BASIC ASSESSMENT FOR THE PROPOSED GUNSTFONTEIN SWITCHING STATION, 132KV OVERHEAD POWER LINE AND ANCILLARY INFRASTRUCTURE FOR THE PROPOSED GUNSTFONTEIN WIND FARM NEAR SUTHERLAND, NORTHERN CAPE:

FAUNA & FLORA SPECIALIST ASSESSMENT REPORT

PRODUCED FOR SAVANNAH ENVIRONMENTAL

BY

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June 2016

CONTENTS

DECLARATION OF CONSULTANTS' INDEPENDENCE

- I Simon Todd, as the appointed independent specialist hereby declare that I:
- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of the EIA Regulations, 2014

Simon Todd Pr.Sci.Nat 400425/11.
June 2016

EXPERTISE OF THE CONSULTANT

Simon Todd Consulting has extensive experience in biodiversity assessment, having provided ecological assessments for more than 100 different developments. This includes a large number of projects in the Roggeveld/Komsberg area well as in the wider Northern and Western Cape regions. He was also the lead terrestrial ecological consultant on the Wind and Solar SEA conducted by CSIR. Simon Todd is a recognised arid-areas ecological expert and is a past chairman of the Arid-Zone Ecology Forum and has 18 years' experience working throughout the country. Simon Todd is registered with the South African Council for Natural Scientific Professions (No. 400425/11). Recent projects in the same area as the current development include the following:

- Karreebosch Wind Farm & Grid Connection. Fauna & Flora Specialist Study. Savannah Environmental 2014.
- Roggeveld Wind Energy Facility. Fauna & Flora Specialist Study. Savannah Environmental 2013.
- Mainstream Sutherland Wind Energy Facility. Fauna & Flora Specialist Study Environmental Resources Management. 2012.
- Roggeveld Wind Farm. Fauna & Flora Specialist Study. Environmental Resources Management. 2012.
- ACED Komsberg Wind Energy Facility. Fauna & Flora Specialist Study. ARCUS. 2015.
- Gunstfontein Wind Energy Facility. Fauna & Flora Specialist Study. Savannah Environmental. 2016.

1 INTRODUCTION

In order to evacuate the power from the Gunstfontein Wind Energy Facility (200MW) into the Eskom grid, the construction of the Gunstfontein Switching Station, 132kV overhead power line (single or double circuit) and ancillary infrastructures is required. Savannah Environmental (Pty) Ltd have been appointed to carry out the required environmental authorization process for the development as required in terms of the EIA regulations and have appointed Simon Todd Consulting to conduct the specialist assessment of the proposed development.

As part of the Basic Assessment process, this ecological specialist study details the ecological characteristics of the affected area and provides an assessment of the likely ecological impacts associated with the development of the switching station, power line and associated infrastructure. Impacts are assessed for the preconstruction, construction, operation, and decommissioning phases of the development. A variety of avoidance and mitigation measures associated with each identified impact are recommended to reduce the likely negative impacts of the development, which should be included in the EMPr for the development. The full scope of study is detailed below.

1.1 SCOPE OF STUDY

The scope of the study includes the following activities

- a description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed project
- a description and evaluation of environmental issues and potential impacts (including direct, indirect and cumulative impacts) that have been identified
- a statement regarding the potential significance of the identified issues based on the evaluation of the issues/impacts
- an indication of the methodology used in determining the significance of potential environmental impacts
- an assessment of the significance of direct, indirect and cumulative impacts in terms of the following criteria :
    - the nature of the impact, which shall include a description of what causes the effect, what will be affected and how it will be affected
    - the extent of the impact, indicating whether the impact will be local (limited to the immediate area or site of development), regional, national or international
    - the duration of the impact, indicating whether the lifetime of the impact will be of a short-term duration (0-5 years), medium-term (5- 15 years), long-

term (> 15 years, where the impact will cease after the operational life of the activity) or permanent
    - the probability of the impact, describing the likelihood of the impact actually occurring, indicated as improbable (low likelihood) probable (distinct possibility), highly probable (most likely), or definite (Impact will occur regardless of any preventable measures)
    - the severity/beneficial scale indicating whether the impact will be very severe/beneficial (a permanent change which cannot be mitigated/permanent and significant benefit with no real alternative to achieving this benefit) severe/beneficial (long-term impact that could be mitigated/long-term benefit) moderately severe/beneficial (medium- to long-term impact that could be mitigated/ medium- to long-term benefit), slight or have no effect
    - the significance which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high
    - the status which will be described as either positive, negative or neutral
    - the degree to which the impact can be reversed
    - the degree to which the impact may cause irreplaceable loss of resources
    - the degree to which the impact can be mitigated

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

General Considerations:

- Disclose any gaps in information or assumptions made.
- Identify recommendations for mitigatory measures to minimise impacts.
- Outline additional management guidelines.
- Provide monitoring requirements, mitigation measures and recommendations in a table format as input into the Environmental Management Plan (EMP) for floral- and faunal-related issues.

A description of the potential impacts of the development and recommended mitigation measures are to be provided which will be separated into the following project phases:

- Preconstruction
- Construction
- Operational Phase
- Decommissioning

1.2 ASSESSMENT APPROACH & PHILOSOPHY

The assessment will be conducted according to the EIA Regulations, published by the Department of Environmental Affairs (2014) in terms of the National Environmental Management Act, 1998 (Act 107 of 1998, as amended) as well as within the best-practice guidelines and principles for biodiversity assessment as outlined by Brownlie (2005) and De Villiers et al. (2005).

This includes adherence to the following broad principles:

- That a precautionary and risk-averse approach be adopted towards projects which may result in substantial detrimental impacts on biodiversity and ecosystems, especially the irreversible loss of habitat and ecological functioning in threatened ecosystems or designated sensitive areas: i.e. Critical Biodiversity Areas (as identified by systematic conservation plans, Biodiversity Sector Plans or Bioregional Plans) and Freshwater Ecosystem Priority Areas.

- Demonstrate how the proponent intends complying with the principles contained in section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA), which, amongst other things, indicates that environmental management should.

    - In order of priority aim to: avoid, minimise or remedy disturbance of ecosystems and loss of biodiversity;
    - Avoid degradation of the environment;
    - Avoid jeopardising ecosystem integrity;
    - Pursue the best practicable environmental option by means of integrated environmental management;
    - Protect the environment as the people's common heritage;
    - Control and minimise environmental damage; and
    - Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic or stressed ecosystems.

These principles serve as guidelines for all decision-making concerning matters that may affect the environment. As such, it is incumbent upon the proponent to show how proposed activities would comply with these principles and thereby contribute towards the achievement of sustainable development as defined by the NEMA.

In order to adhere to the above principles and best-practice guidelines, the following approach forms the basis for the study approach and assessment philosophy:
The study will include data searches, desktop studies, site walkovers / field survey of the property and baseline data collection, describing:

- A description of the broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering, viability, etc.

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

Community and ecosystem level

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

Species level

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

Fauna

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

- or, are of cultural significance.

- Provide monitoring requirements as input into the Environmental Management Plan (EMP) for faunal related issues.

Other pattern-related considerations

- Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity.
- The extent of alien plant cover of the site, and whether the infestation is the result of prior soil disturbance such as ploughing or quarrying (alien cover resulting from disturbance is generally more difficult to restore than infestation of undisturbed sites).
- The condition of the site in terms of current or previous land uses.

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

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

1.3 RELEVANT ASPECTS OF THE DEVELOPMENT

The proposed development for which application is made entails the following:

- The construction of a 132kV single or double circuit overhead power line (~19.17km) from the Gunstfontein Wind Farm to Soetwater Switching Station (which forms part of a separate BAR application) which is planned for commissioning in 2018;
- Switching Station (approximately 120m x 120m) adjacent to the proposed Gunstfontein Substation, and ancillaries (including access tracks/roads, laydown areas and a system metering installation).

- A 300m wide corridor is being investigated for the siting of the proposed route of the power line and a single route is being considered (Figure 1).

Figure 1. Map of the study site, showing the Gunstfontein WEF and the 132kV line corridor from the on-site substation to the Soetwater Switching Station in the south in red.

2 METHODOLOGY

2.1 DATA SOURCING AND REVIEW

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

Vegetation:

- Vegetation types and their conservation status were extracted from the South African National Vegetation Map (Mucina and Rutherford 2006) as well as the National List of Threatened Ecosystems (2011), where relevant.
- Critical Biodiversity Areas for the site and surroundings were extracted from the Biodiversity Assessment of the Central Karoo District Municipality (Skowno *et al*. 2009).

- Information on plant and animal species recorded for the Quarter Degree Square (QDS) 3220 CB, DA, CD, DC was extracted from the SABIF/SIBIS database hosted by SANBI. This is a considerably larger area than the study area, but this is necessary to ensure a conservative approach as well as counter the fact that the area has not been well sampled in the past.
- The IUCN conservation status (Table 1) of the species in the list was also extracted from the database and is based on the Threatened Species Programme, Red List of South African Plants (2015).
- Freshwater and wetland information was extracted from the National Freshwater Ecosystem Priority Areas assessment, NFEPA (Nel *et al*. 2011).
- Important catchments and protected areas expansion areas were extracted from the National Protected Areas Expansion Strategy 2008 (NPAES).

Fauna

- Lists of mammals, reptiles and amphibians which are likely to occur at the site were derived based on distribution records from the literature and various spatial databases (ADU, SANBI's SIBIS and BGIS databases).
- Literature consulted includes Branch (1988) and Alexander and Marais (2007) for reptiles, Du Preez and Carruthers (2009) for amphibians, Friedmann and Daly (2004) and Skinner and Chimimba (2005) for mammals.
- The faunal species lists provided are based on species which are known to occur in the broad geographical area, as well as a preliminary assessment of the availability and quality of suitable habitat at the site.
- The conservation status of each species is also listed, based on the IUCN Red List Categories and Criteria version 2016 (See Figure 2) and where species have not been assessed under these criteria, the CITES status is reported where possible. These lists are adequate for mammals and amphibians, the majority of which have been assessed, however the majority of reptiles have not been assessed and therefore, it is not adequate to assess the potential impact of the development on reptiles, based on those with a listed conservation status alone. In order to address this shortcoming, the distribution of reptiles was also taken into account such that any narrow endemics or species with highly specialized habitat requirements occurring at the site were noted.

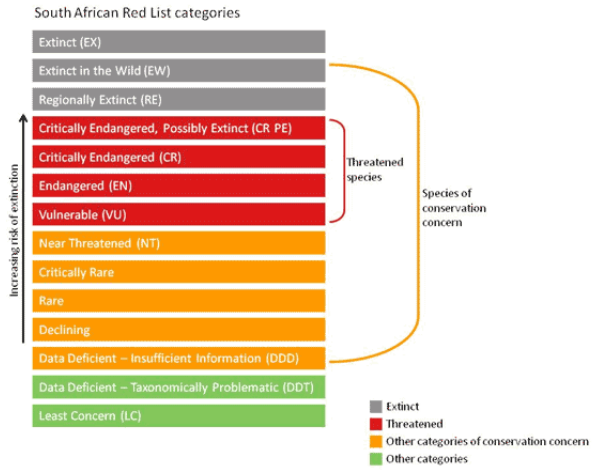

Figure 2. Schematic representation of the South African Red List categories. Taken from http://redlist.sanbi.org/redcat.php

2.2 SITE VISIT

A site visit to the Gunstfontein part of the site was conducted from the 25-28 August 2015, which is in the peak flowering season and near the optimal time for such a visit. A follow-up site visit was conducted in May 2016 to investigate the part of the route off of the plateau to the Soetwater substation. During the site visit, the different biodiversity features, habitat, and landscape units present at the site were investigated in the field. During the site visit, all plant and animal species observed along the route were recorded. There is already an access road down the escarpment along the proposed route, which facilitated access to this steep and otherwise inaccessible section of the route. The presence of the road is also important as the impact of the development would be reduced along this section of the route as the construction of a new access route is not required.

2.3 SENSITIVITY MAPPING & ASSESSMENT

An ecological sensitivity map of the site was produced by integrating the information collected on-site with the available ecological and biodiversity information available in the literature and various spatial databases. This includes delineating the different habitat units identified in the field and assigning sensitivity values to the units based on their ecological properties, conservation value and the potential presence of species of conservation concern. The ecological sensitivity of the different units identified in the mapping procedure was rated according to the following scale:

- **Low** – Areas of natural or transformed habitat with a low sensitivity where there is likely to be a negligible impact on ecological processes and terrestrial biodiversity.

Most types of development can proceed within these areas with little ecological impact.

- **Medium**- Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact such as erosion low. These areas usually comprise the bulk of habitats within an area. Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.
- **High** – Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area. These areas may contain or be important habitat for faunal species or provide important ecological services such as water flow regulation or forage provision. Development within these areas is undesirable and should only proceed with caution as it may not be possible to mitigate all impacts appropriately.
- **Very High** – Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are essentially no-go areas from a developmental perspective and should be avoided as much as possible.

In some situations, areas were also classified between the above categories, such as Medium-High, where it was deemed that an area did not fit well into a certain category but rather fell most appropriately between two sensitivity categories.

2.4 SAMPLING LIMITATIONS AND ASSUMPTIONS

The major potential limitation associated with the sampling approach is the narrow temporal window of sampling. Ideally, a site should be visited several times during different seasons to ensure that the full complement of plant and animal species present are captured. However, this is rarely possible due to time and cost constraints and therefore, the representivity of the species sampled at the time of the site visit should be critically evaluated.

The primary site visit for the current study took place in spring, near the optimal time for such a visit. As such, the abundance of geophytes, annuals and forbs was high and the presence of species of conservation concern at the site could be well documented. It is not likely that additional site visits and field assessment would significantly alter the results of the study as the current baseline is adequate to describe the site at an appropriate level of detail. The timing and duration of the site visit, is therefore not seen as a significant limitation for the current study and is not considered to be a limiting factor which might compromise the results in any way.

The lists of amphibians, reptiles and mammals for the site are based on those observed at the site as well as those likely to occur in the area based on their distribution and habitat preferences. Several site visits have been conducted during various seasons to the broader

area and information on fauna observed in the area is included where relevant. This represents a sufficiently conservative and cautious approach which takes the study limitations into account.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT- BASELINE

3.1 BROAD-SCALE VEGETATION PATTERNS

According to the national vegetation map (Mucina & Rutherford 2006), there are four vegetation types along the power line route as indicated below in Figure 3. The area on the escarpment is classified as Roggeveld Shale Renosterveld, while the steep escarpment slopes are Tanqua Escarpment Shrubland and there is a small section of Tanqua Wash Riviere in the valley bottom below the escarpment, while the final section of the route towards the Soetwater substation lies within the Central Mountains Shale Renosterveld vegetation type. The basic statistics of each vegetation type are provided below in Table 1.

Roggeveld Shale Renosterveld occurs in the Northern and Western Cape and occupies the majority of the Roggeveld from the edge of the Western edge of the Great Escarpment mostly above the Tanqua Basin, reaching as far east as the higher-lying areas of the Teekloof Pass south of Fraserburg along the northwest summit plateaus of the Nuweveldberge. It occupies undulating, slightly sloping plateau landscapes, with low hills and broad shallow valleys supporting mainly moderately tall shrublands dominated by renosterbos with a rich geophytic flora in the wetter and rocky habitats. It occurs mostly on mudrocks and sandstones of the Adelaide Subgroup. The land types present are mostly Fc and Da. Mucina & Rutherford (2006) list 12 endemic species for this vegetation type, which is a large number given that the total extent of the vegetation type is only 2917 km^2.

Tanqua Escarpment Shrubland occurs as a narrow belt on northwest-facing slopes of the Klein-Roggeveldberge and on southwest-facing and west-facing slopes of the Roggeveld Escarpment at altitudes of 620-100m (Mucina & Rutherford 2006). This vegetation type usually occupies steep flanks below an escarpment overlooking a basin, supporting succulent shrubland of medium height with *Tylecodon* (botterboom) and *Euphorbia mauritanica* (melkboom)(Mucina & Rutherford 2006). This vegetation type is classified as Least Threatened, and only a very small portion is formally conserved in the Tankwa Karoo National Park. Levels of transformation are however low but it is part of the Hantam-Roggeveld Centre of Endemism and is one of the least studied vegetation types of the country (Mucina & Rutherford 2006).

Tanqua Wash Riviere is associated with the Alluvia of the Tanqua and Doring Rivers and sheet-wash plains of their less important tributaries embedded largely within the Tanqua

Karoo vegetation unit. It consists of a mosaic of shrublands with *Salsola* and *Lycium* alternating with *Acacia karoo* gallery thickets. It is classified as Least Threatened and is considered moderately-well conserved as 8.9% of the target 19% falls within the Tanqua National Park and other formal nature reserves. It has not been heavily impacted by transformation and more than 95% is still intact. At a broad level, this is considered to be a sensitive vegetation type as it is vulnerable to disturbance and being associated with drainage lines is ecologically important for a variety of ecological services and processes. In addition, the Riverine Rabbit *Bunolagus monticularis* which is listed as Critically Endangered is known to occur within this vegetation unit.

Central Mountain Shale Renosterveld occurs in the Western and Northern Cape on the southern and southeastern slopes of the Klein Roggeveldberge and Komsberg, below the Komsberg section of the Great Escarpment, as well as farther east below Besemgoedberg and Suurkop and in the west in the Karookop area. It is associated with clayey soils overlying Adelaide Subgroup mudstones and subordinate sandstones with land types mostly Ib and Fc. Although this vegetation type is classified as Least Threatened, it has a very limited extent of 1236km^2 and is not formally conserved anywhere. Levels of transformation are however low and it is considered to be 99% intact. Although no endemic species are known to occur within this vegetation type, little is known about this Renosterveld type and it has been poorly sampled. Experience from this and other projects in the area indicate that this should be considered to be a relatively sensitive vegetation type with a relatively high abundance of species of conservation concern.

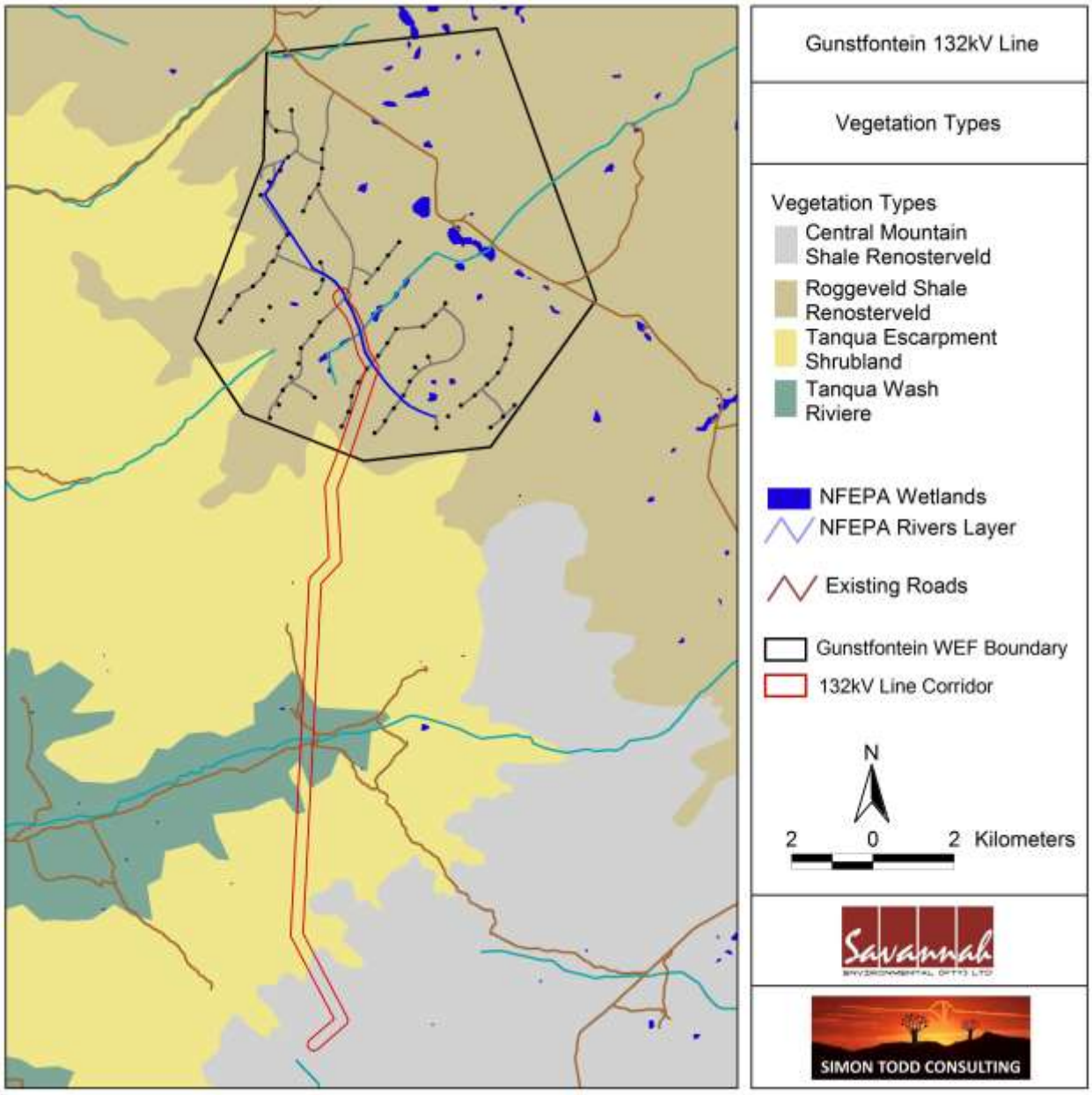

Figure 3. Broad-scale overview of the vegetation in and around the Gunstfontein-Soetwater power line route. The vegetation map is an extract of the national vegetation map as produced by Mucina & Rutherford (2006), and also includes rivers and wetlands delineated by the National Freshwater Ecosystem Priority Areas assessment (Nel et al. 2011).

Table 1. Basic statistics of the different vegetation types which occur along the Gunstfontein power line.

	Vegetation Type			
	Tanqua Escarpment Shrubland	Roggeveld Shale Renosterveld	Central Mountain Shale Renosterveld	Tanqua Wash Riviere
Biome	Succulent Karoo Biome	Fynbos Biome	Fynbos Biome	Azonal Vegetation
National Extent (km^2)	1321	2917	1236	2130
Remaining %	99.80%	99%	99%	96.90%
Conservation target	19%	27%	27%	19%
Formally Protected	0.70%	0	0	8.90%
Conservation Status	Least threatened	Least threatened	Least threatened	Least threatened
Protection Status	Hardly protected	Not protected	Not protected	Moderately protected

3.2 Listed and Protected Plant Species

According to the SANBI SIBIS database, 519 plant species have been recorded from the two quarter degree squares 3220 DB and DA (Table 2). This includes 6 species of high conservation concern and 14 species of moderate conservation concern. Several listed species were observed at the site including *Brunsvigia josephinae*, *Eriocephalus grandiflorus*, *Adromischus phillipsiae*, *Lachenalia congesta*, *Delosperma sphalmanthoides*, *Cliffortia arborea* and *Romulea komsbergensis*. Areas of high listed species density include the low-lying areas on sandy soils along drainage lines, gravel outcrops and rock pavements especially along the escarpment.

Table 2. Numbers of the species within the different conservation status categories as indicated below, data derived from the SANBI SIBIS database. Species not evaluated are largely alien species and species no longer recognised as valid.

Status/ IUCN Red List Category	No. Species
Critically Endangered (CR)	**0**
Endangered (EN)	**0**
Vulnerable (VU)	**6**
Near Threatened (NT)	**4**
Critically Rare	**0**
Rare	**10**
Declining	**0**
Data Deficient - Insufficient Information (DDD)	**0**
Data Deficient - Taxonomically Problematic (DDT)	**4**
Least Concern	**382**
Not Evaluated	**113**
Total	**519**

3.3 CRITICAL BIODIVERSITY AREAS & BROAD-SCALE PROCESSES

The site lies within the planning domain of the Namakwa District Biodiversity Sector Plan (Desmet & Marsh 2008). Such district-wide biodiversity assessments were commissioned to inform Spatial Development Frameworks (SDFs), Biodiversity Sector plans, Environmental Management Frameworks (EMFs), Strategic Environmental Assessments (SEAs) and the Environmental Impact Assessment (EIA) process. The Biodiversity Assessments identify Critical Biodiversity Areas (CBAs) which represent biodiversity priority areas which should be maintained in a natural to near natural state. The CBA maps indicate the most efficient selection and classification of land portions requiring safeguarding in order to meet national biodiversity objectives. The CBA map for the general area surrounding the site is depicted below in Figure 4. A large part of the route is within an Ecological Support Area with occasional sections of Critical Biodiversity Areas. Although development in CBAs is not desirable, the footprint of the power line would be very low and unlikely to compromise the ecological functioning of the ESA or CBAs along the route.

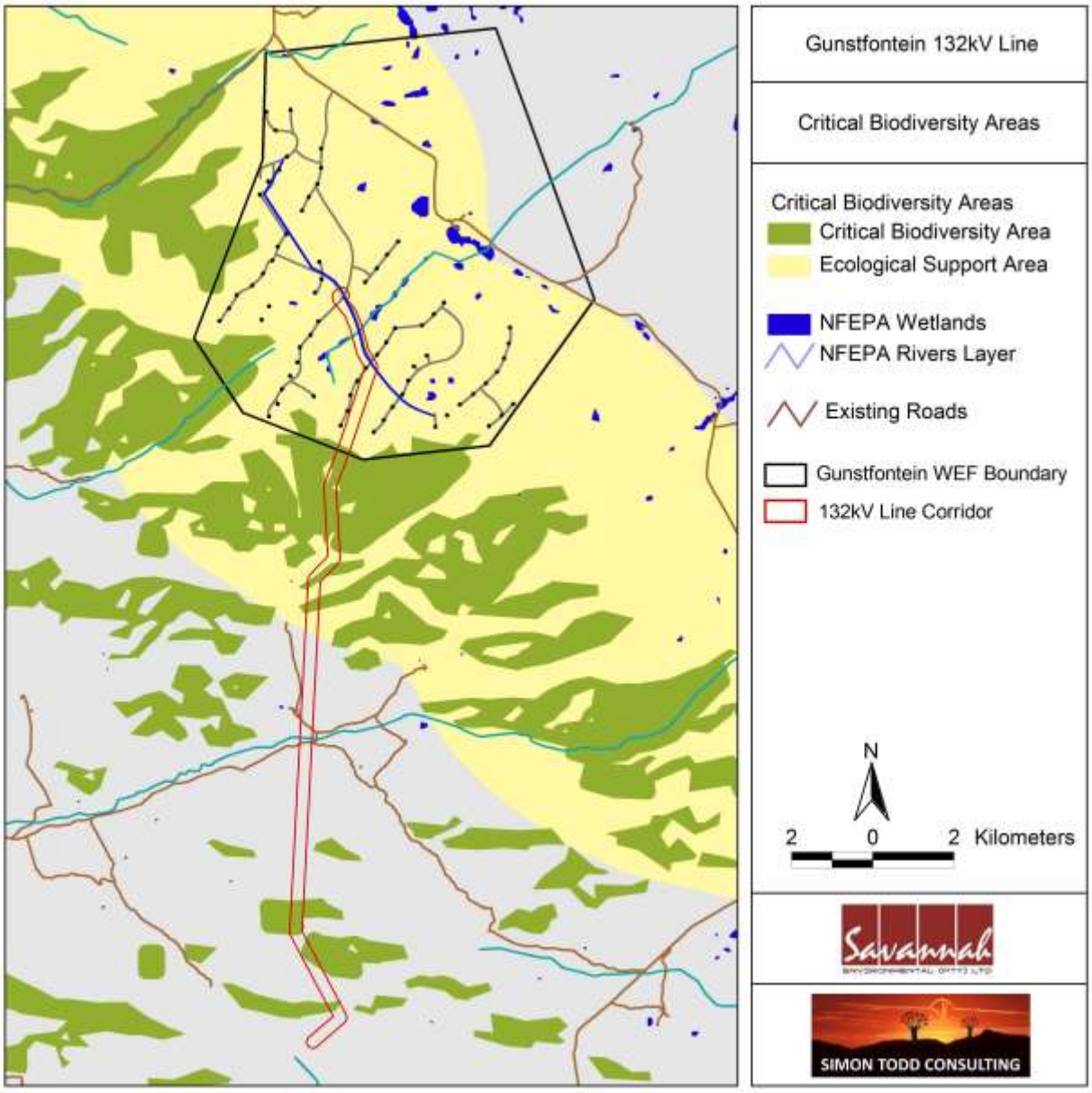

Figure 4. Critical Biodiversity Areas map of the proposed Gunstfontein-Soetwater 132kV line, substation and the surrounding area.

3.4 CUMULATIVE IMPACTS

According to the map of DEA-registered projects as at December 2015, there are a lot of renewable energy project applications in the broader area (Figure 5). The major footprint would be from the facilities themselves and the contribution of the current power line would be very low in comparison and is not considered significant. As a result, the impact of the power line on cumulative impacts in the area would be low as the required extent of transformation would be low.

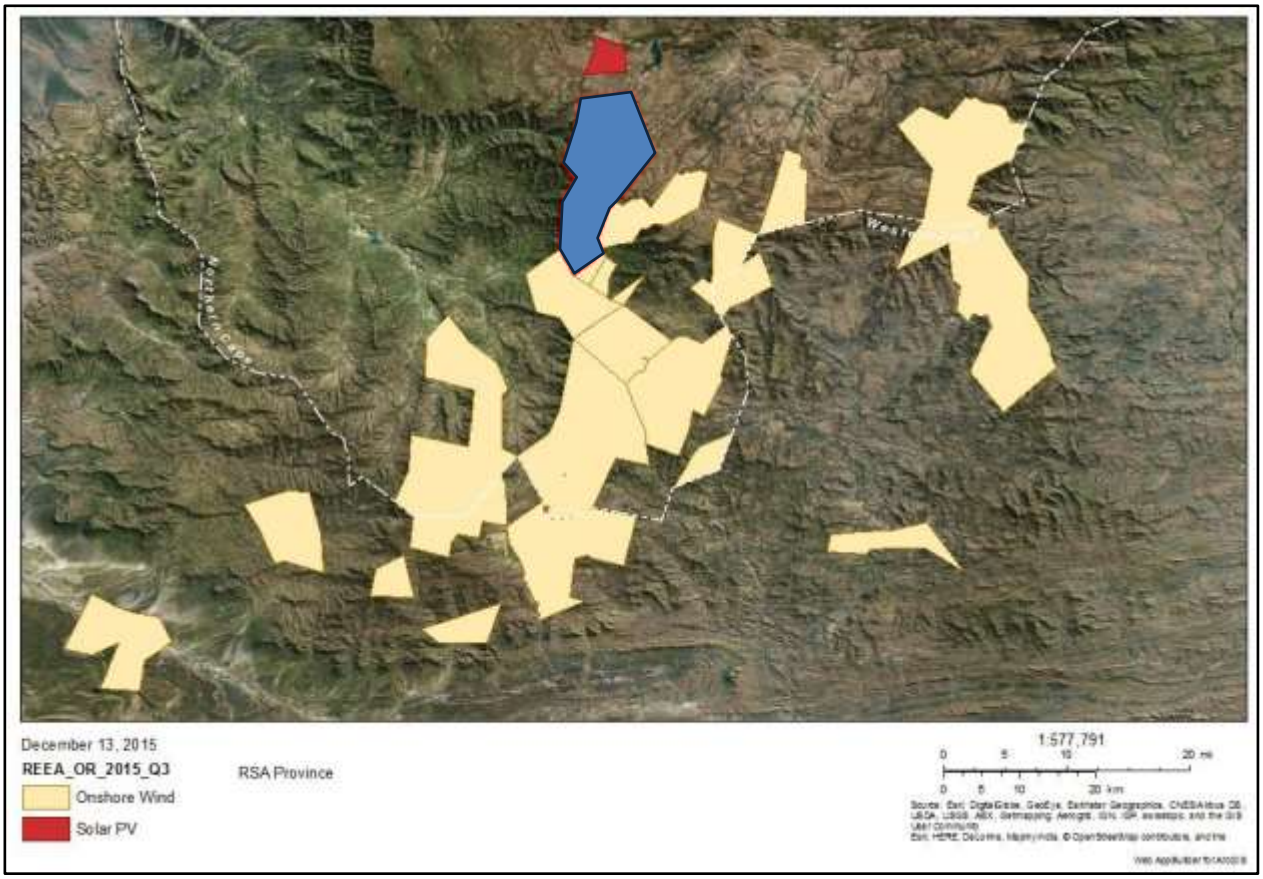

Figure 5. Current map of DEA-registered projects known from the vicinity of the Gunstfontein Wind Farm, which is shown in blue.

3.5 HABITAT DESCRIPTION

In this section, the switching station site and different sections of the power line are illustrated with pictures and descriptions of the affected habitats and plant species present.

Image 1. Typical habitat on the escarpment near to the on-site substation site. The vegetation is classified as Roggeveld Shale Renosterveld and is dominated by species such as *Rosenia oppositifolia*, *Pteronia glomerata*, *Euryops lateriflorus*, *Asparagus capensis*, *Dimophotheca cuneata*, *Elytropappus rhinocerotis*, *Eriocephalus ericoides* and *Selago articulata*.

Image 2. Vegetation on the escarpment slope along the route, within the Tanqua Escarpment Shrubland vegetation type. The vegetation is dominated by *Eriocephalus africanus, Elytropappus rhinocerotis, Chrysocoma ciliata, Ruschia cradockensis, Selago articulata, Diospyros austro-africana, Asparagus capensis, Eriocephalus microphyllus* var. *microphyllus, Pteronia glauca, Tylecodon wallachii, Tylecodon reticulatus, Galenia africana, Lycium cinereum, Nemesia fruticans.*

Image 3. Tanqua Wash Riviere along one of the larger drainage lines along the route. The drainage line and silty floodplains plains are dominated by species such as *Salsola aphylla, Pteronia paniculata, Pteronia incana, Lycium oxycarpum, Searsia lancea, Searsia burchelli, Salvia dispermas, Melianthus comosus, Phragmites australis, Searsia longispina, Diospyros lycioides* and *Acacia karoo*.

Image 4. Looking along the final section of the route towards the Soetwater substation site. The vegetation is dominated by Pteronia glauca, Pteronia incana, Pteronia paniculata, *Ruschia cradockensis, Pteronia sordida, Pentzia incana, Eriocephalus ericoides* var. *ericoides*, *Euphprobia decussata*, *Euphorbia mauritanica*.

3.6 FAUNAL COMMUNITIES

Mammals

The Gunstfontein power line route is likely to have moderate mammalian species richness. The site falls within or near the edge of the distribution range of at least 44 terrestrial mammals. Due to differences in vegetation, rainfall and other climatic variables, there is also likely to be a relatively large differentiation of the species associated with the plateau and the lower-lying areas towards Soetwater substation. The ridges, hills and uplands of the site, with rocky outcrops, rocky bluffs and cliffs provide suitable habitat for species which require or prefer rock cover such as Cape Rock Elephant Shrew, *Elephantulus edwardii*, Hewitt's Red Rock Hare *Pronolagus saundersiae*, Namaqua Rock Mouse *Micaelamys namaquensis* and Rock Hyrax, *Procavia capensis*. Larger species commonly observed on the plateau include Grey Rhebok, *Pelea capreolus* and Klipspringer, *Oreotragus oreotragus*. The introduced Fallow Deer, *Dama dama* is also common in the area and is likely to occur at the site. The lowlands are likely to contain an abundance of species associated with more vegetated lowland habitats on deeper soils and along drainage lines and floodplains, which includes Brants's Whistling Rat *Parotomys brantsii*, the Bush Vlei Rat *Otomys unisulcatus*, Hairy-footed Gerbil *Gerbillurus paeba* and Common Duiker *Sylvicapra grimmia*.

Listed species which may occur at the site include the Honey Badger *Mellivora capensis*, Black-footed Cat *Felis nigripes* (Vulnerable), Leopard *Panthera pardus* (Near Threatened) and Riverine Rabbit *Bunolagus monticularis* (Critically Endangered). Except for the Riverine Rabbit, all of these species have relatively large ranges across South Africa and the development of the power line would not result in a significant habitat loss for these species. Although the Riverine Rabbit *Bunolagus monticularis* is known to occur in the wider area, it is not known from the affected area and if it did occur would be restricted to the larger drainage systems in the lowlands of the route. Due to the low footprint of the power line within this area, it is not likely that there would be any significant impact on this species if it does occur in this area.

Reptiles

According to the distribution maps available in the literature, as many as 52 reptiles could occur within the assessed powerline corridor or in the general vicinity of the site. However, according to the records within the SARCA database, only 34 have been recorded in the area. Although the SARCA total is likely to be the most representative for the area, it is clear that the site is likely to have a relatively high reptile richness, which can be attributed to the location of a portion of the powerline traversing the great escarpment as well as the wide variety of habitats present. There is a relatively strong climatic gradient present at the

site and the reptile community on the warmer and drier lowland parts of the site are likely to be relatively distinct from that of the significantly wetter and colder uplands. In addition, there are many species associated with the rocky cliffs and outcrops along the escarpment. In terms of species of conservation concern, the only listed species recorded in the area is the Karoo Padloper *Homopus boulengeri* which is listed as Near Threatened.

Species observed in the area during the site visit or on other visits to the area include Karoo Tent Tortoise *Psammobates tentorius tentorius*, Angulate Tortoise *Chersina angulata*, Puff Adder *Bitis arietans*, Karoo Girdled Lizard *Cordylus polyzonus*, Southern Rock Agama *Agama atra*, Namaqua Plated Lizard *Gerrhosaurus typicus*, Cape Skink *Mabuya capensis*, Variegated Skink *Trachylepis variegata*, Common Sand Lizard *Pedioplanis lineoocellata pulchella* and Cape Cobra *Naja nivea*. Although there are a variety of different habitats present, the generally intact nature of the area means that most habitats have associated reptiles. Habitats of specific sensitivity include drainage lines and vleis and the rocky bluffs and cliffs of the site.

In terms of impacts of the development on reptiles, the major impact is likely to come from disturbance during the construction phase which would be transient and localised and consequently of low long-term consequence.

Common reptiles observed at the site include Variegated Skink (left) and Common Sand Lizard (right).

Amphibians

Only seven amphibians are likely to occur in the area, indicating that the frog diversity of the site is likely to be very low. No listed species are likely to occur in the area. All of the species recorded in the area are widespread species of low conservation concern.

Within the uplands species such the Cape River Frog *Amietia fuscigula* occurs along the larger drainage lines in pools and in the farm dams on the plateau. Species such as Karoo Caco *Cacosternum karooicum*, Karoo Toad *Vandijkophrynus gariepensis* and Cape Sand Frog *Tomopterna delalandii* are less dependent on water and are likely to be more widespread

across the site. Given the aridity or unsuitable steep nature of large parts of the site, the most important parts of the site for amphibians is the vicinity of the larger drainage lines across the site and the wetlands and pans of the higher-lying plateau area.

Erosion would be a primary risk factor for amphibians associated with the development, as this would impact water quality and amphibian habitat. During the construction phase, pollution, particularly from petrochemicals would also be a potential risk factor. With the appropriate mitigation, these risks can however be reduced to a low level.

3.7 SITE SENSITIVITY ASSESSMENT

The sensitivity map for the Gunstfontein to Soetwater 132kV line corridor is illustrated below in Figure 6. The major feature of the route, is the transition from the flat plateau area on Gunstfontein down the steep escarpment and onto the low plains below, before rising back up to the Soetwater substation. The steep slopes are considered sensitive on account of the high risk of erosion and other related ecological impacts in these areas. A significant reduction in impact results from the presence of an existing access route down the escarpment along the power line route. As a result, the construction of a new road down the escarpment would not be required and the total footprint of new disturbance in this sensitive area would be low. C*liffortia arborea* (VU) is also present on the escarpment in the vicinity of the power line route, but was not observed within the direct footprint of the line, but care should be taken to ensure that no individuals of this species are affected during construction.

Apart from the steep slopes, the other sensitive feature along the route are the numerous drainage lines in the lowlands of the middle section of the route. None of these are very large and it is likely that no pylons would need to be located within these areas and all drainage lines can be bridged.

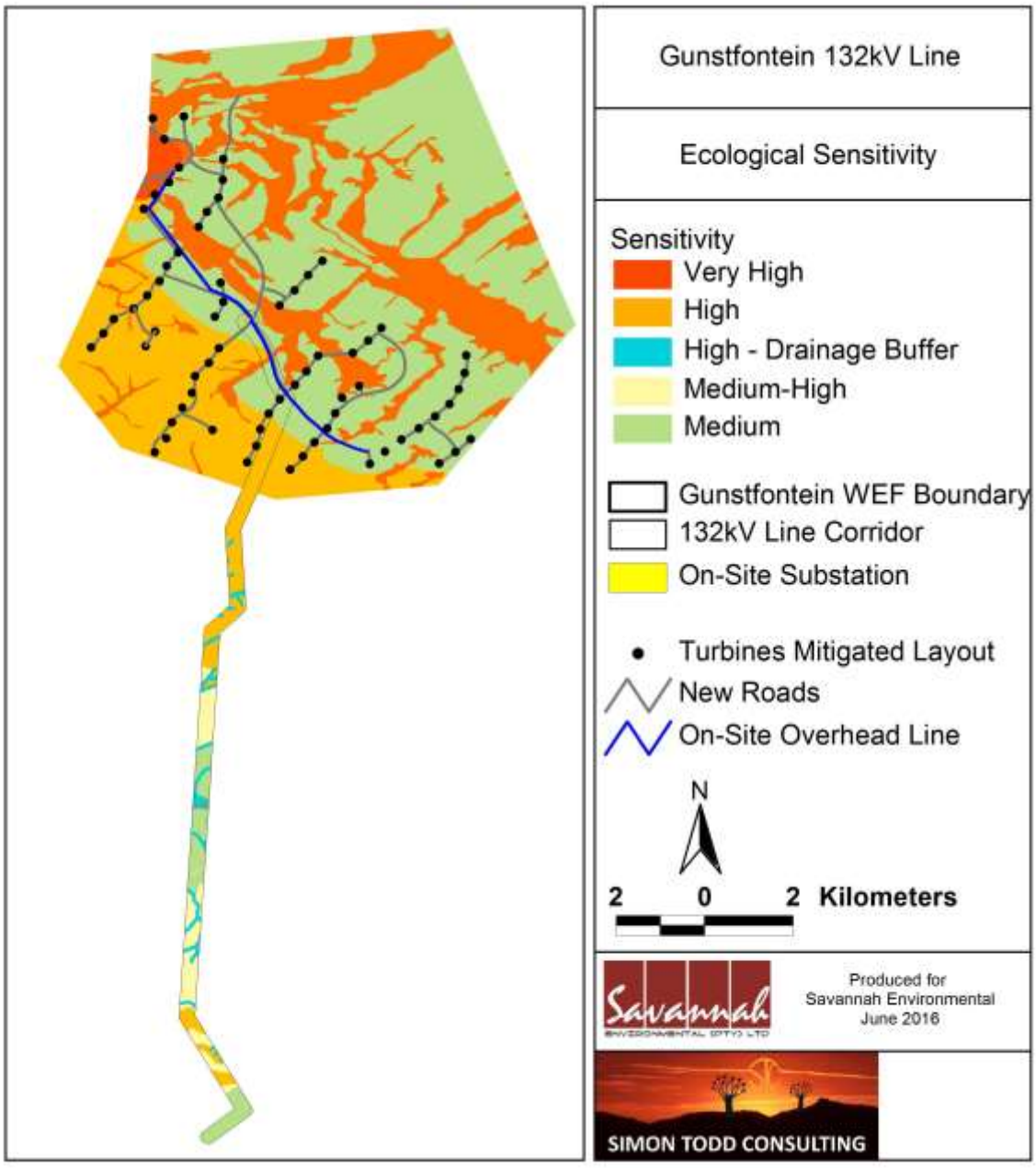

Figure 6. Ecological sensitivity map of the power line route corridor for the Gunstfontein to Soetwater 132kV line.

4 IDENTIFICATION & NATURE OF IMPACTS

The development of the Gunstfontein to Soetwater 132kV line would potentially result in a variety of impacts, associated largely with the disturbance, loss and transformation of intact vegetation and faunal habitat due to construction of the power line and switching station. The following impacts are identified as the major impacts associated with the development

and which are assessed for the preconstruction, construction, operational and decommissioning phases of the development.

Impacts on vegetation and protected plant species

The construction phase would require vegetation clearing for the construction of the on-site switching station as well as pylon foundations. Vegetation along the powerline route may also be impacted on by construction vehicles and machinery. Apart from a potential impact on listed species, there are a number of protected species in the area as well and some individuals of such species are highly likely to be impacted by the development, while some vegetation loss will also result from disturbance for roads, pylons and substation infrastructure.

Direct Faunal impacts

Construction phase noise, potential pollution from hydrocarbon spills, disturbance and human presence will be detrimental to fauna. Sensitive and shy fauna would move away from the area as a result of the noise and human activities present, while some slow-moving species might not be able to avoid the construction activities and might be killed. Some mammals or reptiles such as tortoises would be vulnerable to illegal collection or poaching during the construction phase as a result of increased human presence. Impact on fauna could be experienced in both operational and decommissioning phases

Alien Plant Invasion

Disturbance associated with the construction phase of the project will render the disturbed areas vulnerable to alien plant invasion. Some alien invasion is inevitable and regular alien clearing activities would likely be required to limit the extent of this invasion. Once the natural vegetation has returned to the disturbed areas, the site will be less vulnerable to alien plant invasion. Although the disturbance is generated during construction, this is of short duration and alien plants must be managed during operation as well as following decommissioning.

Impacts on drainage systems and hydrological processes

The development footprint includes a number of wetlands and drainage lines. Disturbance in these areas can have consequences for the biodiversity and hydrology of these systems. Although this is a potentially significant impact, the drainage lines along the route are small and can easily be spanned by the pylons and it will not be necessary to locate pylons within the drainage systems. In addition, there is already an access road along a large part of the route down the escarpment face and so additional disturbance for access during construction will not be required in this area. This impact would occur during construction and there would not be additional impact during operation.

Impacts on Critical Biodiversity Areas and broad-scale ecological processes

The majority of the power line corridor falls within an ESA with significant amounts of CBA as well. While CBAs are not no-go areas, development within CBAs is not encouraged as such development may compromise the ecological functioning of the CBA or result in direct biodiversity loss within the CBA if not approached carefully and managed effectively. In this regard the preconstruction walk-through of the final power line route would be an important measure to minimise direct impact of biodiversity. The footprint of the development is very small and is highly unlikely to generate a significant impact on ecological processes. In addition, the contribution of the current development to cumulative impacts on the CBA are small.

4.2 ASSESSMENT OF IMPACTS

Planning & Construction Phase Impacts

Impact 1: Impacts on vegetation & protected plant species during construction

Impact Nature: Impacts on vegetation and protected plant species will occur due to vegetation clearing and disturbance associated with the construction of the switching station, power line & ancillaries.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Medium-term (3)
Magnitude	Medium (5)	Low (3)
Probability	Probable (3)	Improbable (2)
Significance	Low (30)	Low (14)
Status	Negative	Negative
Reversibility	Medium	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Impacts on protected plant species can be mitigated through avoidance and a preconstruction walk-through	
Mitigation	• Preconstruction walk-through of the route and switching station site in order to locate species of conservation concern that should be avoided or translocated. • Construction to commence only after walk through has been conducted and necessary permits obtained from CapeNature and DENC. There are no protected trees at the site and a permit from DAFF would not be required. • Preconstruction environmental induction for all construction staff on	

	site to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas • ECO to provide supervision and oversight of vegetation clearing activities near sensitive areas. • Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared. • Existing access roads to be used as far as possible.
Cumulative Impacts	The potential for cumulative impacts is low given the small footprint of the power line
Residual Impacts	There would be little residual impact after mitigation as a result of the low impacts anticipated.

Impact 2. Faunal Impacts During Construction.

Impact Nature: Disturbance, transformation and loss of habitat will have a negative effect on resident fauna during construction.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Medium (4)	Medium-Low (3)
Probability	Probable (3)	Improbable (2)
Significance	Low (21)	Low (12)
Status	Negative	Negative
Reversibility	Medium	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	To a large extent, yes.	
Mitigation	• All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises, and owls which are often persecuted out of superstition. • Any fauna threatened by the construction activities should be removed to safety by the ECO or appropriately qualified person. • Implement regular dust suppression during construction, especially along gravel access roads which are used frequently. • No construction activity should be allowed at the site between sunset and sunrise as this is the period when many fauna are active with the	

	greatest risk of roadkill • All construction vehicles should adhere to a low speed limit (40km/h) to avoid collisions with susceptible species such as snakes and tortoises. • All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
Cumulative Impacts	During the construction phase, the activity would contribute to cumulative fauna disturbance and disruption in the area, but the impact would be of local extent, limited duration and not of high significance with mitigation.
Residual Impacts	With mitigation, there would be low residual impact.

Impact 3. Impacts on drainage features and hydrological impacts

Impact Nature: The power line would potentially impact on drainage lines and wetland areas during construction if there was disturbance and construction activity in these areas. This would impact on the biodiversity, hydrology and delivery of clean water from these systems. However, this impact can be well avoided as the drainage lines along the route are of a limited nature and can easily be spanned by the pylons and it would not be necessary to generate significant disturbance in these areas.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (1)
Magnitude	Medium-Low (4)	Low (3)
Probability	Highly Probable (4)	Probable (3)
Significance	**Low (28)**	**Low (15)**
Status	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes.	
Mitigation	• Where access roads traverse drainage features, care should be taken to ensure that low-level crossings or culverts are constructed in a manner which does not affect or alter the direction of flow in the channel. • Disturbed areas near to drainage channels should be regularly inspected during and after construction to ensure that erosion has not been initiated in these areas and resulting in bank or channel erosion due to changes in flow at crossings. • Where there is disturbance along the banks of ephemeral drainage channels and erosion risk may have been increased, measures to	

	reduce this risk should be implemented such as revegetation or the use of gabions to limit erosion impact. • During construction sediment traps and other measures may be necessary to ensure that there is not significant movement of silt and soil off disturbed areas near to drainage channels.
Cumulative Impacts	The development will contribute to impacts on drainage systems in the area, but the contribution will be low as there are few existing impacts along the power line route.
Residual Impacts	Some erosion risk will persist into the operational phase but provided that appropriate measures can be taken during construction, then impacts on drainage features can be minimised to directly affected areas.

Operation Phase Impacts

Impact 1. Increased alien plant invasion

Impact Nature: Alien plants are likely to invade along the power line route as a result of the disturbance created during construction. (The construction period is too short to have significant alien invasion within the construction phase and the resulting invasion risk will need to be managed during the operational phase)

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Medium (4)	Low (2)
Probability	Probable (3)	Improbable (2)
Significance	Low (27)	Low (14)
Status	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	
Mitigation	• Rehabilitation of cleared areas with indigenous species after construction to reduce alien invasion potential. • Regular monitoring and management for alien plants in disturbed areas for at least the first 2 years of operation. Bi-annual surveys are likely to be sufficient for this purpose. • If there are any infestations, alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible and should only be used for woody species which re-sprout following manual control.	

Cumulative Impacts	Alien invasion would contribute to cumulative habitat degradation in the area, but if alien species are controlled then cumulative impact from alien species would not be significant.
Residual Impacts	If alien species at the site are controlled, then there will be very little residual impact.

Impact 2. Impacts on Critical Biodiversity Areas and Broad-Scale Processes

Impact Nature: Several sections of the power line route is located within a CBA and the development could potentially impact on the ecological value and functioning of the affected CBAs.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Medium (4)	Low (2)
Probability	Probable (3)	Improbable (1)
Significance	Low (27)	Low (7)
Status	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	
Mitigation	• Rehabilitation of cleared areas with indigenous species after construction to reduce alien plant invasion and erosion potential. • Regular monitoring and management for alien plants and erosion impacts for 2 years following construction. Bi-annual surveys with associated remedial action would be sufficient.	
Cumulative Impacts	The development would contribute to cumulative habitat loss and degradation in the area, but the contribution would be low and is not considered significant.	
Residual Impacts	With mitigation there should be minimal residual impact on the terrestrial environment.	

Decommissioning & Closure

Impact 1. Faunal Impacts During Decommissioning

Impact Nature: Disturbance or persecution of fauna during the decommissioning phase may occur.		
	Without Mitigation	**With Mitigation**

Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Medium (4)	Low (2)
Probability	Probable (3)	Improbable (2)
Significance	Low (21)	Low (10)
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes.	
Mitigation	• The collection, hunting or harvesting of any plants or animals at the site or in the surrounding area by decommissioning personnel should be strictly forbidden. • Any accidental chemical, fuel, and oil spills that occur at the site during decommissioning should be cleaned up in the appropriate manner as related to the nature of the spill. • No open excavations, holes or pits should be left open for extended periods at the site as fauna can fall in and become trapped. Active pits and trenches should have soil ramps present to allow fauna to escape and all holes and trenches should be filled and levelled following removal of infrastructure. • All disturbed areas should be rehabilitated with a cover of indigenous species grown from seed or cuttings sourced locally.	
Cumulative Impacts	Cumulative impacts at the decommissioning phase are likely to be low.	
Residual Impacts	With avoidance measures there should be no residual impact on fauna.	

Impact 2. Increased alien plant invasion following decommissioning

Impact Nature: Alien plants are likely to invade the site as a result of disturbance created during decommissioning		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Short-term (2)
Magnitude	Medium (4)	Low (2)
Probability	Highly Probable (4)	Improbable (2)
Significance	Medium (36)	Low (10)
Status	Negative	Negative

Reversibility	Medium	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	
Mitigation	• Due to the disturbance at the site during decommissioning, alien plant species are likely to invade the site and a long-term control plan will need to be implemented for two to three years after decommissioning • Regular monitoring (bi-annual) for alien plants within the development footprint for two to three years after decommissioning. • Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible. The frequency of alien clearing events should be determined by the identity of the species present and the density of invasion. • Cleared and disturbed areas should be revegetated with a cover of indigenous grass or shrubs, to a minimum cover of at least 25% projected canopy cover.	
Cumulative Impacts	Alien invasion would contribute to cumulative habitat degradation in the area, but if alien species are controlled then cumulative impacts from alien species would not be significant.	
Residual Impacts	If alien species at the site are controlled, then there will be very little residual impact	

5 CONCLUSION & RECOMMENDATIONS

Although there are a number of sensitive areas along the Gunstfontein to Soetwater 132kV power line route, the major impacts can be mitigated to a low level of significance. The route down the escarpment is along an existing route which is significant as the construction of a new road down the escarpment will not be required and this significantly reduces the overall assessed impacts of the power line. There are however still some steep sections of the route towards the Soetwater Switching Station and specific mitigation of erosion impacts should be implemented along these sections to ensure that the construction of the power line does not initiate significant erosion.

Apart from the steep sections of the route, the route also traverses some low-lying areas with large drainage lines which should be avoided by the pylons. Since these are not very wide, it should be possible to span all drainage systems and impact on these areas can be minimised. The presence of listed species along the power line route is confirmed and impacts on these species can be minimised through a pre-construction walk through of the power line route and switching station footprint to ensure that any individuals directly beneath the line or within the footprint can be avoided. Although a large part of the

corridor is within an ESA and there are several sections of CBA, the overall footprint of the development would not be sufficient to compromise the ecological functioning of the ESA and CBA.

The impacts on vegetation and fauna within the proposed footprint is likely to be relatively low given the small footprint of the power line and switching station. Given the small footprint of the development, the construction and operation of the Gunstfontein to Soetwater 132kV line would not generate any impact of high negative significance. As a result, there do not appear to be any reasons to oppose the development of the proposed switching station, 132kV overhead powerline and ancillaries.

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7 APPENDIX 1. LISTED PLANT SPECIES

List of plant species of conservation concern which are known to occur in the vicinity of the Gunstfontein 132kV line. The list is derived from the SIBIS:SABIF website as at June 2015. Species in bold were observed at the site or within the wider area in the vicinity of the site.

Family	Species	IUCN Status
AMARYLLIDACEAE	***Boophone disticha***	**Declining**
AMARYLLIDACEAE	*Strumaria karooica*	Rare
AMARYLLIDACEAE	***Brunsvigia josephinae***	**VU**
APOCYNACEAE	*Hoodia gordonii*	DDD
APOCYNACEAE	*Hoodia pilifera subsp. pillansii*	DDT
ASPHODELACEAE	*Bulbine torta*	Rare
ASTERACEAE	*Gnaphalium declinatum*	NT
ASTERACEAE	***Eriocephalus grandiflorus***	**Rare**
ASTERACEAE	*Euryops marlothii*	Rare
ASTERACEAE	*Euryops petraeus*	Rare
ASTERACEAE	*Phymaspermum schroeteri*	Rare
CRASSULACEAE	*Adromischus humilis*	Rare
CRASSULACEAE	***Adromischus phillipsiae***	**Rare**
CRASSULACEAE	*Crassula roggeveldii*	Rare
CRASSULACEAE	*Crassula rupestris subsp. commutata*	Rare
ERICACEAE	*Erica caffrorum var. glomerata*	DDT
HYACINTHACEAE	***Lachenalia congesta***	**Rare**
IRIDACEAE	*Romulea komsbergensis*	NT
IRIDACEAE	*Romulea subfistulosa*	NT
IRIDACEAE	*Ixia brevituba*	Rare
IRIDACEAE	*Romulea multifida*	VU
IRIDACEAE	*Romulea syringodeoflora*	VU
MESEMBRYANTHEMACEAE	***Delosperma sphalmanthoides***	**DDT**
MESEMBRYANTHEMACEAE	*Ruschia inclusa*	DDT
POACEAE	*Helictotrichon namaquense*	VU
PROTEACEAE	*Protea venusta*	EN
ROSACEAE	***Cliffortia arborea***	**VU**
SANTALACEAE	*Thesium marlothii*	DDT
SCROPHULARIACEAE	*Manulea incana*	DDD

8 APPENDIX 2. LIST OF MAMMALS

List of Mammals which potentially occur at the Gunstfontein 132kV line. Taxonomy and habitat notes are derived from Skinner & Chimimba (2005), while conservation status is according to the IUCN 2015.

Scientific Name	Common Name	Status	Habitat	Likelihood
Afrosoricida (Golden Moles):				
Chlorotalpa sclateri	Sclater's Golden Mole	LC	Montane grasslands, scrub and forested kloofs of the Nama Karoo and grassland biomes	High
Chrysochloris asiatica	Cape Golden Mole	LC	Coastal parts of the Northern and Western Cape	High
Macroscledidea (Elephant Shrews):				
Macroscelides proboscideus	Round-eared Elephant Shrew	LC	Species of open country, with preference for shrub bush and sparse grass cover, also occur on hard gravel plains with sparse boulders for shelter, and on loose sandy soil provided there is some bush cover	High
Elephantulus edwardii	Cape Rock Elephant Shrew	LC	From rocky slopes, with or without vegetation, from hard sandy ground bearing little vegetation, quite small rocky outcrops	High
Tubulentata:				
Orycteropus afer	Aardvark	LC	Wide habitat tolerance, being found in open woodland, scrub and grassland, especially associated with sandy soil	High
Hyracoidea (Hyraxes)				
Procavia capensis	Rock Hyrax	LC	Outcrops of rocks, especially granite formations and dolomite intrusions in the Karoo. Also erosion gullies	High
Lagomorpha (Hares and Rabbits):				
Bunolagus monticularis	Riverine Rabbit	CR	Confined to riparian bush on the narrow alluvial fringe of seasonally dry watercourses in the Central Karoo.	Possible
Pronolagus saundersiae	Hewitt's Red Rock Hare	LR/LC	Confined to areas of krantzes, rocky hillsides, boulder-strewn koppies and rocky ravines	High
Lepus capensis	Cape Hare	LR/LC	Dry, open regions, with palatable bush and grass	High
Lepus saxatilis	Scrub Hare	LR/LC	Common in agriculturally developed areas, especially in crop-growing areas or in fallow lands where there is some bush development.	High
Rodentia (Rodents):				
Cryptomys hottentotus	African Mole Rat	LC	Wide diversity of substrates, from sandy soils to heavier compact substrates such as decomposed schists and stony soils	High
Hystrix africaeaustralis	Cape Porcupine	LC	Catholic in habitat requirements.	High

Graphiurus ocularis	Spectacled Dormouse	LC	Associated with sandstones of Cape Fold mountains, which have many vertical and horizontal crevices.	High
Acomys subspinosus	Cape Spiny Mouse	LC	Associated with rocky areas on mountain slopes in Fynbos	Low
Rhabdomys pumilio	Four-striped Grass Mouse	LC	Essentially a grassland species, occurs in wide variety of habitats where there is good grass cover.	High
Mus minutoides	Pygmy Mouse	LC	Wide habitat tolerance	High
Micaelamys namaquensis	Namaqua Rock Mouse	LC	Catholic in their habitat requirements, but where there are rocky koppies, outcrops or boulder-strewn hillsides they use these preferentially	High
Micaelamys granti	Grant's Rock Mouse	LC	Restricted to the karoo where they are associated with rocky terrain.	High
Parotomys brantsii	Brants's Whistling Rat	LC	Associated with a dry sandy substrate in more arid parts of the Nama-karoo and Succulent Karoo. Species selects areas of low percentage of plant cover and areas with deep sands.	High
Parotomys littledalei	Littledale's Whistling Rat	LC	Riverine associations or associated with Lycium bushes or Psilocaulon absimile	Low
Otomys unisulcatus	Bush Vlei Rat	LC	Shrub and fynbos associations in areas with rocky outcrops Tend to avoid damp situations but exploit the semi-arid Karoo through behavioural adaptation.	High
Desmodillus auricularis	Cape Short-tailed Gerbil	LC	Tend to occur on hard ground, unlike other gerbil species, with some cover of grass or karroid bush	High
Gerbillurus paeba	Hairy-footed Gerbil	LC	Gerbils associated with Nama and Succulent Karoo preferring sandy soil or sandy alluvium with a grass, scrub or light woodland cover	High
Tatera afra	Cape Gerbil	LC	Confined to areas of loose, sandy soils of sandy alluvium. Common on cultivated lands.	Low
Malacothrix typica	Gerbil Mouse	LC	Found predominantly in Nama and Succulent Karoo biomes, in areas with a mean annual rainfall of 150-500 mm.	High
Dendromus melanotis	Grey Climbing Mouse	LC	Often associated with stands of tall grass especially if thickened with bushes and other vegetation	High
Primates:				
Papio hamadryas	Chacma Baboon	LR/LC	Can exploit fynbos, montane grasslands, riverine courses in deserts, and simply need water and access to refuges.	High
Eulipotyphla (Shrews):				
Myosorex varius	Forest Shrew	LC	Prefers moist, densely vegetated habitat	High

Crocidura cyanea	Reddish-Grey Musk Shrew	LC	Occurs in relatively dry terrain, with a mean annual rainfall of less than 500 mm. Occur in karroid scrub and in fynbos often in association with rocks.	High
Carnivora:				
Proteles cristatus	Aardwolf	LR/LC	Common in the 100-600mm rainfall range of country, Nama-Karoo, Succulent Karoo Grassland and Savanna biomes	High
Caracal caracal	Caracal	LC	Caracals tolerate arid regions, occur in semi-desert and karroid conditions	High
Felis silvestris	African Wild Cat	LC	Wide habitat tolerance.	High
Panthera pardus	Leopard	SARDB NT	Wide habitat tolerance, associated with areas of rocky koppies and hills, mountain ranges and forest	Low/Moderate
Felis nigripes	Black-footed cat	VU	Associated with arid country with MAR 100-500 mm, particularly areas with open habitat that provides some cover in the form of tall stands of grass or scrub.	High
Genetta genetta	Small-spotted genet	LR/LC	Occur in open arid associations	High
Genetta tigrina	Large-spotted genet	LR/LC	Fynbos and savanna particularly along riverine areas	Low
Suricata suricatta	Meerkat	LR/LC	Open arid country where substrate is hard and stony. Occur in Nama and Succulent Karoo but also fynbos	High
Cynictis penicillata	Yellow Mongoose	LR/LC	Semi-arid country on a sandy substrate	High
Galerella pulverulenta	Cape Grey Mongoose	LR/LC	Wide habitat tolerance	High
Vulpes chama	Cape Fox	LC	Associated with open country, open grassland, grassland with scattered thickets and coastal or semi-desert scrub	High
Canis mesomelas	Black-backed Jackal	LC	Wide habitat tolerance, more common in drier areas.	High
Otocyon megalotis	Bat-eared Fox	LC	Open country with mean annual rainfall of 100-600 mm	High
Aonyx capensis	Cape Clawless Otter	LC	Predominantly aquatic and do not occur far from permanenetpermanenet water	Medium
Ictonyx striatus	Striped Polecat	LR/LC	Widely distributed throughout the sub-region	High
Mellivora capensis	Ratel/Honey Badger	SARDB EN	Catholic habitat requirements	High
Rumanantia (Antelope):				
Sylvicapra grimmia	Common Duiker	LR/LC	Presence of bushes is essential	High
Pelea capreolus	Grey Rhebok	LC	Associated with rocky hills, rocky mountainsides, mountain plateaux with good grass cover.	High
Antidorcas marsupialis	Springbok	LC	Arid regions and open grassland.	High
Raphicerus campestris	Steenbok	LR/LC	Inhabits open country,	High

Raphicerus melanotis	Cape Grysbok	LC	Thick scrub bush, particularly along the lower levels of hills	Medium
Oreotragus oreotragus	Klipspringer	LR/cd	Closely confined to rocky habitat.	High

9 APPENDIX 3. LIST OF REPTILES.

List of reptiles which are known from the broad area around the Gunstfontein 132kV Line, according to the SARCA database, derived for the degree squares 3220 and 3221. Status is according to Bates et al. (2014).

Family	Genus	Species	Subspecies	Common name	Red list category	No. records
Agamidae	*Agama*	*atra*		Southern Rock Agama	Least Concern	20
Agamidae	*Agama*	*hispida*		Spiny Ground Agama	Least Concern	1
Chamaeleonidae	*Bradypodion*	*gutturale*		Little Karoo Dwarf Chameleon	Least Concern	2
Chamaeleonidae	*Chamaeleo*	*namaquensis*		Namaqua Chameleon	Least Concern	1
Colubridae	*Boaedon*	*capensis*		Brown House Snake	Least Concern	2
Colubridae	*Dipsina*	*multimaculata*		Dwarf Beaked Snake	Least Concern	1
Colubridae	*Lamprophis*	*guttatus*		Spotted House Snake	Least Concern	2
Colubridae	*Prosymna*	*sundevallii*		Sundevall's Shovel-snout	Least Concern	1
Colubridae	*Psammophis*	*crucifer*		Cross-marked Grass Snake	Least Concern	1
Colubridae	*Psammophis*	*notostictus*		Karoo Sand Snake	Least Concern	4
Colubridae	*Pseudaspis*	*cana*		Mole Snake	Least Concern	1
Cordylidae	*Cordylus*	*cloetei*		Cloete's Girdled Lizard	Least Concern	14
Cordylidae	*Cordylus*	*minor*		Western Dwarf Girdled Lizard	Least Concern	6
Cordylidae	*Karusasaurus*	*polyzonus*		Karoo Girdled Lizard	Least Concern	22
Cordylidae	*Pseudocordylus*	*microlepidotus*	*namaquensis*	Nuweveldberg Crag Lizard	Least Concern	4
Elapidae	*Aspidelaps*	*lubricus*	*lubricus*	Coral Shield Cobra	Not listed	2
Elapidae	*Hemachatus*	*haemachatus*		Rinkhals	Least Concern	4
Elapidae	*Naja*	*nivea*		Cape Cobra	Least Concern	2
Gekkonidae	*Chondrodactylus*	*angulifer*	*angulifer*	Common Giant Ground Gecko	Least Concern	1
Gekkonidae	*Chondrodactylus*	*bibronii*		Bibron's Gecko	Least Concern	4
Gekkonidae	*Goggia*	*lineata*		Striped Pygmy Gecko	Least Concern	1
Gekkonidae	*Pachydactylus*	*capensis*		Cape Gecko	Least Concern	3
Gekkonidae	*Pachydactylus*	*geitje*		Ocellated Gecko	Least Concern	5
Gekkonidae	*Pachydactylus*	*kladaroderma*		Thin-skinned Gecko	Least Concern	13
Gekkonidae	*Pachydactylus*	*mariquensis*		Marico Gecko	Least Concern	3
Gekkonidae	*Pachydactylus*	*oculatus*		Golden Spotted Gecko	Least Concern	27
Gekkonidae	*Pachydactylus*	*purcelli*		Purcell's Gecko	Least Concern	7
Gekkonidae	*Pachydactylus*	*weberi*		Weber's Gecko	Least Concern	1
Gerrhosauridae	*Tetradactylus*	*tetradactylus*		Cape Long-tailed Seps	Least Concern	1
Lacertidae	*Meroles*	*suborbitalis*		Spotted Desert Lizard	Least Concern	1
Lacertidae	*Nucras*	*tessellata*		Western Sandveld Lizard	Least Concern	4

Lacertidae	*Pedioplanis*	*burchelli*		Burchell's Sand Lizard	Least Concern	3
Lacertidae	*Pedioplanis*	*lineoocellata*	*pulchella*	Common Sand Lizard	Least Concern	13
Lacertidae	*Pedioplanis*	*namaquensis*		Namaqua Sand Lizard	Least Concern	2
Scincidae	*Trachylepis*	*sulcata*	*sulcata*	Western Rock Skink	Least Concern	4
Scincidae	*Trachylepis*	*variegata*		Variegated Skink	Least Concern	9
Testudinidae	*Chersina*	*angulata*		Angulate Tortoise	Least Concern	4
Testudinidae	*Homopus*	*boulengeri*		Karoo Padloper	Near Threatened	2
Testudinidae	*Homopus*	*femoralis*		Greater Padloper	Least Concern	3
Testudinidae	*Psammobates*	*tentorius*	*tentorius*	Karoo Tent Tortoise	Not listed	8
Testudinidae	*Psammobates*	*tentorius*	*verroxii*	Verrox's Tent Tortoise	Not listed	1

10 APPENDIX 4. LIST OF AMPHIBIANS

List of amphibians which potentially occur at the Gunstfontein 132kV Line. Taxonomy and habitat notes are from du Preez and Carruthers (2009) and conservation status from the Minter et al. (2004).

Scientific Name	Common Name	Status	Habitat	Distribution	Likelihood
Amietophrynus rangeri	Raucous Toad	Not Threatened	Rivers and stream in grassland and fynbos	Endemic	High
Vandijkophrynus gariepensis	Karoo Toad	Not Threatened	Karoo Scrub	Widespread	High
Xenopus laevis	Common Platanna	Not Threatened	Any more or less permanent water	Widespread	High
Cacosternum boettgeri	Common Caco	Not Threatened	Marshy areas, vleis and shallow pans	Widespread	High
Amietia fuscigula	Cape River Frog	Not Threatened	Large still bodies of water or permanent streams and rivers.	Widespread	Confirmed
Cacosternum karooicum	Karoo Dainty Frog	Data Deficient	Arid areas with unpredictable rainfall. Breeds in small streams as well as man-made dams.	Karoo Endemic	High
Tomopterna delalandii	Cape Sand Frog	Not Threatened	Lowlands in fynbos and Succulent Karoo	Endemic	High
Tomopterna tandyi	Tandy's Sand Frog	Not Threatened	Nama karoo grassland and savanan	Widespread	High