the Swartland Municipality, Western Cape.
24. 2017: Undertook the field survey and co-authored a coastal dune study that assesses the impacts associated with the proposed rezoning and subdivision of Farm Bookram No. 30 to develop a resort.
25. 2017: Project managed and co-authored a risk assessment for the use of Marram Grass to stabilise dunes in the City of Cape Town.
26. 2015-2016: iGas Saldanha to Ankerlig Biodiversity Assessment Project Manager, Saldanha.
27. 2015: Innowind Ukomoleza Wind Energy Facility Alien Invasive Management Plan, Eastern Cape Province, South Africa.
28. 2015: Savannah Nxuba Wind Energy Facility Powerline Ecological Assessment, ground truthing and permit applications, Eastern Cape South Africa.
29. 2014: Cob Bay botanical groundtruthing assessment, Eastern Cape, South Africa.
30. 2013-2016: Dassiesridge Wind Energy Facility Project Manager, Eastern Cape, South Africa.
31. 2013: Harvestvale botanical groundtruthing assessment, Eastern Cape, South Africa.
32. 2012: Tsitsikamma Wind Energy Facility Community Power Line Ecological Assessment, Eastern Cape, South Africa.
33. 2012: Golden Valley Wind Energy Facility Power Line Ecological Assessment, Eastern Cape, South Africa.
34. 2012: Middleton Wind Energy Facility Ecological Assessment and Project Management, Eastern Cape, South Africa.
35. 2012: Mossel Bay Power Line Ecological Assessment, Western Cape, South Africa.
36. 2012: Groundtruthing the turbine sites for the Waainek Wind Energy Facility, Eastern Cape, South Africa.
37. 2012: Toliara Mineral Sands Rehabilitation and Offset Strategy Report, Madagascar.

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.

Tarryn Martin Date: 11 April 2019

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Proposed 132 kV sub-transmission line for the proposed Boulders Wind Energy Facility, Western Cape Province, South Africa.

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
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Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
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Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	Coastal and Environmental Services (PTY) Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	1	Percentage Procurement recognition	135 %
Specialist name:	Tarryn Martin			
Specialist Qualifications:	MSc Botany			
Professional affiliation/registration:	SACNASP			
Physical address:	Block C, The Estuaries, oxbow Crescent,			
Postal address:	Century City			
Postal code:	7441	Cell:	071 332 8994	
Telephone:	021 - 045 - 0900	Fax:	086 410 7822	
E-mail:	cesct@cesnet.co.za			

2. DECLARATION BY THE SPECIALIST

I, Tarryn Martin, declare that –

- I act as the independent specialist in this application;
- I will 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;
- 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 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;
- all the particulars furnished by me in this form 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

CES

Name of Company:

18 - 11 - 2019

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Tarryn Martin, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

Coastal & Environmental Services

Name of Company

21 November 2019

Date

21 November 2019

Signature of the Commissioner of Oaths

GHOUWAH EMANDIEN
Commissioner of Oaths
HR Professional (HRP)
Member number: 11013
Block C the Estuaries, OxBow Lane
Century Avenue, Century City
Milnerton, 7441

SABPP™ SA BOARD FOR PEOPLE PRACTICES

Date

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

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473 Steve Biko Road
Arcadia

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Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	LB BIODIVERSITY			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	5	Percentage Procurement recognition	Micro enterprise exempted
Specialist name:	LEIGH-ANN ROBYNNE DE WET			
Specialist Qualifications:	MSc			
Professional affiliation/registration:	SACNASP			
Physical address:	6 KINLOCH CRESCENT, DURBAN NORTH, 4051			
Postal address:	6 KINLOCH CRESCENT, DURBAN NORTH, 4051			
Postal code:	4051	Cell:	083 352 1936	
Telephone:	083 352 1936	Fax:	N/A	
E-mail:	leighann.dewet@gmail.com			

2. DECLARATION BY THE SPECIALIST

I, LEIGH-ANN DE WET, declare that –

- I act as the independent specialist in this application;
- I will 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;
- 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 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;
- all the particulars furnished by me in this form 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

LEIGH-ANN DE WET

Name of Company:

22/01/2020

Date

3. **UNDERTAKING UNDER OATH/ AFFIRMATION**

I, ANELE J MALUKAZI, swear under oath / ~~affirm~~ that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

LEIGH-ANN DE WET

Name of Company

22/01/2020

Date

COMMISSIONER OF OATHS
ANELE J MALUKAZI
BRANCH MANAGER
41 NEWPORT DRIVE
GLEN ASHLEY
4022 DATE: 22/01/20

Signature of the Commissioner of Oaths

22/01/2020.

Date

Ms Amber Jackson
Curriculum Vitae

CONTACT DETAILS

Name of Company	**CES – Environmental and Social Advisory Services**
Designation	Cape Town Branch
Position	Principal Environmental Consultant
Years with firm	Seven (7) Years
E-mail	a.jackson@cesnet.co.za
Office number	+27 (0)21 045 0900
Nationality	South African
Professional Body	SACNASP IAIAsa Herpetological Association of Southern Africa
Key areas of expertise	➢ Faunal Impact Assessments ➢ Environmental, Social and Health Impact Assessments ➢ Environmental and Social Risk Management

PROFILE

Ms Amber Jackson

Amber holds a Masters in Environmental Management from the University of Cape Town and has a background in both Social and Ecological work. Her undergraduate degrees focused on Ecology, Conservation and Environment with particular reference to landscape effects on Herpetofauna, while her masters focused on the environmental management of social and ecological systems. With a dissertation in food security that investigated the complex food system of informal and formal distribution markets. At CES, Amber has been responsible for the management of projects and specialist teams, the preparation and monitoring of project budgets in excess of $500 000. She has managed Environmental, Social and Health Impact Assessments for projects in the renewable, housing, agri-forestry and mining sectors in Mozambique and South Africa to national and international lenders standards including the AfDB, EIB and IFC. Amber specializes in faunal assessments and has conducted a number of these in the both South Africa and Mozambique to international standards, the majority were assisted by and to Prof Bill Branch. She has recently concluded an Environmental and Social Rik management course with the IFC held in Johannesburg over 2018.

EMPLOYMENT EXPERIENCE

Environmental Consultant, CES
2011 – Present

- Project Management, including budgets, deliverables and timelines.
- Environmental Impact Assessments and Basic Assessments project
- Environmental Control Officer
- Faunal Impact Assessment
- Public/client/authority liaison
- Mentoring and training of junior staff

ACADEMIC QUALIFICATIONS

University of Cape Town, Cape Town
M. Phil Environmental Management
2011

University of the Witwatersrand, Johannesburg
BSc (Hons) Ecology, Environment and Conservation *2008*

University of the Witwatersrand, Johannesburg
BSc 'Ecology, Environment and Conservation' and Zoology
2007

COURSES

International Finance Corporation Environmental and Social Risk Management (ESRM) Program
January – November 2018

IAIA WC EMP Implementation Workshop
27 February 2018

IAIAsa National Annual Conference
Goudini Spa, Rawsonville.
August 2017

Biodiversity & Business Indaba, NBBN
Theme: Moving Forward Together (Partnerships & Collaborations)
April 2017

Snake Awareness, Identification and Handling course, Cape Reptile Institute (CRI)
November 2016

Coaching Skills programme, Kim Coach
November 2016

Western Cape Biodiversity Information Event, IAIAsa
Theme: Biodiversity offsets & the launch of a Biodiversity Information Tool
May 2016

Mainstreaming Biodiversity into Business: WHAT, WHY, WHEN and HOW
Hosted by Dr Marie Parramon Gurney on behalf of the NBBN at the Rhodes Business School,
June 2014

IAIAsa National Annual Conference
Thaba'Nchu Sun, Bloemfontein
September 2013

St Johns Life first aid course
July 2012

CONSULTING EXPERIENCE

Faunal Impact Assessments,

- Boschendal Estate Faunal Opportunities and Constraints, WC, SA.
- Suni Resources Balama Graphite Mine Project (ESIA), Mozambique.
- City of Johannesburg Municipal Reserve Proclamation for Linksfield Ridge and Northcliff Hill, South Africa.
- Battery Minerals Montepuez Graphite Mine Project (ESIA), Mozambique.
- Triton Minerals Nicanda Hills Graphite Mine Project (ESIA), Mozambique.
- Sasol Biodiversity Assessment
- Augrabies falls hydro-electric project Hydro-SA (ESIA)
- Lesotho Highlands Water Project (ESIA), Lesotho.
- Lurio Green Resources Forestry Projects (ESIA), Mozambique.
- Malawi Monazite mine Projects (ESIA) EMP ecological management contribution

Post EIA

- Crooks Brothers Post EIA Work- Environmental and Social EMPr, Policies, Management Plans and Monitoring Programmes

Mining

- Triton Ancuabe Graphite Mine (ESHIA), Mozambique.

Risk Assessment

- Blouberg Development Initiative- E&S Risk Assessment
- Port St Johns Second Beach Coastal Infrastructure Project.

Gap Analysis

- Bankable Feasibility Study of Simandou Infrastructure Project – Port and Railway Summary of critical habitat, biodiversity offset plan and monitoring and evaluation plan.

Coastal Development

- Port St Johns Second Beach Coastal Infrastructure Project (EIA), South Africa.
- PGS Seismic Project (ESIA), Mozambique.
- Woodbridge Island Revetment checklist.

Forestry (Mozambique)

- Lurio Green Resources Forestry Projects, (ESIA Upgrade).
- Niassa Green Resources Forestry Projects (ESIA).
- Green Resources Woodchip and MDF plant (EPDA).

Renewable Energy

- G7 Brandvalley Wind Energy Project (EIA)
- G7 Rietkloof Wind Energy Project (EIA)
- G7 Brandvalley Powerlines (BA)
- G7 Rietkloof Powerlines (BA)
- Boschendal wine estate Hydro-electric schemes (BA, 24G and WULA)
- Mossel Bay Wind Energy Project (EIA)
- Mossel Bay Powerline (BA) 132kV interconnection

- Inyanda Farm Wind Energy (EIA)
- Middleton Wind Energy (EIA)
- Peddie Wind Energy (EIA)
- Cookhouse Wind Energy Project (EIA)
- Haverfontein Wind Energy Project (EIA)
- Plan 8 Wind Energy Project (EIA)
- Brakkefontein Wind Energy Project (EIA)
- Grassridge Wind Energy Project (EIA) (Coega)
- St Lucia Wind Energy Project (EIA)

Estate Projects,

- Belmont Valley Golf Course and Makana Residential Estate (EIA)
- Belton Farm Eco Estate (BA).

Palm Oil Projects

- Liberia Palm bay & Butow (ESIA)

Construction audits and Environmental Control Officer (Construction)

- Enel Paleisheuwel Solar farm (Lead ECO)
- NRA Caledon road upgrade ECO
- Solar Capital DeAar Solar farm annual audits
- Eskom Pinotage substation WUL offset compliance

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.

AMBER LEAH JACKSON **10 MAY 2019**

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

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Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	CES			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)		Percentage Procurement recognition	
Specialist name:	AMBER JACKSON			
Specialist Qualifications:	MPHIL Environmental Management			
Professional affiliation/registration:	IAIAsa, SACNASP and HAA			
Physical address:	5 Pepper Tree Sq, 87 Third Ave, Kennelworth			
Postal address:	5 Pepper Tree Sq, 87 Third Ave, Kennelworth			
Postal code:	7804	Cell:	078 340 6295	
Telephone:	021 045 0900	Fax:	-	
E-mail:	a.jackson@cesnet.co.za			

2. DECLARATION BY THE SPECIALIST

I, __AMBER JACKSON_, declare that –

- I act as the independent specialist in this application;
- I will 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;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
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- I will comply with the Act, Regulations and all other applicable legislation;
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- all the particulars furnished by me in this form 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

CES

Name of Company:

10 February 2020

Date

D3447
GEMEENSKAPDIENSSENTRUM
10 FEB 2020
COMMUNITY SERVICE CENTRE
MILNERTON
SOUTH AFRICAN POLICE SERVICE

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, _AMBER JACKSON_, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

CES

Name of Company

10 February 2020

Date

7235068-7.
CST. Nelw.

Signature of the Commissioner of Oaths

Date 10/02/2020

GEMEENSKAPDIENSSENTRUM
10 FEB 2020
COMMUNITY SERVICE CENTRE
MILNERTON
SOUTH AFRICAN POLICE SERVICE