BASIC ASSESSMENT PROCESS FOR DEVIATIONS ON THE APPROVED JUNO - GROMIS LINE

FAUNA & FLORA SPECIALIST REPORT FOR BASIC ASSESSMENT

PREPARED FOR NSOVO ENVIRONMENTAL CONSULTING

BY

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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, 2010 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, 2010 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) 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 regulation 71 of GN No. R. 543.

Note: The terms of reference must be attached.

Simon Todd Pr.Sci.Nat 400425/11.
October 2014

1 INTRODUCTION

Eskom has received authorisation for the construction of a 400kV line from Juno substation near Vredendal in the Western Cape to Gromis in the Northern Cape near Kleinsee. However, due to a variety of existing developments along the authorised route, three deviations have been proposed to avoid these features. As this requires an amendment to the original authorisation, a Basic Assessment process has been initiated. As part of the required studies for the amendment, this fauna and flora specialist report details the ecological characteristics of the deviated sections of the line and provides an assessment of the likely ecological impacts likely to be associated with the development of the proposed deviations. 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 environ mint may be affected by the proposed project
- a description and evaluation of environmental issues and potential impacts (incl. using 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.
- Recommendations for mitigatory measures to minimise impacts identified.
- An outline of additional management guidelines.
- Provide monitoring requirements, mitigation measures and recommendations in a table format as input into the Environmental Management Plan (EMP) for 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

1.2 ASSESSMENT APPROACH & PHILOSOPHY

The assessment will be conducted according to the 2014 EIA Regulations, 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 issues

- Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity.
- The extent of alien plant cover 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.
- All relevant legislation, permits and standards that would apply to the development will be identified.
- The opportunities and constraints for development will be described and shown graphically on an aerial photograph, satellite image or map delineated at an appropriate level of spatial accuracy.

1.3 RELEVANT ASPECTS OF THE DEVELOPMENT

There are three deviations considered on this report, the first is near the Lutzville Landing strip, the second at the Namakwa Sands Tronox Mine and the third at a proposed mine near the Kamiesberg. The three deviations considered are illustrated below in Figure 1 and are between 13 and 30km in length.

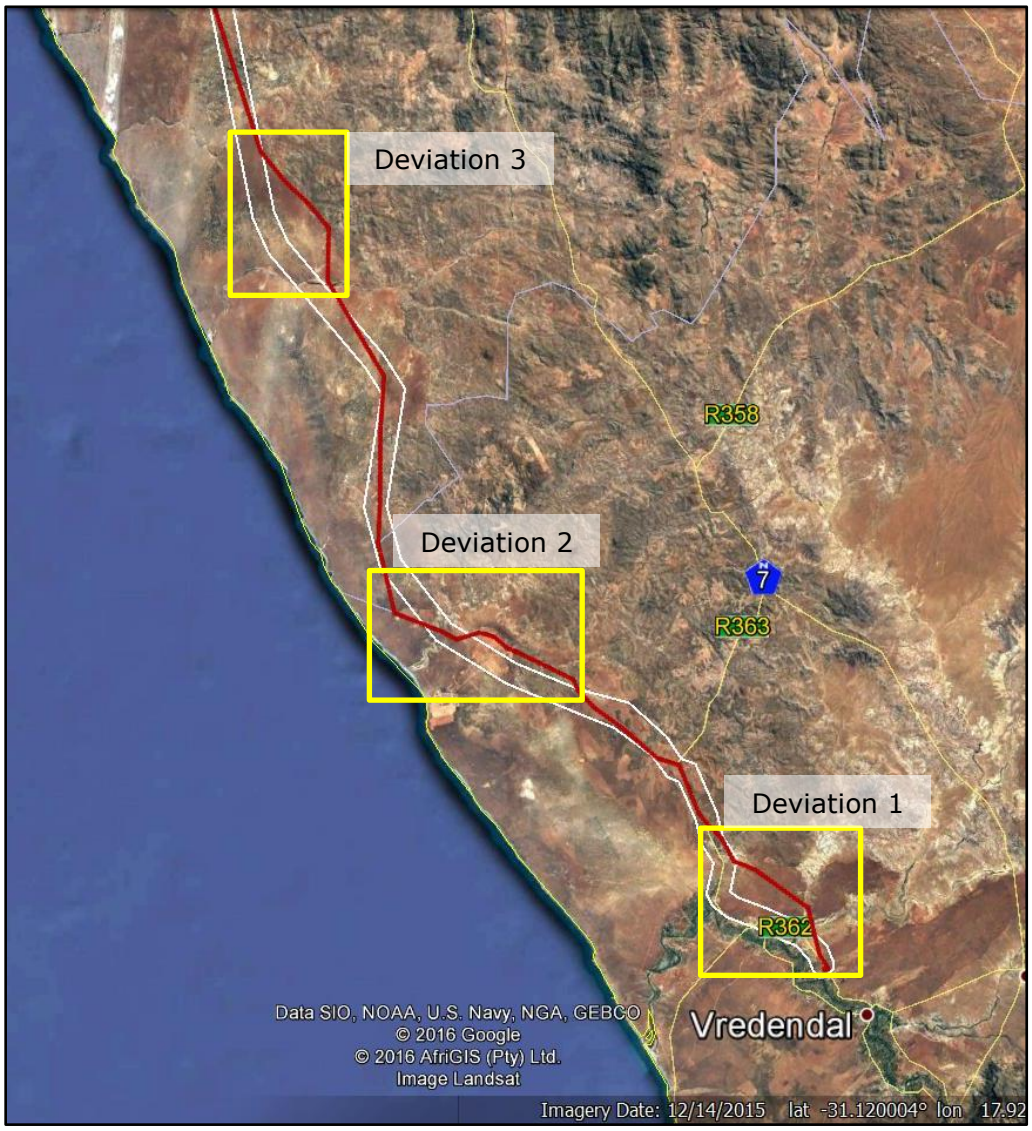

Figure 1. Satellite image of the study area, showing the three deviated sections of the power line that are considered in this report.

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. Helme's (2007)

report on fine scale vegetation mapping in the Sandveld was also consulted where relevant and is used as an alternative to the national vegetation map.

- Critical Biodiversity Areas for the site and surroundings were extracted from the *Fine Scale Conservation Plan for the Matzikama District* which forms part of the C.A.P.E. Fine-scale Biodiversity Planning Project (Pence 2008) as well as the Biodiversity Sector Plan for the Namakwa District ().
- Information on plant and animal species recorded for the affected Quarter Degree Squares was extracted from the SABIF/SIBIS database hosted by SANBI. Although these are considerably larger than the study area, this is necessary to ensure a conservative approach as well as counter the fact that the study areas have not been well sampled in the past.
- The IUCN conservation status (Figure 2) 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 (2016).
- 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 (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.
- Apart from the literature sources, additional information on reptiles were extracted from the SARCA web portal, hosted by the ADU, http://vmus.adu.org.za for the affected quarter degree squares
- 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.

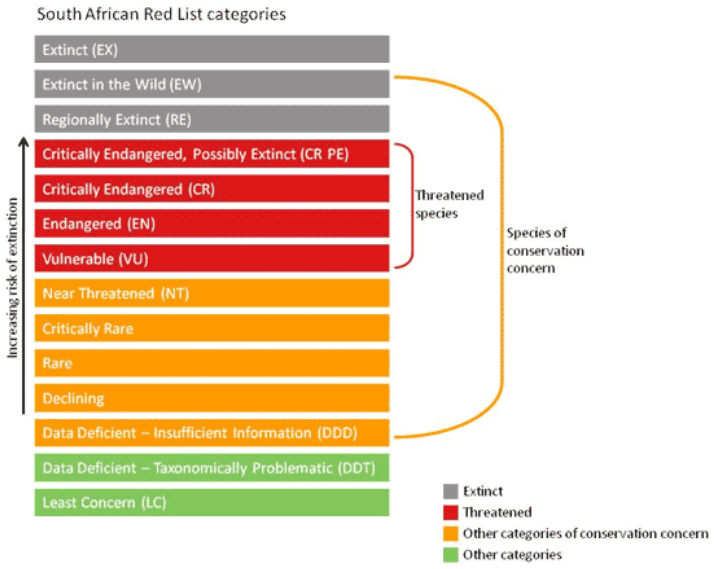

Figure 2. Schematic representation of the South African Red List categories. Taken from http://redlist.sanbi.org/redcat.php

2.2 Site Visit

The affected sections were walked in their entirety during September 2016 and all plant species along the route recorded. Observations of fauna were also made along the routes and any sensitive fauna and flora features along the proposed route recorded and mapped. Photographs of sensitive features and habitats within the affected areas were taken for documentation purposes. Where sensitive features occurred along the route, alternative alignments and pylon placements were investigated and identified in the field.

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 observed 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 current site visit took place in the peak of the spring season at the optimal time for sampling. As such there are few limitations associated with the sampling as the vast majority of species present were flowering or actively growing at the time of the site visit. 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. 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

The different vegetation types affected by the deviations are illustrated (Figure 3, 4 and 5) and described in detail below. Deviation 1 consists largely of Namaqualand Spinescent Grassland, with a small section of Knersvlakte Quartz Vygieveld and Namaqualand Riviere along the Hol and Moedverloor rivers. Deviation 2 consists largely of Namaqualand Strandveld with some short sections of Namaqualand Sand Fynbos and Knersvlakte Quartz Vygieveld. Deviation 3 consists of Namaqualand Heuweltjieveld, Namaqualand Strandveld and a lesser extent of Namaqualand Inland Duneveld and a short extent of Namaqualand Riviere along the Groen River.

Namaqualand Spinescent Grassland occupies 522 km^2 of the Knersvlakte from north and east of Vredendal to Lutzville and Koekenaap. It is restricted to deep red, undifferentiated aeolian sands with a very low stone content. The vegetation is dominated by the spiny shrub-like grass *Cladoraphis spinosa* and a few scattered emergent taller shrubs, both succulent and non-succulent (Mucina & Rutherford 2006). Geophytes and annuals occur in the grass-shrub matrix. Namaqualand Spinescent Grassland has not been heavily impacted by intensive agriculture and 96% of the original extent remains. This vegetation unit is however poorly conserved as only 4% of the target of 26% is conserved. Namaqualand Spinescent Grassland is classified as Least Threatened. While there are some endemic species know from this vegetation type, the overall abundance of species of conservation concern within this unit is generally low and at a broad scale it is considered relatively low sensitivity. This is the dominant vegetation type along Deviation 1 but does not occur along the other deviations.

According to Mucina and Rutherford (2006), Knersvlakte Quartz Vgieveld is distributed in the Knersvlakte from Bitterfontein southwards to just south of Klawer, with the main centre north and northwest of Vanryhnsdorp. It occurs at an altitude of 40-460m across slightly undulating landscapes with slopes and broad ridges covered by prominent but patchy layer of quartzite. The vegetation consists of dwarf succulent shrubland with a high proportion of compact vygies (Aizoaceae) amidst a matrix of low succulent shrubs, dominated by *Ruschia* and *Drosanthemum* (Mucina & Rutherford 2006). This vegetation unit carries one of the largest local densities of endemic plants, of more than 60 species and 3 genera. The vegetation type is classified as Least Threatened, with a conservation target of 28%. Only 5% is statutorily conserved in Moedverloren Nature Reserve (Mucina & Rutherford 2006), although this has been increased recently with the expansion of the Knersvlakte Nature Reserve. Given the high abundance of species of conservation concern within this vegetation type it is considered generally sensitive. However, the distribution of species of concern is concentrated within quartz patches while on deeper soils there are usually fewer species of concern around us. Knersvlakte Quartz Vygieveld occurs in short sections along Deviation 1 and Deviation 2 usually on the lower lying ground along slopes towards the drainage lines.

Namaqualand Riviere vegetation is a complex of alluvial shrubland (*Suaeda fruticosa, Zygophyllum morgsana, Ballota africana*) and patches of tussock graminoids occupying riverbeds and banks of intermittent rivers, throughout Namaqualand (Mucina & Rutherford 2006). It occurs on alluvial sandy soils on Quarternary fluviatile sediments and is seasonally wet (late winter). It is considered Least Threatened although only a very small portion has been formally conserved and almost 20% has been transformed for cultivation. The riparian vegetation is susceptible to invasion by indigenous and alien invasive plant species (Mucina & Rutherford 2006). Given the ecological role of these areas, it is considered a broadly sensitive vegetation type that should be avoided as much as possible. This unit occurs along the major drainage lines of Deviation 1 and Deviation 3.

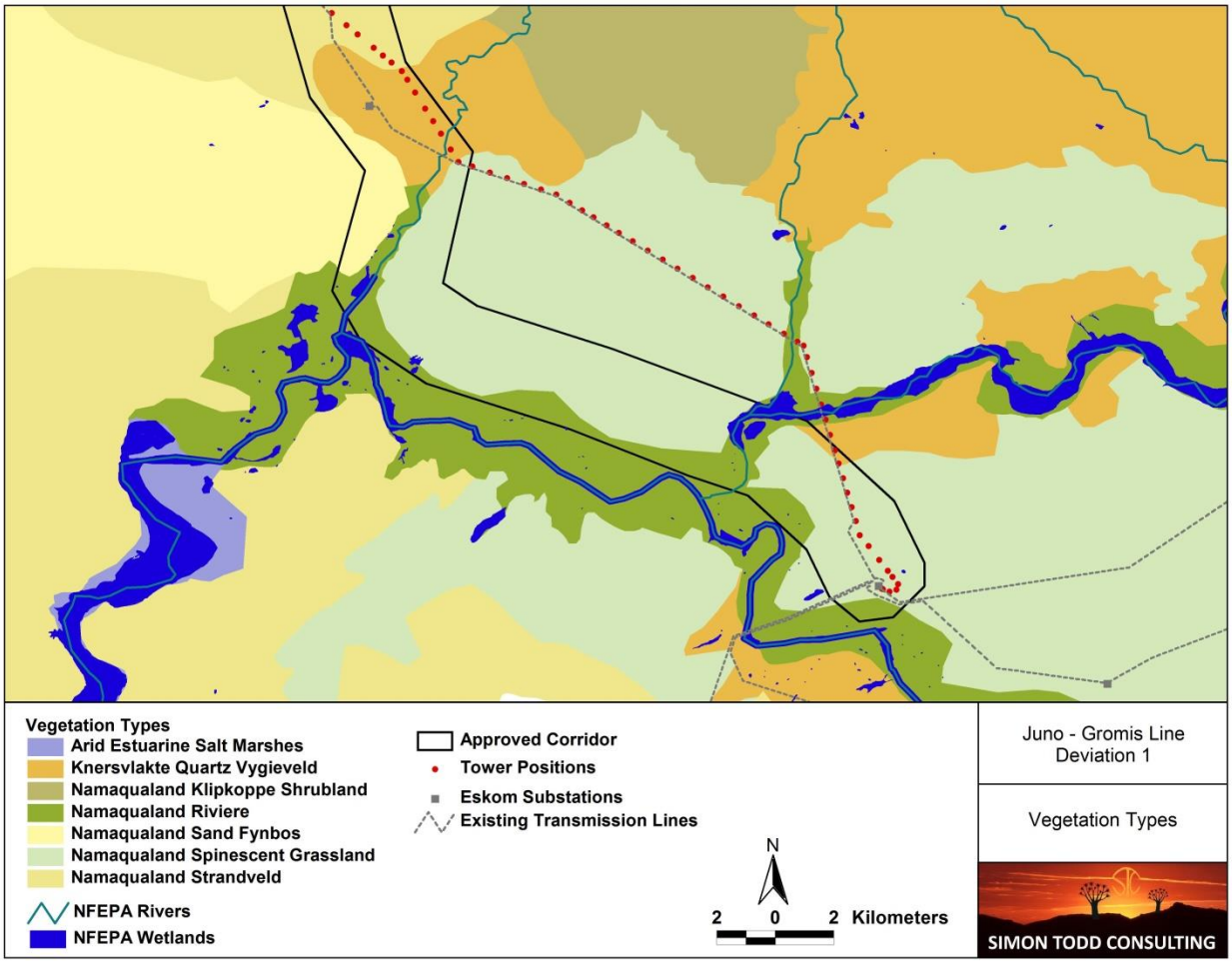

Figure 3. Broad-scale overview of the vegetation in and around Deviation 1, according to the national vegetation map as produced by Mucina & Rutherford (2006).

Namaqualand Strandveld occurs in the Northern and Western Cape from the southern Richtersveld to Donkins Bay in the south. This vegetation unit may penetrate as much as 40 km inland, but is separated from the coast by Namaqualand Coastal Duneveld. It occurs on the coastal peneplain, associated with stabilised aeolian deep red yellowish red stable dunes and deep sand overlying marine sediments and granite gneisses. The vegetation consist of low species-rich shrubland dominated by erect and creeping succulent shrubs as well as nonsucculent shrubs. It has a rich component of annual and perennial flora, producing spectacular spring displays. Mucina & Rutherford (2006) list 8 endemic species for this vegetation type, however this is an underestimate and there are certainly more than twice this number as undescribed species are regularly encountered in this vegetation unit as it has not been well investigated in the past. This vegetation type is threatened by mining for heavy metals, and about 10% has been lost to date, but it is still listed as Least Threatened. This is generally considered a moderately sensitive vegetation type with moderate levels of species of conservation present. This is the dominant vegetation type along Deviation 2 and occupies approximately half of Deviation 3.

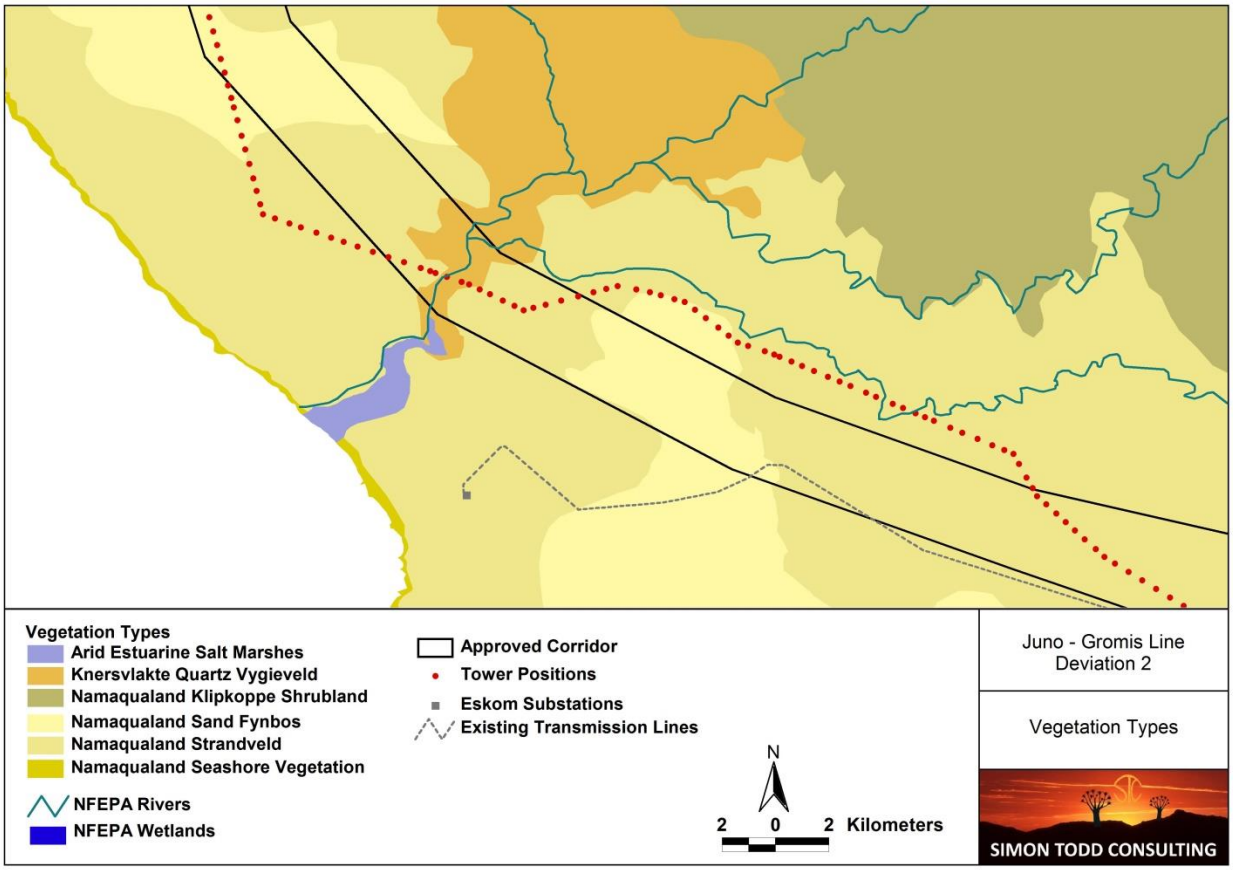

Figure 4. Broad-scale overview of the vegetation in and around Deviation 2, according to the national vegetation map as produced by Mucina & Rutherford (2009).

Namaqualand Sand Fynbos occurs on the coastal plains of the Western and Northern Cape province with a well-separated patch between Kommeggas and Koingnaas in the north and a series of patches south of the Olifants river near Koekenaap (Mucina & Rutherford 2006). The vegetation occurs on slightly undulating plains comprising both isolated streets and dune fields of aeolian sand and consist of scattered 1-1,5m tall shrubs amidst dominant restioids and asteraceous fynbos with localized pockets of proteoid fynbos. There are substantial differences between the dune ridges and dune slacks, with dune slacks far more succulent and of higher diversity than the surrounding strandveld habitats (Mucina & Rutherford 2006). The conservation status of this vegetation type is Least Threatened but only about 1-2% has been statutorily conserved and the target is 29% (Mucina & Rutherford 2006). The vegetation is subject to extensive sheep grazing. This is considered a generally sensitive vegetation unit as the extent of this unit is relatively limited and it is restricted to specific 'sand seas' and it also has a relatively high abundance of species of conservation concern. This vegetation type occurs along two short sections of Deviation 2

but the overall extent affected has been reduced compared to the original alignment of the power line.

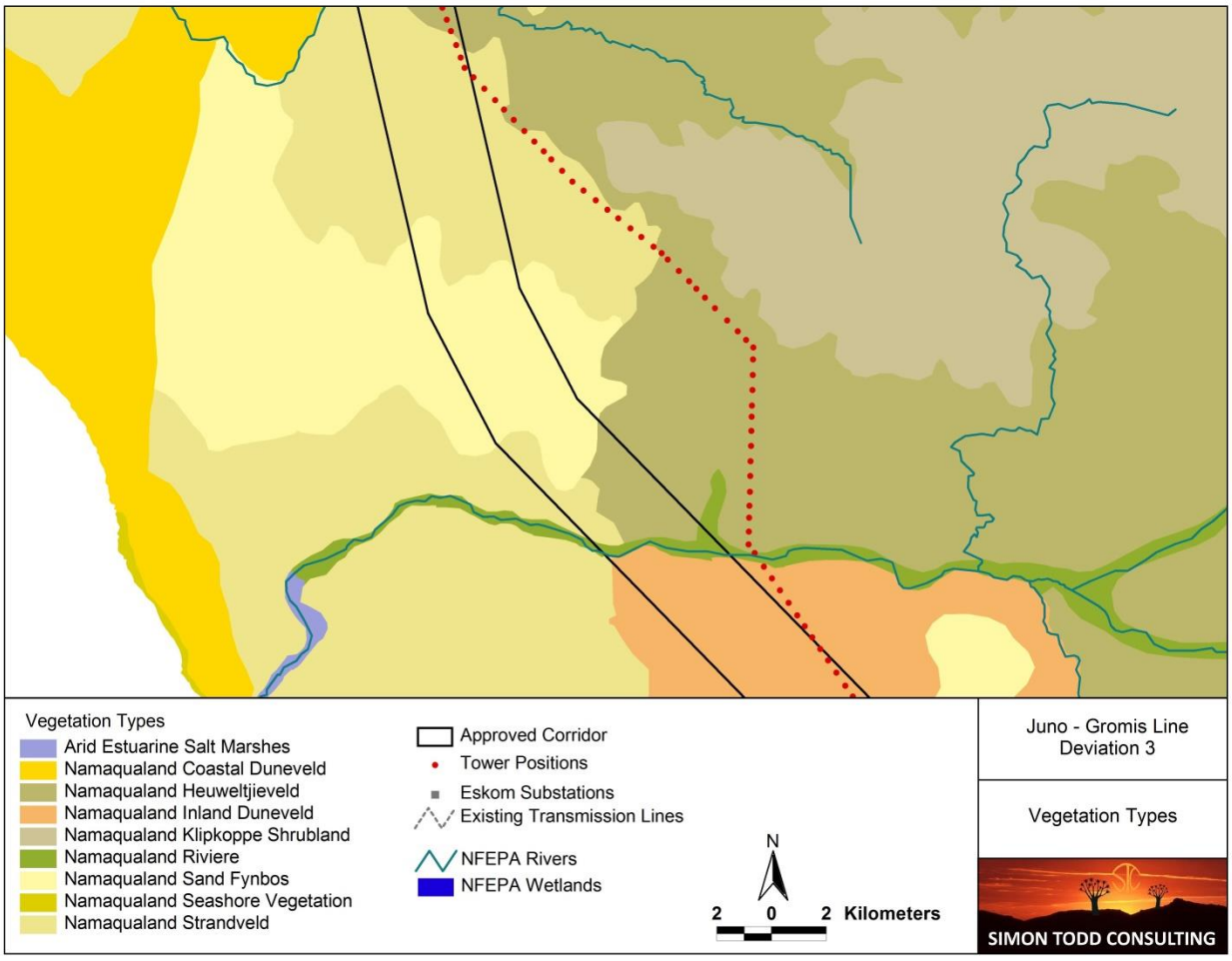

Figure 5. Broad-scale overview of the vegetation in and around Deviation 3, according to the national vegetation map as produced by Mucina & Rutherford (2009).

Namaqualand Heuweltjieveld is distributed in the Northern Cape Province along the western foothills of the Namaqualand escarpment from west of Steinkopf southwards to Soebatsfontein and to Kotzesrust at an altitude of 100-540m (Mucina & Rutherford 2006). The vegetation type consists of undulating plains leading up to the Escarpment with a mosaic of communities on heuweltjies (slightly raised, rounded termite mounds up to 10m in diameter) and inbetween heuweltjies. It consists of a low shrubland dominated by leaf-succulent shrubs and occurs on deep red loamy soils of granites and gneisses of Mokolian age. Species turnover is considerable within this vegetation unit due to its large north-south extent. It is classified as Least Threatened and 11% of this unit's area is protected in the Namaqua National Park but it is subject to land degradation because of intensive local grazing pressure (Mucina & Rutherford 2006). It has a conservation target of 28%. This is considered a relatively low sensitivity vegetation type with moderate to low levels of species

of conservation concern. This vegetation unit is the dominant unit along Deviation 3 from north of the Groen Rivier but does not occur along the other routes.

According to Mucina and Rutherford (2006), Namaqualand Inland Duneveld is distributed in the Northern Cape Province where it occurs in two patches: one between Kotzesrus northwards to the Groen River and the other between Wallekraal and Hondeklipbaai. The vegetation occurs on coastal peneplain with mobile dunes and consists of tall shrubland dominated by non-succulent shrubs (*Berkheya, Eriocephalus, Euclea, Gloveria, Lycium* and others) as well as some grasses (*Ehrharta*) and restioids (*Willdenowia*). It occurs on Quarternary Aeolian deep, looses, red to yellowish sand. It is considered Least Threatened but none is conserved statutorily, and the target is 26%. Overgrazing can result in destabilizing of the sandy substrate and some areas are invaded by *Acacia cyclops* (Mucina & Rutherford (2006). As this is a restricted vegetation type and contains a number of endemic species, it is considered relatively sensitive. This unit occurs along a short section of Deviation 3 but the overall extent has not changed significantly from the original corridor.

3.2 FINE-SCALE VEGETATION PATTERNS

3.2.1 Deviation 1

Floodplain of the Hol River, showing silty soils in the foreground dominated by *Salsola*, with lots of *Lycium* in the middleground and *Acacia karoo* gallery thicket along the Hol River itself. Disturbance in this area should be minimised as much as possible.

Knersvlate Quartz Vygieveld south of the Hol River dominated by *Salsola* and *Zygophyllum*. Although this area is classified as Knersvlate Quartz Vygieveld, it is degraded as a result of overgrazing and does not contain a lot of species of conservation concern and is affected by erosion as a result of the loss of plant cover.

Namaqualand Spinescent Grassland along the central section of Deviation 1, dominated by large tussocks of *Cladoraphis spinosa*, with other woody and succulent shrubs present such as *Stoberia*, *Zygophyllum morgsana, Galenia africana, Hermannia scordifolia, Hermannia trifurca, Lebeckia halenbergensis, Asparagus juniperoides, Tetragonia fruticosa, Conicosia elongata, Dorotheanthus rourkei* and *Lycium* with a forb layer of annuals and geophytes.

3.2.2 Deviation 2

A section of Deviation 2 near the Grootp Goerap River. Although this area is classified by Mucina and Rutherford as Namaqualand Strandveld, it is clearly not this vegetation unit and this area rather corresponds with the Namaqualand Heuweltjieveld vegetation type. Dominant species include *Zygophyllum cordifolium*, *Didelta spinosa* and *Berkheya fruticosa* with a well developed ground layer of spring annuals.

Namaqualand Strandveld on red sands near to where the deviation enters the original corridor again. Dominant species include *Othonna cylindrica*, *Zygophyllum morgsana,*

Zygophyllum cordifolium, *Eriocephalus africanus var paniculatus, Galenia fruticosa*, *Salsola namibica*, *Drosanthemum deciduum*, *Ruschia bipapillata*, *Drosanthemum latipetalum*, *Delosperma crassum*, *Lampranthus uniflorus* and *Lycium ferocissimum*. Annuals are common and consist of species such as *Osteospermum pinnatum* var. *pinnatum*, *Arctotis hirsuta*, *Cotula bipinnata*, *Foveolina tenella*, *Rhynchopsidium pumilum*, *Oncosiphon suffruticosum* and *Senecio arenarius*. This particular area is overgrazed and largely devoid of annuals as a result.

Namaqualand Strandveld on deep red sands, dominated by *Cladoraphis cyperoides*, *Othonna arbuscula* and *Zygophyllum morgsana*. Although this area does not have a high abundance of species of concern, the loose sands are vulnerable to wind erosion and disturbance in these areas should be minimised in order to reduce erosion risk.

3.2.3 Deviation 3

Namaqualand Strandveld in the northern section of Deviation 3 on deep red sands. Dominant species include *Pteronia*, *Othonna* and *Zygophyllum* with a relatively well developed ground layer of annuals.

Namaqualand Heuweltjieveld in the southern section of Deviation 3. This area is degraded as a result of overgrazing and dominated by the creeping succulent Cephallophyllum framesii with occasional taller shrubs.

Namaqualand Inland Duneveld in the southern part of Deviation 3. Dominant species include *Othonna cylindrica*, *Pteronia onobromoides*, *Helichrysum stellatum* and *Euphorbia burmanii*.

3.3 Listed and Protected Plant Species

The broad area along the proposed deviations have a high level of plant diversity and include more than 50 species of high conservation concern. As a result, an impact on such species is a potential concern. Although some listed species were observed along the deviations, these were relatively widespread species, especially within the Namaqualand Strandveld and a significant impact on any populations of such species is highly unlikely.

Table 1. Summary of the IUCN status of the plant species known from the vicinity of the deviations.

Status	Count
CR	2
EN	18
VU	36
NT	10
Thr*	7
Rare	14
Declining	3
DDD	5
LC	754
DDT	16
Grand Total	**865**

3.4 Critical Biodiversity Areas & Broad-Scale Processes

Deviation 1 falls within the planning domain of the Matzikamma Fine-Scale Conservation Plan produced as part of the C.A.P.E. Fine-scale Biodiversity Planning Project (Pence 2008). Deviation 2 and Deviation 3 fall within the Namakwa District Biodiversity Sector Plan (Desmet & Marsh 2006). These 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.

Within Deviation 1 (Figure 5), there is a section of CBA in the southern part of the deviation and a short section of NPAES Focus Area towards the north of the deviation. Given the low terrestrial footprint of the power line, a significant impact on ecological functioning within either the CBA or NPAES Focus Area is not likely. In addition, cumulative impacts along this deviation would be low as the current levels of impact and transformation in the area is low.

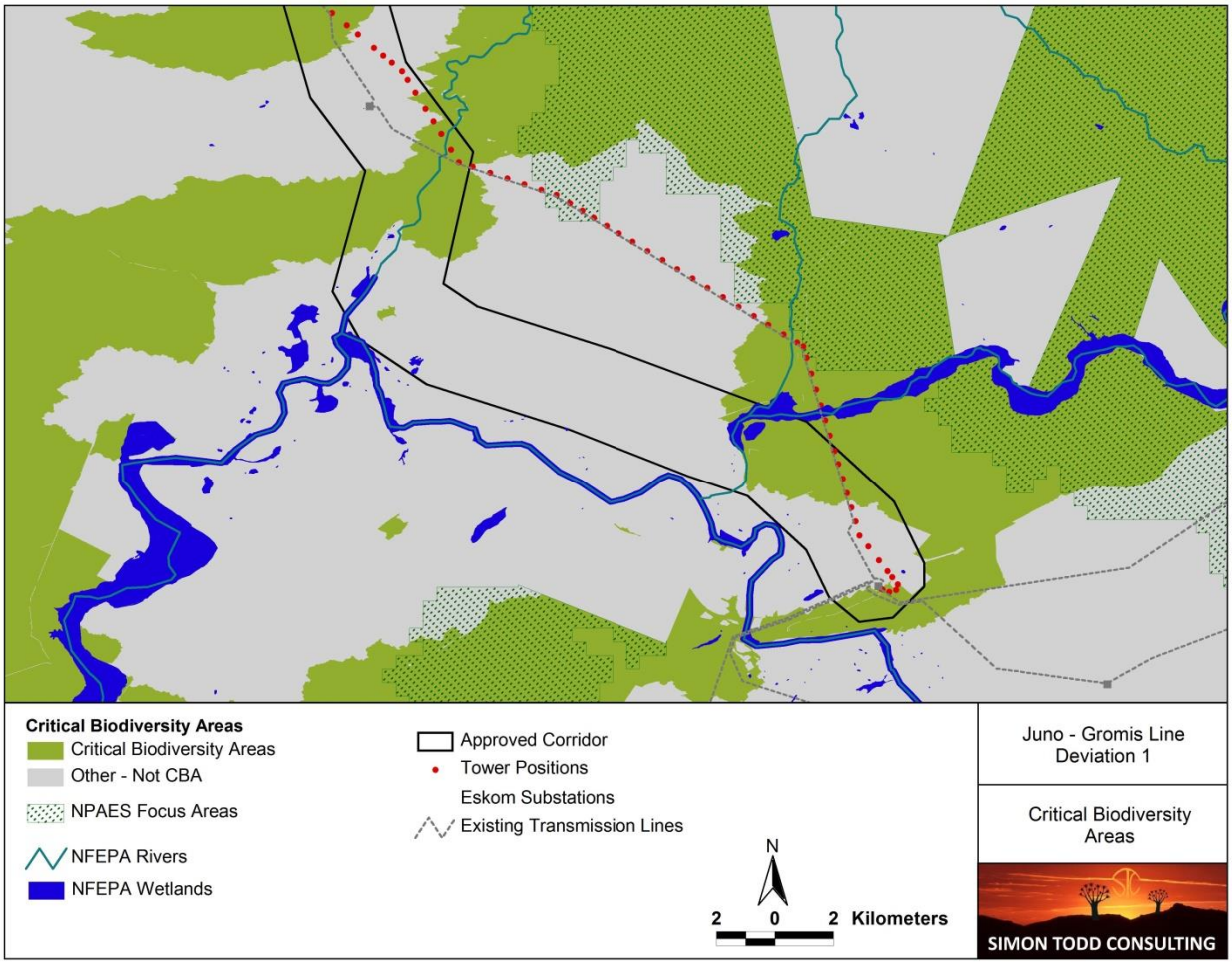

Figure 5. Critical Biodiversity Areas in and around Deviation 1, showing that the southern section of the deviation is within a CBA and there are some short sections of the line within NPAES focus areas.

Within Deviation 2 there are no CBAs along the proposed deviated route but there is a short section of Ecological Support Area along the coast that is along the route. As this ESA is wide and the power line would have minimal terrestrial footprint, a disruption of function within the ESA is highly unlikely and no significant impacts on CBAs and ESAs are likely. In addition, there are no NPAES Focus Areas along Deviation 2 that would be affected by the development.

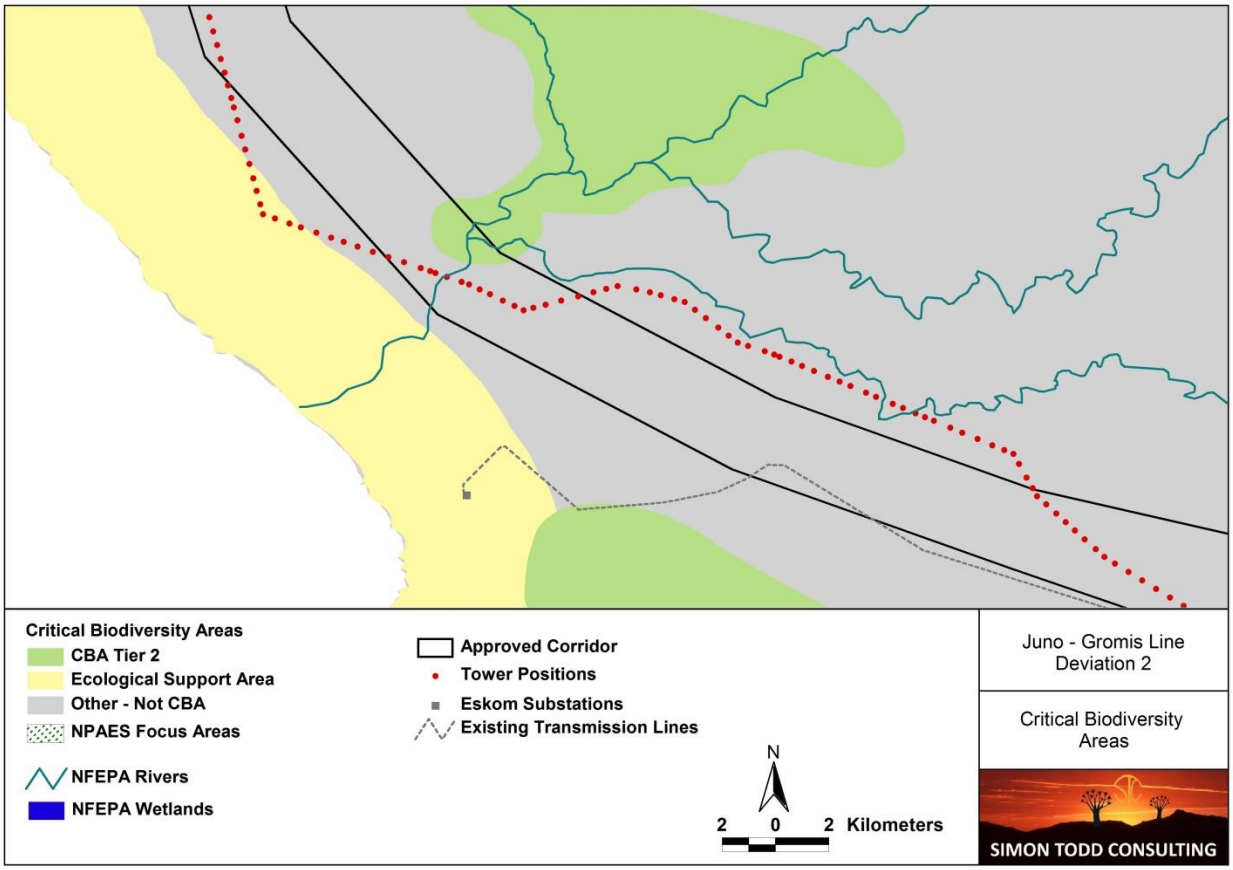

Figure 6. Critical Biodiversity Areas in and around Deviation 2, showing that there are no CBAs along the route, but a short section of ESA and no NPAES focus areas.

Within Deviation 3 there is a wide ESA along the Groen River that is designed to maintain the connectivity of the landscape. The power line would not significantly impact this function as it would not result in significant habitat loss that would limit or affect the movement of fauna through the area. There is also an ESA towards the north of the deviation, but this would not be impacted by the current alignment of the route. There are no CBAs or NPAES Focus Areas along the proposed deviation that would be affected by the development. Given the low footprint of the power line, a significant impact on the ESA or other broad-scale ecological processes are not likely.

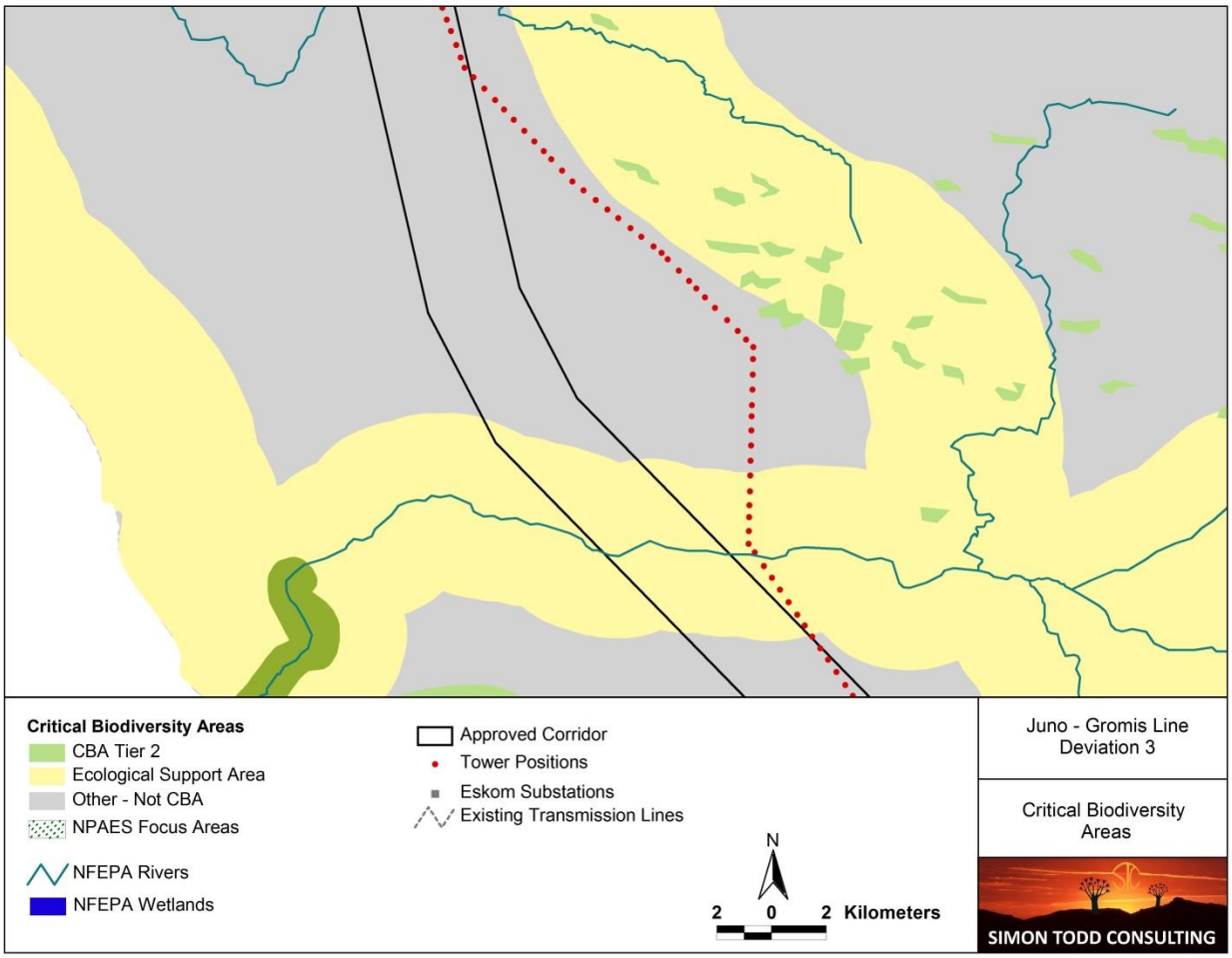

Figure 7. Critical Biodiversity Areas in and around Deviation 3, showing that there are no CBAs along the route, but a short section of ESA along the Groen River and no NPAES focus areas.

3.5 FAUNAL COMMUNITIES

Mammals

A total of 46 terrestrial mammals and eight bat species potentially occur in the area (Annex 2). There are however few significant rocky outcrops along the route and so species associated with such habitats are not likely to be present or widespread along the power line route. Larger mammals observed or likely to occur in the affected area include Steenbok *Raphicerus campestris*, Common Duiker *Sylvicapra grimmia*, Jackal *Canis mesomelas*, Caracal *Caracal caracaI,* Porcupine *Hystrix africaeaustralis* and Aardvark *Orycteropus afer*. Due to the mobility and broad habitat tolerances of these species, they are not likely to be highly sensitive to the transient disturbance associated with the construction of the power line. Three listed species, the Brown Hyaena *Hyaena brunnea* (Near Threatened), Honey Badger *Mellivora capensis* (Near Threatened) and Black-footed cat *Felis nigripes* (Vulnerable) may occur in the area. As most parts of the site are used for

extensive sheep farming, predators are usually persecuted under these circumstances and so it is not likely that the Brown Hyaena is abundant within the area. The Honey Badger and Black-footed Cat are likely to be present in the area, but the loss of habitat likely to result from the development would be low and not likely to result in significant impact on the local populations of these species.

Overall there do not appear to be any highly significant issues regarding mammals and the development of the power line deviations. In general the major impact associated with the development of the power line for mammals would be disturbance during the construction phase but this would be transient and long-term impacts would be low.

Reptiles

As many as 60 different reptiles are known from the wider area around the site. However some of these are associated with habitats that are not found at the site and the actual number of species present is likely to be about half this number. This does however include several listed species as well as a number of narrow endemics. The most important habitats for reptiles within the site are likely to be the rocky areas along the coastal zone which provide refuge for geckos and other species associated with rocky shelter and then the areas of soft sands which are likely to be important for the legless skinks which occur in the area, including the listed Lomi's Blind Legless Skink *Typhlosaurus lomiae* as well as the endemic Pink Blind Legless Skink *Typhlosaurus vermis*.

Species observed at the site include the Variable Skink *Mabuya varia*, Giant Desert Lizard *Meroles ctenodactylus*, Knox's Desert Lizard *Meroles knoxii*, Spotted Sand Lizard *Pedioplanis lineoocellata* and Angulate Tortoise *Chersina angulata* which were common throughout the area, while the Spotted Desert Lizard *Meroles suborbitalis* was common on the firmer lowland substrates. Listed species known from the area are listed below, but are not likely to be significantly affected by the development. Impacts on reptiles are likely to be restricted largely to disturbance during the construction phase with little residual long term impact during the operational phase.

Table 1. Reptile species of conservation concern which may occur in the vicinity of the study site.

Scientific Name	Common Name	Distribution	Status	Likelihood
Homopus signatus	Speckled Padloper	Endemic	Vulnerable	High
Typhlosaurus lomiae	Lomi's Blind Legless Skink	Narrow Endemic	NT	High
Cordylus macropholis	Large-scaled Girdled Lizard	Endemic	NT	High

Amphibians

The site lies within the known distribution range of seven frog and toad species. However as there is very little perennial water in the area, many of these are not likely to occur within the affected area. Although there are several rivers along the route such as the Groen and Hol, these are ephemeral and do not contain river on a regular basis, with the result that they are likely to be used by frogs accustomed to ephemeral pools and are not likely to contain species which require permanent water. Species likely to be present in the area include the Desert Rain Frog *Breviceps macrops*, Namaqua Rain Frog *Breviceps namaquensis* and Karoo Toad *Vandijkophrynus gariepensis*. The Desert Rain Frog occurs along the coast, in Strandveld vegetation up to 10km from the coastline and is listed as Vulnerable due in large part to habitat loss from mining activities. The current development would not significantly impact the habitat of this species and a significant impact on this species is not likely. As with other fauna, the major impact of the development would occur during construction due to disturbance and potentially pollution due to chemical spills as well.

3.6 SITE SENSITIVITY ASSESSMENT

Sensitive features along the power line deviations include the major drainage lines, especially, the Hol, Groen, Groot Goerap and Moedverloor rivers. Disturbance in these areas should be minimised as much as possible. The sections of line on deep sandy soils, especially along Deviation 2 are vulnerable to wind erosion and the footprint of the power line should be kept as low as possible within these areas. Apart from the drainage lines, there are few features of significance along the deviations and no specific habitats of concern that would need to be avoided were observed. Compared to the original alignment of the power line, the deviations are not likely to generate a higher impact and impacts are therefore likely to be similar to the original assessed impacts.

Overall, the alignment of the power line deviations are considered favourable and there are no recommendations for further major adjustments or changes to the proposed alignments.

4 IDENTIFICATION & NATURE OF IMPACTS

4.1.1 Impact Risk Factors

Potential ecological impacts resulting from the construction and operation of the Juno – Gromis 400kV power line deviations would stem from a variety of different activities and risk factors associated with the construction and operational phases of the project including the following:

Planning & Construction Phase

- Vegetation clearing & site preparation

- Operation of heavy machinery at the site
- Human presence

Operational Phase

- Servitude maintenance activities
- Power line presence
- Human presence

Decomissioning

- Operation of heavy machinery at the site
- Human presence

The above impacts would be likely to result in the following impacts which are described briefly below and assessed for each phase of the development as appropriate thereafter:

4.1.2 Construction Phase Impacts

Impacts on Vegetation and Species of Conservation Concern

The abundance of listed species in the area is high and it is possible that some of these will be impacted by the development. In addition, loss of currently intact habitat resulting from site clearing around pylons and along access roads is an inevitable consequence of the development.

Faunal Impacts

Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna resident or utilising the site. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some mammals and reptiles would also be vulnerable to illegal collection or poaching.

4.1.3 Operational Phase

Degradation of Ecosystems

Disturbance along the power line route is likely to increase the vulnerability of the disturbed areas to wind or water erosion. Furthermore, these areas are likely to remain vulnerable to alien plant invasion for some time following construction and it is likely that alien species will invade these areas to a greater or lesser extent.

Faunal Impacts

During the operational phase of the development, impacts on fauna are likely to be very low and with standard mitigation and avoidance, no significant impacts on fauna

during operation are anticipated. This impact is therefore not assessed for the Operational Phase.

4.1.4 Cumulative impacts

Impact on Critical Biodiversity Areas and Broad-Scale Ecological Processes

The site is located partly within a CBA and the cumulative loss of habitat resulting from the development would contribute to cumulative impacts on the CBAs and the disruption of landscape connectivity. Given that the development is located at least partly within a CBA, this impact is of potential concern and is assessed.

5 IMPACT ASSESSMENT

5.1 CONSTRUCTION PHASE IMPACTS

Impacts on Vegetation and Species of Conservation Concern

The abundance of listed species at the site is high and it is possible that these may be impacted by the development. In addition, loss of currently intact habitat resulting from site clearing within the development footprint is an inevitable consequence of the development.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Loss of listed and protected plants from the development footprint	No	Negative	1	2	5	4	32 = Medium
	Yes	Negative	1	2	2	3	15= Low
Corrective Actions	• There should be a preconstruction walk-through of the power line route to identify species of conservation concern that should be avoided or translocated (Already conducted). • Individuals of protected species which cannot be avoided, should be translocated to safe sites nearby. • A permit from CapeNature and Northern Cape DENC is required for any vegetation clearing, destruction or translocation of listed or protected plant species. • Existing tracks should be used for access wherever possible and wholesale clearing for a permanent road beneath the new power line is not recommended.						

Faunal Impacts During Construction

Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna resident or utilising the site. Sensitive and shy fauna would

move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some mammals and reptiles would also be vulnerable to illegal collection or poaching.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Faunal Impacts During Construction	No	Negative	1	2	5	4	32 = Medium
	Yes	Negative	1	1	3	3	15 = Low
Corrective Actions	• Any active faunal burrows within the development footprint should be located and marked before construction and avoided until the occupant animals can be excluded or have moved away due to the nearby construction activities. • Any fauna threatened by construction activities should be removed to safety by the ECO or other suitably qualified person. • Existing roads and access routes should be used wherever possible. • During construction all vehicles should adhere to demarcated tracks or roads and the speed limit should not exceed 40km/h on larger roads and should be 20-30km/h on smaller access tracks. • Where necessary, dust suppression should be used to reduce dust impacts on surrounding areas. • All construction staff should undergo environmental induction before construction commences in order to raise awareness and reduce potential faunal impacts. • All spills of hazardous material should be cleared in the appropriate manner according to the nature and identity of the spill and all contaminated soil removed from the site.						

5.2 OPERATIONAL PHASE IMPACTS

Degradation of Ecosystems

Disturbance along the power line route is likely to increase the vulnerability of the disturbed areas to erosion. Furthermore, these areas are likely to remain vulnerable to alien plant invasion for some time following construction and alien species are likely to invade the disturbed area to a greater or lesser degree.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Ecosystem Degradation	No	Negative	1	2	5	4	32 = Medium
	Yes	Negative	1	2	2	3	15 = Low

Corrective Actions	• Any erosion problems observed along the power line servitude should be rectified as soon as possible using the appropriate revegetation and erosion control works. • Any woody invaders present along the power line route should be cleared on an annual basis.

5.3 CUMULATIVE IMPACTS

Impact on Critical Biodiversity Areas and Broad-Scale Ecological Processes

Parts of the deviated sections are within a CBA and habitat loss resulting from the development could potentially contribute to cumulative impacts on the CBAs and the disruption of landscape connectivity.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impact on CBAs	No	Negative	1	4	4	3	27 = Low
	Yes	Negative	1	4	2	2	14 = Low
Corrective Actions	• The development footprint should be kept to a minimum, especially with regards to access roads created during construction. • Follow-up checks should be conducted on an annual basis to ensure that alien species have not invaded the disturbed areas and no other forms of degradation have occurred.						

5.4 SUMMARY ASSESSMENT

A summary assessment of the likely impacts associated with the deviated sections of the Juno-Gromis 400kV line is provided below. Although the area has a high abundance of species of conservation concern there are no highly sensitive features along the power line route deviations apart from the drainage lines and their immediate vicinity. Impacts on fauna are likely to be restricted largely to the construction phase of the development with little long term residual impact. Similarly, the impact of the development on CBAs and NPAES Focus Areas is also not likely to be significant given the low overall footprint of the development and the currently intact nature of the majority of the route. No highly significant impacts or impacts which cannot be mitigated to an acceptable level have been identified.

Summary assessment of the likely impacts associated with the development of the power line and associated infrastructure along the deviated sections.

Impact	Signficance – Without Mitigation	Significance – With Mitigation

Construction Phase		
Impacts on Vegetation and Species of Conservation Concern	32 = Medium	15 = Low
Faunal Impacts During Construction	32 = Medium	15 = Low
Operational Phase		
Degradation of Ecosystems	32 = Medium	15 = Low
Cumulative Impacts		
Impact on Critical Biodiversity Areas and Broad-Scale Ecological Processes	27 = Low	14 = Low

6 CONCLUSION & RECOMMENDATIONS

Sensitive features along the power line deviations include the major drainage lines, especially, the Hol, Groen, Groot Goerap and Moedverloor rivers. Disturbance in these areas should be minimised as much as possible. The sections of line on deep sandy soils, especially along Deviation 2 are vulnerable to wind erosion and the footprint of the power line should be kept as low as possible within these areas. Apart from the drainage lines, there are few features of significance along the deviations and no specific habitats of concern that would need to be avoided were observed. Compared to the original alignment of the power line, the deviations are not likely to generate a higher impact and impacts are therefore likely to be similar to the original assessed impacts. Overall, the alignment of the power line deviations are considered favourable and there are no recommendations for further major adjustments or changes to the proposed alignments.

Although the area has a high abundance of species of conservation concern there are no highly sensitive features along the power line route deviations apart from the drainage lines and their immediate vicinity. Impacts on fauna are likely to be restricted largely to the construction phase of the development with little long term residual impact. Similarly, the impact of the development on CBAs and NPAES Focus Areas is also not likely to be significant given the low overall footprint of the development and the currently intact nature of the majority of the route. No highly significant impacts or impacts which cannot be mitigated to an acceptable level have been identified.

With the recommended mitigation measures as listed in this report applied, the overall impact of the deviations would be restricted to the affected areas and of local significance only. There are no impacts associated with the development that cannot be reduced to a low level through avoidance and mitigation and there are no unavoidable impacts present

that are likely to represent a red flag or no-go situation for the development of the power line deviations.

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8 ANNEX 2. LIST OF MAMMALS

List of mammals which are likely to occur in the broad vicinity of the study area. Habitat notes and distribution records are based on Skinner & Chimimba (2005), while conservation status is from the IUCN Red Lists 2013.

Scientific Name	Common Name	Status	Habitat	Likelihood
Afrosoricida (Golden Moles):				
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	Low
Tubulentata:				
Orycteropus afer	Aardvark	LC	Wide habitat tolerance, being found in open woodland, scrub and grassland, especially associated with sandy soil	Definite
Hyracoidea (Hyraxes)				
Procavia capensis	Rock Hyrax	LC	Outcrops of rocks, especially granite formations and dolomite intrusions in the Karoo. Also erosion gullies	Low
Lagomorpha (Hares and Rabbits):				
Lepus capensis	Cape Hare	LC	Dry, open regions, with palatable bush and grass	Low
Lepus saxatilis	Scrub Hare	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	Definite
Hystrix africaeaustralis	Cape Porcupine	LC	Catholic in habitat requirements.	Definite
Graphiurus ocularis	Spectacled Dormouse	LC	Associated with sandstones of Cape Fold mountains, which have many vertical and horizontal crevices.	Low
Acomys subspinosus	Cape Spiny Mouse	LC	Assocaited 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
Myomyscus verreauxii	Verreaux's Mouse	LC	Scrub on grassy hillsides and riverine forest	Low
Aethomys 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	Low

Parotomys brantsii	Brants' 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.	Low
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
Gerbilliscus afra	Cape Gerbil	LC	Confined to areas of loose, sandy soils of sandy alluvium. Common on cultivated lands.	High
Mystromys albicaudatus	White-tailed Mouse	EN	Variable vegetation, but live in cracks or burrows in the soil	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	Low
Steatomys krebsii	Krebs's Fat Mouse	LC	Prefer a sandy substrate.	High
Primates:				
Papio ursinus	Chacma Baboon	LC	Can exploit fynbos, montane grasslands, riverine courses in deserts, and simply need water and access to refuges.	Low
Eulipotyphla (Shrews):				
Myosorex varius	Forest Shrew	LC	Prefers moist, densely vegetated habitat	Low
Suncus varilla	Lesser Dwarf Shrew	LC	Often associated with termitaria, little else known	Low
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.	Moderate
Carnivora:				
Proteles cristata	Aardwolf	LC	Common in the 100-600mm rainfall range of country, Nama-Karoo, Succulent Karoo Grassland and Savanna biomes	Low
Caracal caracal	Caracal	LC	Caracals tolerate arid regions, occur in semi-desert and karroid conditions	Low
Felis silvestris	African Wild Cat	LC	Wide habitat tolerance.	Low
Genetta genetta	Small-spotted genet	LC	Occur in open arid associations	Moderate
Suricata suricatta	Meerkat	LC	Open arid country where substrate is hard and stony. Occur in Nama and Succulent Karoo but also fynbos	Definite
Cynictis penicillata	Yellow Mongoose	LC	Semi-arid country on a sandy substrate	Definite

Herpestes pulverulentus	Cape Grey Mongoose	LC	Wide habitat tolerance	High
Atilax paludinosus	Marsh Mongoose	LC	Associated with well-watered terrain, living in close association with rivers, streams, marshes, etc.	Low
Vulpes chama	Cape Fox	LC	Associated with open country, open grassland, grassland with scattered thickets and coastal or semi-desert scrub	Moderate
Canis mesomelas	Black-backed Jackal	LC	Wide habitat tolerance, more common in drier areas.	Low
Otocyon megalotis	Bat-eared Fox	LC	Open country with mean annual rainfall of 100-600 mm	Moderate
Aonyx capensis	African Clawless Otter	LC	Predominantly aquatic and do not occur far from permanenet water	Low
Ictonyx striatus	Striped Polecat	LC	Widely distributed throughout the sub-region	High
Mellivora capensis	Ratel/Honey Badger	IUCN LC/SA RDB EN	Catholic habitat requirements	Low
Rumanantia (Antelope):				
Sylvicapra grimmia	Common Duiker	LC	Presence of bushes is essential	Low
Raphicerus campestris	Steenbok	LC	Inhabits open country,	Moderate
Raphicerus melanotis	Cape Grysbok	LC	Thick scrub bush, particularly along the lower levels of hills	Low
Chiroptera (Bats)				
Pipistrellus capensis	Cape Serotine Bat	LC	Wide habitat tolerances, but often found near open water	High
Tadarida aegyptiaca	Egyptian Free-tailed Bat	LC	In arid areas. often associated with water sources	High
Tadarida pumila	Little free-tailed bat	LC	Wide habitat tolerance	High
Miniopterus schreibersii	Schreibers' long-fingered bat	NT	Cave dwelling and suitable caves are an essential habitat requirement	High
Myotis tricolor	Temminck's hairy Bat	LC	Occurrence may be goverened by the presence of caves	Low
Eptesicus hottentotus	Long-talied serotine bat	LC	Wide habitat tolerance	High
Rhinolophus capensis	Cape horseshoe bat	LC	Many records from coastal caves	High
Eidolon helvum	Straw-coloured fruit bat	LC	Occasional migratory visitors within southern Africa	Low

9 ANNEX 3. LIST OF REPTILES

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

Family	Genus	Species	Subspecies	Common name	Red list category	No. records
Agamidae	*Agama*	*atra*		Southern Rock Agama	Least Concern	2
Agamidae	*Agama*	*hispida*		Spiny Ground Agama	Least Concern	4
Atractaspididae	*Homoroselaps*	*lacteus*		Spotted Harlequin Snake	Least Concern	1
Chamaeleonidae	*Bradypodion*	*occidentale*		Western Dwarf Chameleon	Least Concern	2
Colubridae	*Boaedon*	*capensis*		Brown House Snake	Least Concern	1
Colubridae	*Dasypeltis*	*scabra*		Rhombic Egg-eater	Least Concern	1
Colubridae	*Psammophis*	*crucifer*		Cross-marked Grass Snake	Least Concern	1
Colubridae	*Psammophis*	*leightoni*		Cape Sand Snake	Vulnerable	1
Colubridae	*Psammophis*	*notostictus*		Karoo Sand Snake	Least Concern	4
Cordylidae	*Cordylus*	*mclachlani*		McLachlan's Girdled Lizard	Least Concern	1
Cordylidae	*Karusasaurus*	*polyzonus*		Karoo Girdled Lizard	Least Concern	26
Elapidae	*Naja*	*nivea*		Cape Cobra	Least Concern	1
Gekkonidae	*Chondrodactylus*	*angulifer*	*angulifer*	Common Giant Ground Gecko	Least Concern	1
Gekkonidae	*Chondrodactylus*	*bibronii*		Bibron's Gecko	Least Concern	1
Gekkonidae	*Goggia*	*lineata*		Striped Pygmy Gecko	Least Concern	3
Gekkonidae	*Pachydactylus*	*austeni*		Austen's Gecko	Least Concern	3
Gekkonidae	*Pachydactylus*	*geitje*		Ocellated Gecko	Least Concern	2
Gekkonidae	*Pachydactylus*	*labialis*		Western Cape Gecko	Least Concern	3
Gekkonidae	*Pachydactylus*	*mariquensis*		Marico Gecko	Least Concern	3
Gekkonidae	*Pachydactylus*	*weberi*		Weber's Gecko	Least Concern	8
Gerrhosauridae	*Cordylosaurus*	*subtessellatus*		Dwarf Plated Lizard	Least Concern	3
Lacertidae	*Meroles*	*knoxii*		Knox's Desert Lizard	Least Concern	19
Lacertidae	*Nucras*	*livida*		Karoo Sandveld Lizard	Least Concern	2
Lacertidae	*Pedioplanis*	*lineoocellata*	*pulchella*	Common Sand Lizard	Least Concern	6
Lacertidae	*Pedioplanis*	*namaquensis*		Namaqua Sand Lizard	Least Concern	1
Leptotyphlopidae	*Namibiana*	*gracilior*		Slender Thread Snake	Least Concern	2
Scincidae	*Acontias*	*lineatus*		Striped Dwarf Legless Skink	Least Concern	9
Scincidae	*Scelotes*	*caffer*		Cape Dwarf Burrowing Skink	Least Concern	2
Scincidae	*Trachylepis*	*capensis*		Cape Skink	Least Concern	2
Scincidae	*Trachylepis*	*sulcata*	*sulcata*	Western Rock Skink	Least Concern	1
Scincidae	*Trachylepis*	*variegata*		Variegated Skink	Least Concern	5
Scincidae	*Typhlosaurus*	*caecus*		Southern Blind Legless Skink	Least Concern	5
Testudinidae	*Chersina*	*angulata*		Angulate Tortoise	Least Concern	17

Testudinidae	*Psammobates*	*tentorius*	*subsp. ?*	Tent Tortoise (subsp. ?)	Least Concern	2
Testudinidae	*Psammobates*	*tentorius*	*trimeni*	Namaqua Tent Tortoise	Not listed	3
Typhlopidae	*Rhinotyphlops*	*lalandei*		Delalande's Beaked Blind Snake	Least Concern	1

10 ANNEX 4. LIST OF AMPHIBIANS

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

Scientific Name	Common Name	Status	Habitat	Distribution	Likelihood
Breviceps namaquensis	Namaqua Rain Frog	Not Threatened	Arid sandy habitats from the coast to inland mountains	Endemic	Medium
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	Low
Amietia fuscigula	Cape River Frog	Not Threatened	Large still bodies of water or permanent streams and rivers.	Widespread	Low
Strongylopus grayii	Clicking Stream Frog	Not Threatened	Winter and summer rainfall areas in the fynbos, Succulent and Nama Karoo	Widespread	Low
Tomopterna delalandii	Cape Sand Frog	Not Threatened	Lowlands in fynbos and Succulent Karoo	Endemic	Low