TERRESTRIAL BIODIVERSITY THEME ASSESSMENT FOR THE MURA EGI CORRIDOR

PRODUCED FOR CEN ON BEHALF OF RED CAP ENERGY

3Foxes Biodiversity Solutions

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First Draft – November 2022

NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND ENVIRONMENTAL IMPACT REGULATIONS, 2014 (AS AMENDED) – REPORTING REQUIREMENTS FOR SPECIALIST THEMES

GN 1150 of 30 October 2020: Terrestrial Biodiversity Specialist Assessment Report (Very High or High Sensitivity)	Section of Report
3.1.1 contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;	P5
3.1.2 a signed statement of independence by thpecialist;	P7
3.1.3 a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 2
3.1.4 a description of the methodology used to undertake the site sensitivity verification, impact assessment and site inspection, including equipment and modelling used where relevant;	Section 2
3.1.5 a description of the mean density of observations/number of sample sites per unit area and the site inspection observations;	Section 2
3.1.6 a description of the assumptions made and any uncertainties or gaps in knowledge or data;	Section 2
3.1.7 details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;	Section 2
3.1.8 the online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;	Section 3.3
3.1.9 the location of areas not suitable for development and to be avoided during construction where relevant;	Section 3
3.1.10 a discussion on the cumulative impacts;	Section 3, Section 5
3.1.11 impact management actions and impact management outcomes proposed	Section 3, Section 5
3.1.12 a reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant; and	Section 6
3.1.13 a motivation must be provided if there were any development footprints identified as per paragraph 2.2.12 above [of GN 1150 of 30 October 2020] that were identified as having “low” or “medium” terrestrial animal species sensitivity and were not considered appropriate.	Section 2.4

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SHORT CV/SUMMARY OF EXPERTISE – SIMON TODD

Simon Todd Pr.Sci.Nat
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Ecological Solutions for People & the Environment

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

Skills & Primary Competencies

- Research & description of ecological patterns & processes in Nama Karoo, Succulent Karoo, Thicket, Arid Grassland, Fynbos and Savannah Ecosystems.
- Ecological Impacts of land use on biodiversity
- Vegetation surveys & degradation assessment & mapping
- Long-term vegetation monitoring
- Faunal surveys & assessment.
- GIS & remote sensing

Tertiary Education:

- 1992-1994 – BSc (Botany & Zoology), University of Cape Town
- 1995 – BSc Hons, Cum Laude (Zoology) University of Natal
- 1996-1997- MSc, Cum Laude (Conservation Biology) University of Cape Town

Employment History

- 2009 – Present – Sole Proprietor of Simon Todd Consulting, providing specialist ecological services for development and research.
- 2007 Present – Senior Scientist (Associate) – Plant Conservation Unit, Department of Botany, University of Cape Town.

- 2004-2007 – Senior Scientist (Contract) – Plant Conservation Unit, Department of Botany, University of Cape Town
- 2000-2004 – Specialist Scientist (Contract) - South African National Biodiversity Institute
- 1997 – 1999 – Research Scientist (Contract) – South African National Biodiversity Institute

A selection of recent work is as follows:

Strategic Environmental Assessments

Co-Author. Chapter 7 - Biodiversity & Ecosystems - Shale Gas SEA. CSIR 2016.

Co-Author. Chapter 1 Scenarios and Activities – Shale Gas SEA. CSIR 2016.

Co-Author – Ecological Chapter – Wind and Solar SEA. CSIR 2014.

Co-Author – Ecological Chapter – Eskom Grid Infrastructure SEA. CSIR 2015.

Contributor – Ecological & Conservation components to SKA SEA. CSIR 2017.

Recent Specialist Ecological Studies in the Vicinity of the Current Site

- Nuweveld North, East and West WEFs. Fauna & Flora Specialist Study for EIA. Zutari 2021.
- Beaufort West PV Facility. Fauna & Flora Assessment. SiVest Environmental 2022.
- San Solar PV Facility, Kathu. Fauna & Flora Assessment. Savannah Environmental 2022.
- Soventix Phase 3 PV Facility, De Aar. Fauna & Flora Assessment. Ecologes Environmental Consultants, 2022.
- Sadawa PV Facilities, Tankwa Karoo. Fauna & Flora Assessment. Savannah Environmental 2021.
- Kotulo Tsatsi PV 1 Facility near Kenhardt. Fauna & Flora Assessment. Savannah Environmental 2021.
- Hyperion 2 PV Facility, Kathu. Fauna & Flora Assessment. Savannah Environmental 2021.

SPECIALIST DECLARATION

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

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

Signature of the specialist: 

Name of Specialist: ____Simon Todd_____

Date: ____25 November 2022_____

1 INTRODUCTION

Red Cap Energy (Pty) Ltd is proposing to develop four solar facilities and an associated grid connection, on behalf of four separate Project Applicants, collectively known as the Mura PV Development between Loxton and Beaufort West in the Beaufort West Local Municipality and Ubuntu Local Municipality and the Central Karoo District Municipality and Pixley ka Sema District Municipality. Each solar facility will connect to the Eskom grid via new 132 kV overhead lines (assessed in a separate process to the PV facilities) connecting the two on-site solar substations via adjacent Eskom switching stations to the approved Nuweveld Collector substation. An Electrical Grid Infrastructure (EGI) Corridor is proposed and includes multiple connection routes of up to two 132 kV overhead lines running in parallel and switching stations to enable the connection of the Mura Solar Developments to the approved Nuweveld Collector Substation.

As part of the required studies for the required Basic Assessment application for environmental authorisation of the grid corridor and associated infrastructure, 3Foxes Biodiversity Solutions has been appointed to provide terrestrial ecological input for the development application. The DFFE Screening Tool indicates that the Terrestrial Biodiversity Theme for the affected area includes areas mapped as Very High sensitivity, with the result that a full terrestrial biodiversity assessment is required. To these ends, this Terrestrial Biodiversity Assessment for the Mura EGI Corridor and associated infrastructure, addresses the potential impacts of the development on Terrestrial Biodiversity and must be included in the BA for the development and any mitigation and monitoring measures as identified, must be incorporated into the EMPr for the development.

1.1 SCOPE OF STUDY

In terms of GN 320 (20 March 2020) and GN 1150 (30 October 2020) of the NEMA EIA Regulations of 2014 (as amended), prior to the commencement of a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project areas as identified by the Screening Tool. In terms of the findings of the Screening Tool, the corridors contain areas of Very High sensitivity for the Terrestrial Biodiversity Theme due to the presence of areas of CBA 1, CBA 2 and ESA within the study area (i.e. the EGI Corridor). In terms of the Assessment Criteria, this implies the following outcome:

1. An applicant intending to undertake an activity identified in the Scope of this Protocol, on a site identified as being of “very high sensitivity” for terrestrial biodiversity on the national web based environmental screening tool must submit a Terrestrial Biodiversity Impact Assessment.
2. The Terrestrial Biodiversity Impact Assessment should meet the following terms of reference:

2.1 The assessment must be undertaken by a SACNASP registered specialist, on the preferred development site.

2.2 Description of the preferred site - the following aspects, as a minimum, must be considered in the baseline description:

2.2.1 A description of the ecological drivers/processes of the system and how the proposed development will impact these;

2.2.2 Ecological functioning and ecological processes (e.g. fire, migration, pollination, etc.) that operate within the proposed development site;

2.2.3 The ecological corridors that the development would impede including migration and movement of flora and fauna;

2.2.4 The description of any significant landscape features (including rare or important flora/faunal associations, presence of Strategic Water Source Areas (SWSAs) or Freshwater Ecosystem Priority Areas (FEPA) sub catchments;

2.2.5 A description of terrestrial biodiversity and ecosystems on the proposed development site, including –

a) Main vegetation types;
b) Threatened ecosystems, including Listed Ecosystems as well as locally important habitat types identified;
c) Ecological connectivity, habitat fragmentation, ecological processes and fine-scale habitats; and
d) Species, distribution, important habitats (e.g. feeding grounds, nesting sites, etc.) and movement patterns identified.

2.3 Identify any alternative development footprints within the preferred development site which would be of a “low” sensitivity as identified by the national web based environmental screening tool and verified through the Initial Site Sensitivity Verification;

2.4 The Terrestrial Biodiversity Impact Assessment must be based on the results of a site inspection undertaken on the preferred development site and must identify:

2.5 Terrestrial Critical Biodiversity Areas (CBAs), including:

2.5.1 The reasons why an area has been identified as a CBA;
2.5.2 An indication of whether or not the development is consistent with maintaining the CBA in a natural or near natural state or in achieving the goal of rehabilitation;

2.5.3 The impact on species composition and structure of vegetation with an indication of the extent of clearing activities;
2.5.4 The impact on ecosystem threat status;
2.5.5 The impact on explicit subtypes in the vegetation;
2.5.6 The impact on overall species and ecosystem diversity of the site; and
2.5.7 The impact on populations of species of special concern in the CBA.

2.6 Terrestrial Ecological Support Areas, including;

2.6.1 The impact on the ecological processes that operate within or across the site;
2.6.2 The extent the development will impact on the functionality of the ESA; and
2.6.3 Loss of ecological connectivity (on site, and in relation to the broader landscape) due to the degradation and severing of ecological corridors or introducing barriers that impede migration and movement of flora and fauna.

2.7 Protected Areas as defined by the National Environmental Management: Protected Areas Act, 2004 including:

2.7.1 An opinion on whether the proposed development aligns with the objectives/purpose of the Protected Area and the zoning as per the Protected Area Management Plan;

2.8 Priority Areas for Protected Area Expansion, including:

2.8.1 The way in which in which the development will compromise or contribute to the expansion of the protected area network.

2.9 Strategic Water Source Areas (SWSA) including:

2.9.1 The impact(s) on the terrestrial habitat of a Strategic Water Source Area, and
2.9.2 The impacts of the development on the SWSA water quality and quantity (e.g. describing potential increased runoff leading to increased sediment load in water courses).

2.10 Freshwater Ecosystem Priority Area (FEPA) sub catchments, including:

2.10.1 The impacts of the development on habitat condition and/or species in the FEPA sub catchment.

2.11 Indigenous Forests, including:

2.11.1 Impact on the ecological integrity of the forest;

2.11.2 Extent of natural or near natural indigenous forest area lost.

3. The findings of the Terrestrial Biodiversity Impact Assessment must be written up in a Terrestrial Biodiversity Impact Assessment Report. This report must include as a minimum the following information:

   3.1 Contact details and curriculum vitae of the specialist including SACNASP registration number and field of expertise and their curriculum vitae;

   3.2 A signed statement of independence by the specialist;

   3.3 Duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;

   3.4 A description of the methodology used to undertake the impact assessment and site inspection, including equipment and modelling used where relevant;

   3.5 A description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;

   3.6 Areas not suitable for development, to be avoided during construction and operation (where relevant);

   3.7 Additional environmental impacts expected from the proposed development based on those already evident on the site and a discussion on the cumulative impacts;

   3.8 Impact management actions and impact management outcomes proposed by the specialist for inclusion in the EMPr; and

   3.9 A motivation where the development footprint identified as per section 2.3 were not considered stating reasons why these were not being not considered.

   3.10 A reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, and any conditions to which the statement is subjected.

4. The findings of the Terrestrial Biodiversity Impact Assessment must be incorporated into the Basic Assessment Report or the Environmental Impact Assessment Report, including the mitigation and monitoring measures as identified, which must be incorporated into the EMPr. A signed copy of the Assessment must be appended to the Basic Assessment Report or Environmental Assessment Report.

The above Terms of Reference and reporting requirements are achieved in this study and report.

1.2 RELEVANT ASPECTS OF THE DEVELOPMENT

The infrastructure included on the grid connection application includes the following:

- Eight Eskom Switching stations located adjacent to the solar farm substations within the solar area footprint;
- Maximum height of 12m;
- Footprint of up to 150 m x 75 m.
- Four additional up to 150 m x 75 m switching stations located within the corridor;
- ~70 km of overhead 132 kV lines (~40 km will be single overhead 132 kV lines and ~30 km will be up to two overhead 132 kV lines running in parallel running between the switching stations supported by monopole pylons with a max height 38m); and
- Access tracks.

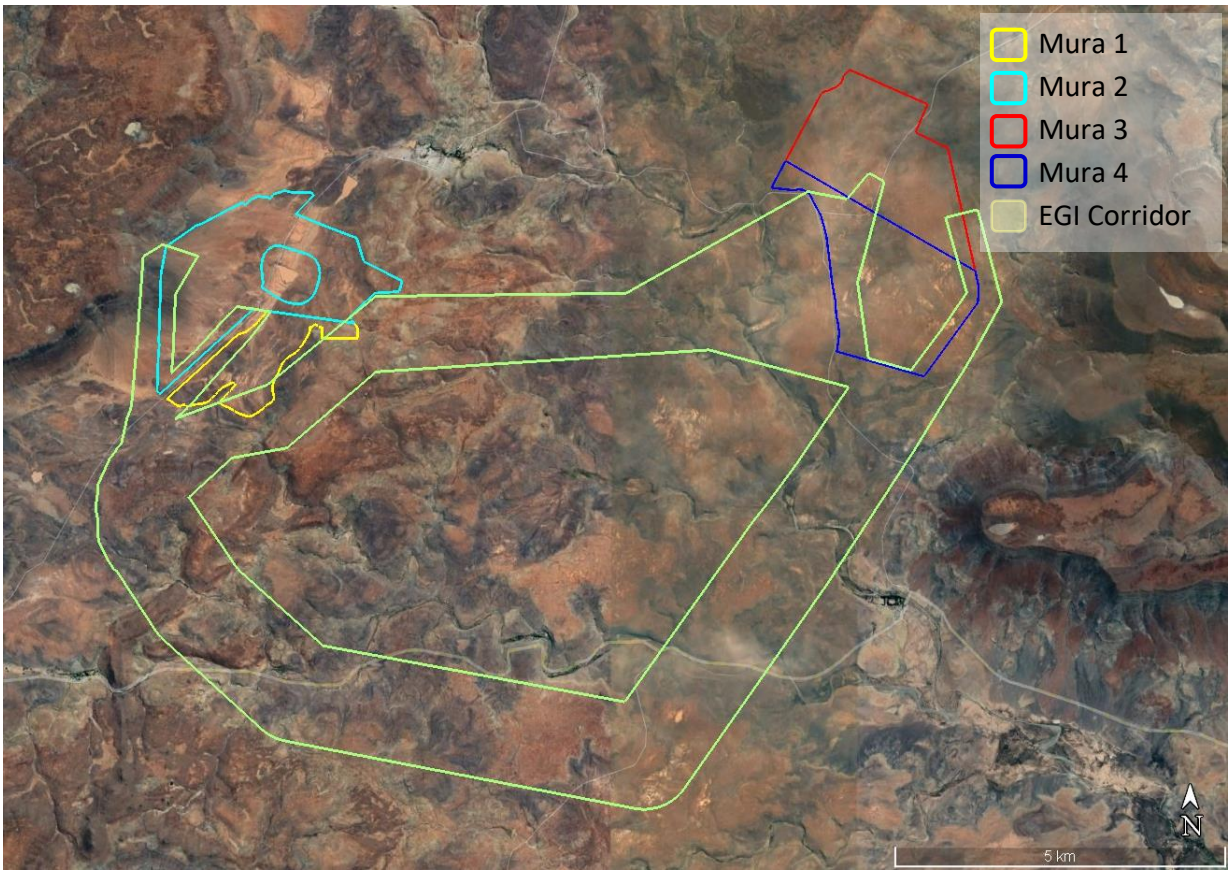

Figure 1. Image showing the regional context and location of the proposed Mura EGI Corridor which links the Nuweveld Collector Substation with the four Mura PV projects.

Table 1. Summary of the components and approximate areas of impact within the Mura Grid Connection Corridor and associated infrastructure.

Project Components	Description	Disturbance footprint
Switching stations	There will be up to two Eskom switching stations on each solar farm with a footprint of approximately 150 x 75 m (11,250 m^2). The switching station area will include all the standard switching station electrical equipment/components, such as bus bars, metering equipment, switchgear, and will also house control, operational, workshop and storage buildings/areas. Additional switching stations are also proposed outside of the solar farm footprint.	13
Overhead lines and pylons	~70 km of overhead 132 kV lines (~40 km will be single overhead 132 kV lines and ~30 km will be up to two overhead 132 kV lines running in parallel running between the switching stations supported by monopole pylons with a max height 38m. The spans (distance between pylons) on the monopole pylons (without stays) are on average 260 m.	2,5
Access roads and tracks	Existing access roads and tracks (upgraded to ± 2-4 m wide where needed) will be used as far as possible and new access tracks would be created where needed (±2-4 m wide). These are required for all project phases.	32
Temporary areas	Temporary laydown areas will be identified along the alignment, with the main equipment and construction yards being located along the alignment or based in one of the surrounding towns or at the solar site camp. It is anticipated that the total area required for the temporary laydown areas is up to 5 ha and two will be required.	10
Total disturbance footprint: Temporary		10
Total disturbance footprint: Permanent		48
TOTAL		58

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 (2018 update).
- Information on plant and animal species recorded for the wider area was extracted from the South African Biodiversity Information Facility (SABIF)/ SANBI Integrated Biodiversity Information System (SIBIS) database hosted by the South African National Biodiversity

Institute (SANBI). Data was extracted for a significantly larger area than the study area, but this is necessary to ensure a conservative approach as well as counter the fact that the site itself has not been well sampled in the past.

- The International Union for Conservation of Nature (IUCN) conservation status of the species in the list was also extracted from the database and is based on the Threatened Species Programme, Red List of South African Plants (2021).

Ecosystem:

- Freshwater and wetland information was extracted from the National Freshwater Ecosystem Priority Areas assessment, NFEPA (Nel *et al.* 2011) as well as the 2018 NBA.
- Critical Biodiversity Areas (CBAs) and ESAs in the study area were obtained from the 2017 Western Cape Biodiversity Spatial Plan (WC-BSP), for the Beaufort West Municipality, which includes the study area, as well as the Northern Cape CBA Map which covers those parts of the site within the Northern Cape Province.
- There are no threatened ecosystems within the Grid Corridor.
- Strategic Water Source Areas (SWSAs) for the corridor were extracted from the SWSAs map available on the SANBI BGIS data portal (Water Research Commission. 2017 Surface and Groundwater SWSA [Vector] 2017).

Fauna

- Lists of mammals, reptiles and amphibians which are likely to occur at the site were derived based on distribution records from the literature and the ADU databases (ReptileMap, Frogmap and MammalMap) http://vmus.adu.org.za.
- Literature consulted includes Branch (1988) and Alexander and Marais (2007) for reptiles, Du Preez and Carruthers (2009) for amphibians, EWT & SANBI (2016) and Skinner and Chimimba (2005) for mammals.
- The faunal species lists provided are based on species which are known to occur in the broad geographical area, as well as an assessment of the availability and quality of suitable habitat at the site.
- The conservation status of mammals is based on the IUCN Red List Categories (EWT/SANBI 2016), while reptiles are based on the South African Reptile Conservation Assessment (Bates *et al*. 2013) and amphibians on Minter *et al.* (2004) as well as the IUCN (2020).

2.2 SITE VISITS & FIELD ASSESSMENT DATES

The Mura Grid Corridor was visited several times for the current study and numerous sections of the grid corridor have also been sampled in the past for a variety of other projects, most notably for the Gamma Grid 400kV power line project which overlaps with the current project area for the

southern grid corridor linking the Mura 3 and 4 project areas to the Nuweveld Collector Substation. Specific dates of site visits for the Mura Grid Corridor assessment include the following dates:

- 22 March 2022
- 07-08 June 2022
- 19 October 2022

This is considered a sufficient amount of time to adequately assess the plant diversity patterns and likely presence of the SCC within the corridor with an adequate degree of confidence.

2.3 FIELD SAMPLING APPROACH

In order to characterise the biodiversity of the corridor, a number of sampling techniques were used, these are summarized below and are also detailed in the Plant Species Compliance Statement for the site as well as the Riverine Rabbit Species Assessment. However, this includes direct sampling of the vegetation through vegetation surveys as well as the use of camera traps within the four associated PV areas and previously within the Nuweveld WEFs project area which includes a large part of the western section of the grid corridors.

Vegetation & Ecosystems

Sensitivity mapping of the corridor was conducted by the consultant based on the identification of important/sensitive habitats using satellite imagery of the site as well as previous knowledge of the affected area. The identification of potentially sensitive areas included the mapping of wetlands and drainage features, steep slopes, mountains, rocky hills and larger areas of rock pavements. The sensitivity mapping was used to guide fieldwork within the corridor, where sampling was focused on sensitive habitats/ecosystems identified in the desktop exercise. The primary objective was to aid in the identification of no-go areas and sensitive features that would need to be avoided in order to minimise the potential impact of the development on sensitive habitats and associated species of concern. As a result, the final routing would in effect be a mitigated route avoiding or minimising the impact on the sensitive features of the area.

Riverine Rabbit Habitat Delineation

As the Riverine Rabbit is key species of conservation concern within the site, the identification and mapping of potentially suitable habitat is considered an important element of risk mitigation at the site. In order to assess the availability, distribution and extent of potential Riverine Rabbit habitat within the grid corridor, satellite imagery was used to delineate and map areas of possible habitat. Such areas can be reasonably easily delineated from satellite imagery due to the specific habitat requirements of the Riverine Rabbit. According to the IUCN 2016 Mammal Red List Assessment "*The Riverine Rabbit inhabits dense riparian growth along the seasonal rivers in the central Karoo (Nama-Karoo shrubland). Specifically, it occurs in riverine vegetation on alluvial soils adjacent to seasonal rivers*." Such areas are readily visible on satellite imagery and can be

mapped with a relatively high degree of accuracy and reliability. Within the study area, areas of habitat are restricted to the major drainage lines of the study site and in particular the Sout and Krom Rivers. Apart from areas deemed to be potentially suitable Riverine Rabbit habitat, all major and minor drainage features of the site were mapped and included into the overall sensitivity mapping of the corridor (refer to the Riverine Rabbit Species assessment for more details).

Karoo Dwarf Tortoise Habitat Delineation

In order to assess the availability, distribution and extent of potential Karoo Dwarf Tortoise habitat within the Mura EGI Corridor, satellite imagery was used to delineate and map areas of potential habitat. Such areas can be reasonably easily delineated from satellite imagery due to the specific habitat requirements of the Karoo Dwarf Tortoise. According to the IUCN 2018 Red List Assessment for this species (Hofmeyr et al. 2018), *Chersobius boulengeri* is habitat specialist that occurs in association with dolerite ridges and rocky outcrops of the Nama and Succulent Karoo. The tortoises usually take shelter under rocks in vegetated areas or in rock crevices (Boycott and Bourquin 2000), but few rocky sites over the range offer suitable retreats for the species. Populations are considered to be relatively isolated within areas of suitable habitat and movement between such patches is expected to be low. As such, suitable areas of habitat can be relatively easily recognised and mapped from satellite imagery. In addition, it is also possible to at least some degree differentiate likely high-quality habitat associated with dolerite outcrops and ridges from lower quality shale and mudstone slopes that appear to be less favoured (refer to the Karoo Dwarf Tortoise Species assessment for more details).

2.4 SAMPLING LIMITATIONS AND ASSUMPTIONS

The conditions during the current field assessment were excellent for sampling following exceptional rains across the affected area in the late summer period. As a result, the vegetation included an abundance of forbs, annuals and grasses. Although not all of the grid corridor could be sampled in detail given its' large extent, the corridor is considered to have been well-covered and it is highly unlikely that there are any significant vegetation features present that would not have been observed during the study. Given the amount of time spent on the site, the consultants' knowledge of the area and the favourable conditions at the time of the site visits, there are few limitations and assumptions required with regards to the vegetation of the corridor and the presence of plant SCC within the grid corridor.

A number of limitations and assumptions are also inherent in the study regarding the fauna of the site including the following:

- Camera trapping for fauna was conducted within the four PV areas as well as previously within the the Nuweveld Wind Farms project area which includes a large section of the west of the Mura EGI corridors. No rabbits were detected at any of these cameras, including those in the upper reaches of the Krom Rivier. However, data obtained from EWT indicate that there are historical sightings of Rabbits within the corridor and the field

assessment confirmed th presence of suitable habitat within the corridor along some section of the Krom Rivier. In addition, in order to ensure a conservative approach, all areas with suitable habitat are assumed to have Riverine Rabbits present, and are included in the 'no-go' layer.

- It is assumed that there are no Riverine Rabbits residing in areas outside of the riparian habitat which is typically associated with this species in the Upper Karoo. This is considered to be a reasonable assumption as this species is strongly associated with riparian vegetation within the study area. It is only in the southern population that Riverine Rabbits can usually be found outside of riparian areas.
- It is assumed that the Karoo Dwarf Tortoise is potentially present in all areas mapped as optimal habitat for this species. Clearly this is not the case in reality as not all areas of suitable habitat would be occupied. As such, the assessment is designed to assess the worst-case scenario with regards to the distribution of the tortoise within the corridor.
- It is assumed that there are no Karoo Dwarf Tortoises resident in areas outside of the rocky hills habitat typically associated with this species. This is considered to be a reasonable assumption as this species is known to be strongly associated with rocky hills and does not occur within areas without sufficient shelter.

3 MURA EGI CORRIDOR BASELINE DESCRIPTION

3.1 VEGETATION TYPES

The national vegetation map (Mucina & Rutherford 2006 & SANBI 2018 update) for the study area is depicted below in Figure 2. The whole of the Mura EGI Corridor is classified as falling within the Eastern Upper Karoo vegetation type. The results of the field assessment confirm that this is an oversimplification of the vegetation of the site and based on the fieldwork on the site and site verification, there are some dolerite hills present that can be considered to represent the Upper Karoo Hardeveld vegetaion type, while the areas of riparian vegetation along the larger drainage systems of the corridor such as the Krom can be considered to represent the Southern Karoo Riviere vegetation type. These three vegetation types are described and illustrated briefly below.

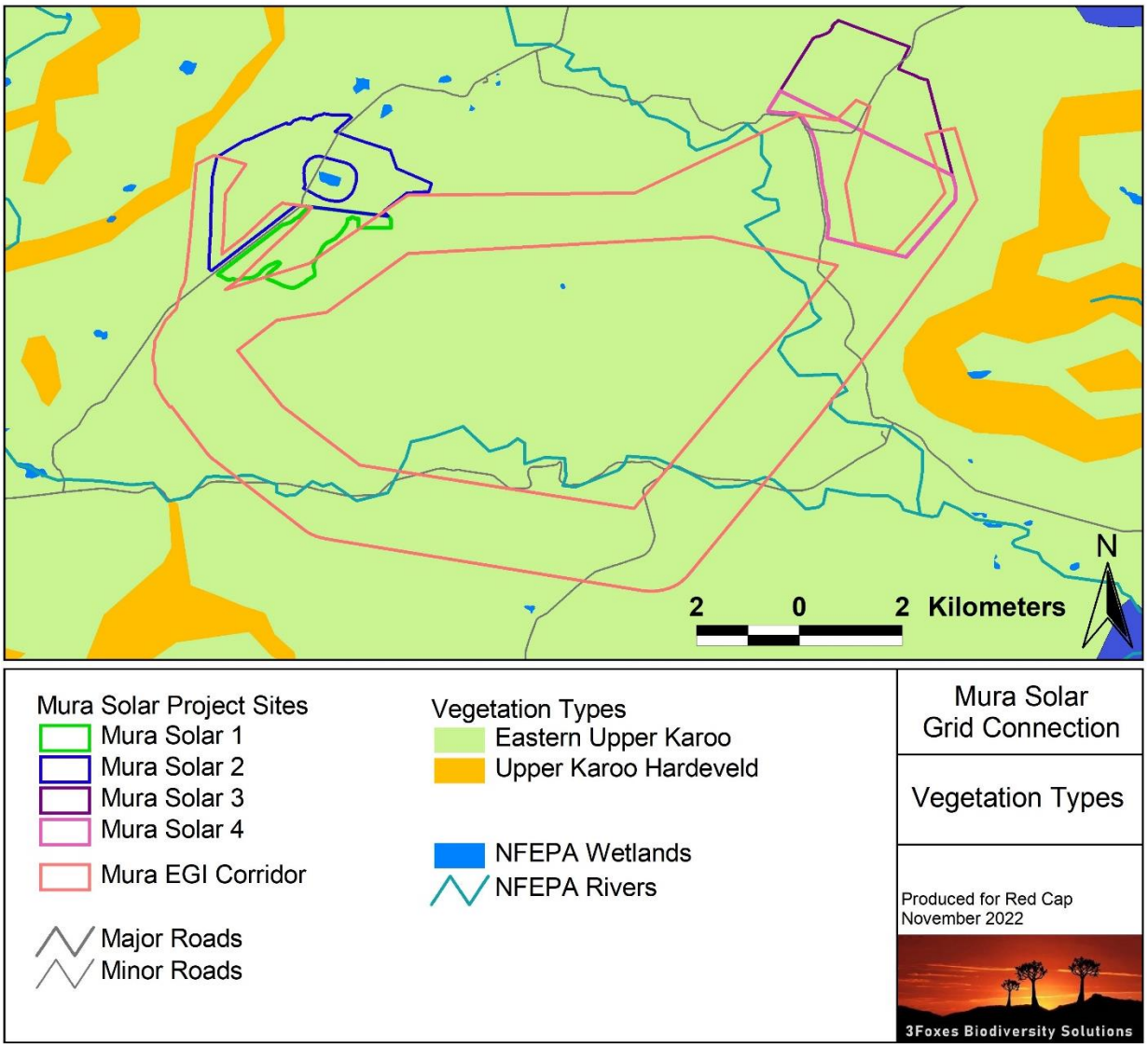

Figure 2. The national vegetation map (SANBI 2018 Update) for the Mura EGI Corridor and surrounding area. Although the map indicates that the site is restricted to the Eastern Upper Karoo vegetation type, there are some tracts of Upper Karoo Hardeveld and Southern Karoo Riviere also present that have not been mapped.

Eastern Upper Karoo

Eastern Upper Karoo has an extent of 49 821 km^2 and is the most extensive vegetation type in South Africa and forms a large proportion of the central and eastern Nama Karoo Biome. This vegetation type is classified as Least Threatened, and about 2% of the original extent has been transformed largely for intensive agriculture. Eastern Upper Karoo is however poorly protected and less than 1% of the 21% target has been formally conserved. Mucina & Rutherford (2006) list eight endemic species for this vegetation type, which considering that it is the most extensive

unit in the country, is not very high. As a result, this is not considered to represent a sensitive vegetation type.

Dominant and characteristic species observed within the areas of Eastern Upper Karoo vegetation include low woody shrubs such as *Pentzia globosa*, *Rosenia humulis*, *Asparagus capensis*, *Eriocephalus ericoides*, *Pteronia sordida*, *Pteronia incana*, *Plinthus karooicus*, *Helichrysum luciloides*, *Felicia muricata*, with a varying density of low succulent shrubs such as *Roepera lichtensteinii*, *Aridaria noctiflora* and *Ruschia spinosa*, with a variable grass layer dominated by *Aristida adscenionis*, *Stipagrostis ciliata*, *Stipagrostis obtusa*, *Enneapogon desvauxii* and *Tragus berteronianus.*

Figure 3. Typical landscape present within the Mura EGI Corridor study area, corresponding with the Eastern Upper Karoo vegetation type. The cliffs in the distance are along the Krom Rivier which is the major feature along the southern grid corridor route. The typical plains of the study area are considered low sensitivity.

Upper Karoo Hardeveld

Although there are no expansive areas of Upper Karoo Hardeveld within the grid corridor, there are several minor ridges and the dolerite hills along the Krom Rivier can generally be considered to represent this vegetation type. The Upper Karoo Hardeveld vegetation type is associated with 11 734 km^2 of the steep slopes of koppies, buttes mesas and parts of the Great Escarpment covered with large boulders and stones. The vegetation type occurs as discrete areas associated with slopes and ridges from Middelpos in the west and Strydenburg, Richmond and Nieu-Bethesda in the east, as well as most south-facing slopes and crests of the Great Escarpment

between Teekloofpas and eastwards to Graaff-Reinet. Altitude varies from 1000-1900m. Mucina & Rutherford (2006) list 17 species known to be endemic to the vegetation type. This is a high number given the wide distribution of most karoo species and illustrates the relative sensitivity of this vegetation type compared to the surrounding Eastern Upper Karoo.

Upper Karoo Hardeveld is usually consists of very rocky ground and is often associated with steep slopes, with the result that it is considered vulnerable to disturbance as such areas may take a long time to recover if the topsoil is lost. Although this vegetation type contains a higher diversity of species than the adjacent areas of Eastern Upper Karoo, no red-listed plant species were observed within these areas during the field survey.

Figure 4. Dolerite slope within the Mura EGI Corridor, along the Krom Rivier representative of the Upper Karoo Hardeveld vegetation type.

Southern Karoo Riviere

The vegetation along the major drainage lines of the corridor can be considered to represent the Southern Karoo Riviere vegetation type. This vegetation type is associated with the rivers of the central karoo such as the Buffels, Bloed, Dwyka, Gamka, Sout, Kariega and Sundays Rivers. About 12% has been transformed as a result of intensive agriculture and the construction of dams. Although it is classified as Least Threatened, it is associated with rivers and drainage lines and as such represents areas that are considered ecologically significant. Within the grid corridor, these areas are of particular significance due to the association with the Riverine Rabbit which is a species of high conservation concern. Typical and dominant species observed from the drainage lines of the area includes *Vachellia karroo*, *Searsia lancea*, *Cenchrus ciliaris*, *Searsia*

burchellii, *Melianthus comosus*, *Lycium oxycarpum*, *Sporobolus ioclados*, *Helichrysum pentzioides*, *Drosanthemum lique*, *Pentzia globosa*, *Salsola aphylla*, *Tribulis terrestris*, *Felicia muricata*, *Atriplex vestita, Roepera retrofractum*, *Cynodon dactylon*, *Chrysocoma ciliata*, *Stipagostis namaquensis*, *Lycium pumilum*, *Lycium cinereum*, *Artemisia africana*, *Tripteris spinescens*, *Exomis microphylla* and *Derverra denudata*.

Figure 5. Riparian vegetation along the Krom Rivier considered to represent the Southern Karoo Riviere vegetation type. The vegetation of the silty floodplains in this area are considered to represent suitable habitat for the Riverine Rabbit.

3.2 DFFE SENSITIVE PLANT SPECIES

The DFFE Screening Tool output for the Mura EGI Corridor indicates that the southern part of the Mura EGI Corridor falls within an area mapped as Medium Sensitivity due to the potential presence of two plant species of concern, *Isolepis expallescens* and Sensitive species 945. Neither of these species were observed within the corridor and it is considered unlikely that either species is present, with the result that the corridor is considered Low Sensitivity for these two species (refer to the Plant Species Compliance Statement for the corridor for more details).

3.3 FAUNAL COMMUNITIES

In terms of the fauna that potentially occur at the site, the potential diversity is considered to be moderate and numbers approximately 38 mammals, 28 reptiles and about 6 frog and toads. Mammals observed at the site directly, indirectly or through the camera trapping include

Steenbok, Kudu, Cape Hare, Cape Porcupine, Suricate, Bat-eared Fox, Cape Fox, Cape Mongoose, Yellow Mongoose, Common Genet, Aardwolf and Black-backed Jackal. Reptiles and amphibians observed on the site or in the immediate environment include Leopard Tortoise, Southern Tent Tortoise, Karoo Girdled Lizard, Spotted Sand Lizard, Southern Rock Agama, Cape Thick-toed Gecko, Variegated Skink, Ground Agama and Karoo Toad. Although the DFFE Screening Tool identified only the Karoo Dwarf Tortoise and Riverine Rabbit as being of potential concern at the site, there are several other fauna species of concern that occur in the wider area (***Table 2***). However, interrogation of these also suggests that none of these other species are likely to occur within the site as they all occur in habitats that are not well-represented within the grid corridor. In terms of the two species identified by the Screening Tool, there is some habitat present within the corridor for both the Karoo Dwarf Tortoise and the Riverine Rabbit. The implications of the development for these two species are summarized below but is also dealt with in more detail in the species assessments for each of these species.

The Riverine Rabbit is associated with well-vegetated alluvial floodplains of the ephemeral rivers of the central and upper Karoo and in the Upper Karoo at least, do not tend to stray far from this habitat. The total extent of high-quality habitat within the assessment Corridor is estimated at 134 ha, while the areas of less-favourable/suboptimal habitat is estimated at 49 ha. Based on the Riverine Rabbit density reported by Duthie (1989) for an area near Victoria West (0.06–0.17 individual/ha) which can be assumed to be similar to the density within the corridor, the areas of optimal habitat would be able to support between 8 and 23 individuals of Riverine Rabbits assuming that all of the identified habitat was fully occupied. The degree of conflict between the Riverine Rabbit and the development of the Mura grid infrastructure is likely to be low as there is no habitat in the areas where the switching stations would be located and the pylons are likely to be able to span the areas of habitat (which have in any case been mapped as no-go areas for pylons). The Krom Rivier at its widest within the corridor is approximately 300m wide and the pylons would be able to span the whole river and the adjacent floodplains without significant impact on the riparian vegetation that would be home to the Riverine Rabbit. As such, a significant amount of habitat loss related to the project is not likely and habitat loss is not likely to be a significant factor related to the project. There would however be a significant increase in traffic related to both the Mura EGI corridor and the related PV projects, especially during construction, which would potentially have a negative impact through mortality of rabbits related to vehicle collisions.

The Karoo Dwarf Tortoise *Chersobius boulengeri* occurs in association with dolerite ridges and rocky outcrops of the southern Succulent and Nama Karoo biomes, and peripherally in the Albany Thicket biome in the southeast, at altitudes of approximately 800 to 1,500 m. The vegetation usually consists of dwarf shrubland that often contains succulent and grassy elements. The tortoises usually take shelter under rocks in vegetated areas or in rock crevices. However, these are quite specific in terms of their requirements with the result that suitable retreats for the species are not common. Due to their strong habitat association, populations are isolated on rocky

outcrops with specialized vegetation (Hofmeyr et al. 2018). Since some of the ridge systems within the corridor which have been mapped as favourable habitat for the Karoo Dwarf Tortoise are quite extensive, it will not be possible to fully avoid these areas, there will inevitably be some habitat loss resulting from the power line development. It is not possible to provide a reliable estimate of the population size within the Mura EGI Corridor. Firstly, there are no reliable estimates of population density for this species that can be extrapolated across the range and secondly, the reported population declines appear to be widespread with the result that it is not possible to ascertain what proportion of the suitable habitat within the corridor would actually be occupied. However, in order to assess the relative importance of the area impacted by the power line, the whole of the EGI corridor has an area of 4328 ha (43.28 km^2) which compares to the Area of Occurrence of this species of 13 5090 km^2. The Mura EGI corridor therefore occupies less than 0.05% of the Area of Occurrence of this species and assuming a similar level of occupancy across the range, this would amount to less than 0.05% of the population. Again, assuming an even distribution of impact within the corridor for the access road and power line, which would represent a worst-case scenario, the maximum footprint within areas mapped as potentially suitable for the Karoo Dwarf Tortoise would be 7ha. Direct habitat loss within the corridor would amount to less than 1% of the mapped suitable habitat present, with the result that direct habitat loss would be minimal and is not considered a significant threat resulting from the development.

Table 2. Faunal species conservation concern known from the broad area, and their likely presence within the site.

Species	Wider area	Mura EGI Corridor
Vaal Rhebok (NT)	Present on higher ground, especially the Nuweveld mountains.	Not observed within the corridor, but may move through the area on occasion. The corridor is however considered low sensitivity for this species.
Black-footed Cat (VU)	Previously recorded from within the Karoo National Park, but no recent records.	No recent records from the area and the regular presence of this species within the corridor is considered unlikely. The corridor is considered low sensitivity for this species.
Leopard (VU)	This species is generally confined to protected areas or mountainous terrain and may be present in the wider area.	The terrain within and near the site is highly unlikely to be attractive for this species which prefers rugged terrain with more cover than the site offers.

Species	Wider area	Mura EGI Corridor
Riverine Rabbit (CR)	There are records from the Krom River and some of the larger tributaries.	Likely present within the larger habitat patches present along the Krom Rivier within the corridor.
Littledale's Whistling Rat (NT)	Occurs in the wider area and the arid parts of the Nama and Succulent Karoo and Namibia.	This species is associated with sandy soils and makes characteristic burrows that are relatively easily observed. Not observed within the corridor and considered unlikely to be present.
Karoo Dwarf Tortoise (NT)	Occasional records from the broad area. Associated with dolerite outcrops.	Potentially present as there is some suitable habitat within the corridor and tere are some records from similar habitat nearby.

3.4 CRITICAL BIODIVERSITY AREAS & BROAD-SCALE PROCESSES

There is an extensive CBA located within the Mura EGI Corridor (Figure 6), that would be affected by both power line routes. Since this an extensive CBA that extends well beyond the grid corridor itself, there is no possibility for avoidance of the areas of CBA. A summary of the various underlying features that drive the selection of the CBA 1 areas within the Mura EGI Corridor are identified and discussed below in Table 3. The majority of the CBAs within the Western Cape are driven by the selection of areas of Eastern Upper Karoo, as well as water resource protection areas identified as Very High Sensitivity under the Shale Gas SEA and Karoo River Types. There are no CBAs within the Northern Cape section of the Mura EGI Corridor.

In terms of the Western Cape Land Use Guideline Handbook which provides land use guidelines for CBAs, these areas should be kept in a natural state as far as possible and transformation within these areas is considered undesirable (Pool-Stanvliet et al. 2017). However, in this regard it is important to note that the study area has not experienced a high degree of transformation, with the result that the irreplaceability of CBAs is generally low. In addition, the CBA mapping makes use of hexagonal planning units which tend to be more extensive than the features being protected, with the result that the underlying biodiversity objectives and ecological functioning of the CBAs may not be compromised even when there is development in close proximity or within the CBA. In the current case, the constraints mapping illustrated in Section 4, ensures that sensitive ecological features within the site are avoided as much as possible and that the overall ecological functioning of the site and the CBA is not compromised.

As the Eastern Upper Karoo vegetation type within the corridor is not seen as being unique or of specific significance it is considered to have a low irreplaceability with regards to the Eastern

Upper Karoo vegetation type. In terms of the water resource protection and ecological process features captured by the CBA within the corridor, the development footprint within the CBA would be relatively limited and the power lines are highly unlikely to compromise the ecological functioning of the affected area or the future ability to meet conservation targets in the Upper Karoo. The development footprint (at construction) of the power line would be less than 60 ha and this would be distributed linearly along the whole length of the power lines and somewhat more concentrated at the switching station locations. As a result, the extent of habitat loss and disruption in any one area or habitat would be low and would not compromise the ecological value or functioning of these areas.

In terms of the conservation planning priorities and features of the corridor, there are no NPAES Focus Areas within the corridor. Given the low transformation rate and extensive nature of the affected vegetation types, the development would have minimal impact on the future ability to meet conservation targets for these vegetation types, within the study area or more broadly.

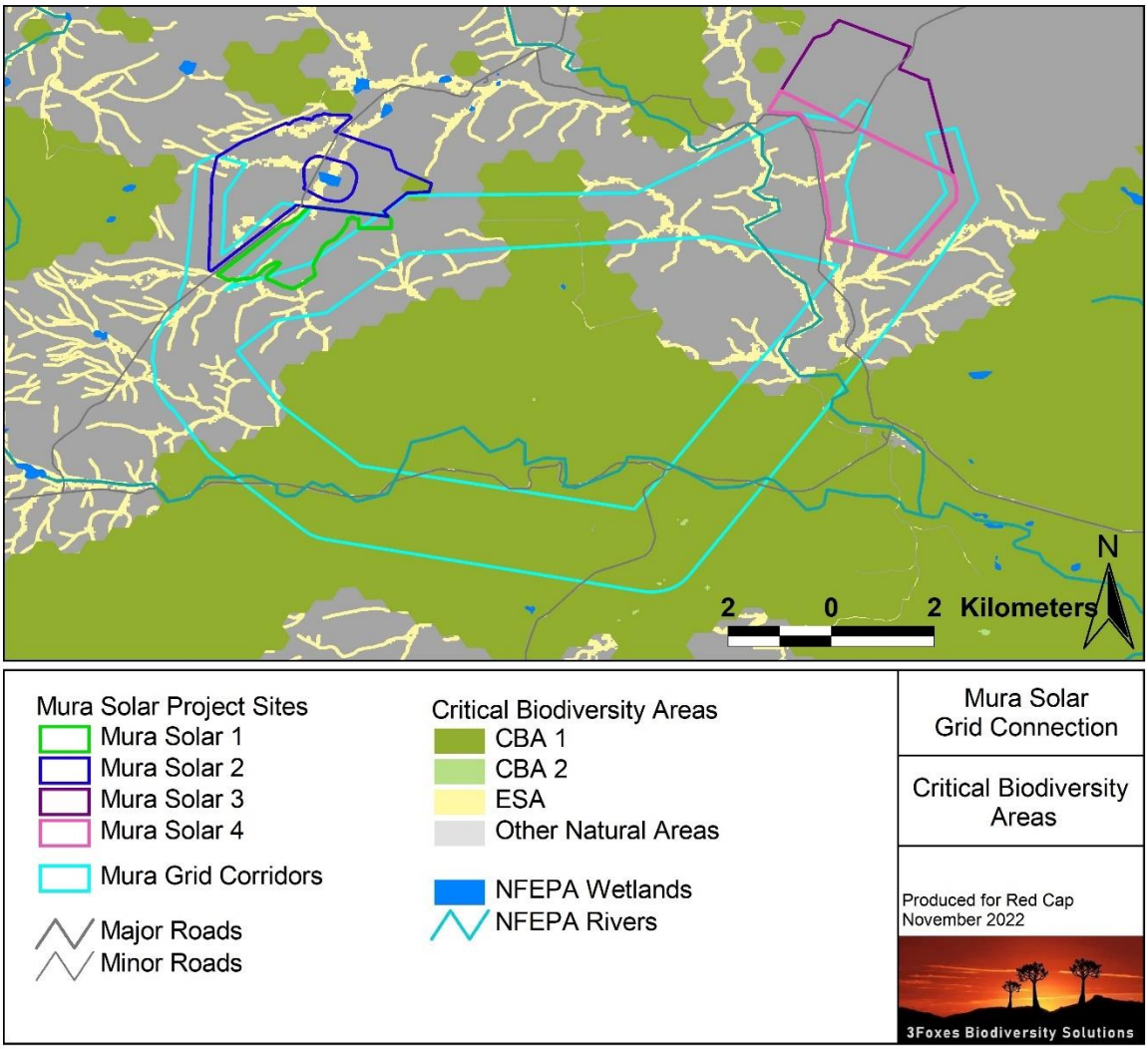

Figure 6. Extract of the Western Cape Biodiversity Spatial Plan and Northern Cape CBA map for the Mura EGI Corridor and surrounds.

Table 3. Summary of the various underlying drivers of the CBAs present within the Mura EGI Corridor and the potential impact of the development on these features or reasons. The CBA basis is available within the CBA lookup layers associated with the CBA mapping and also available for download from the SANBI BGIS webpage.

CBA Basis	Feature Description & Irreplaceability	Consequence & Potential Impact Analysis
Eastern Upper Karoo	These areas have been selected in order to meet the representivity requirement for the Eastern Upper Karoo vegetation type. As this vegetation type is still largely intact and is classified as Least Threatened, it is considered to have low irreplaceability.	Habitat loss associated with the Mura EGI Corridor within these areas would not compromise the ability to meet future conservation targets for this vegetation type. There are still extensive tracts of intact similar habitat available in the area and the affected areas have low irreplaceability. As a result, the implications of the development for habitat loss within the Eastern Upper Karoo are minimal and would not impact the conservation status of this vegetation type or the affected habitat types present within the study area in any meaningful manner.
Water Resource Protection	These areas have been designated CBA in order to protect drainage features or wetlands from development impact. This could be direct impact such as habitat loss within the wetlands or indirect impact such as damage through erosion and consequent siltation.	The development of the grid connection could potentially pose some threat to the integrity of the hydrological systems and processes operating within the affected CBA. However, it is important to note that the CBAs are based on large hexagonal planning units and actual features that require protection have not been mapped in detail. These features have however been mapped in detail here in this report in an ecological context and have also been mapped in the freshwater specialist study. The mapping, along with the required mitigation and avoidance measures suggested in this and the freshwater study, would ensure that impacts on the hydrological systems of the study area are minimised.
Shale Gas Very High Sensitivity (WC only)	These areas have been identified as being very high	The sensitivities mapped in the Shale Gas SEA were specific to shale gas development and exploration and different development options

CBA Basis	Feature Description & Irreplaceability	Consequence & Potential Impact Analysis
	sensitivity in the Shale Gas SEA.	such as power transmission pose very different risks to these areas. While these are generally still considered to represent more sensitive parts of the landscape, the potential impacts posed by the grid connection are very different from those posed by Shale Gas development, which has a far more intensive and intrusive nature compared to a power line. Areas considered unsuitable for Shale Gas development are not necessarily unsuitable for a power line development. The detailed, ground-truthed sensitivity mapping produced as part of this study are considered to represent a more realistic representation of the sensitivity of the site and the actual development constraints for the power line.

3.5 CUMULATIVE IMPACTS

In terms of cumulative impacts in and around the site, there are no built PV or wind energy facilities within 30km of the corridor to date. The three Nuweveld WEFs west of the corridor have been authorised and there is also the Hoogland North and Hoogland South WEFs which have not yet been authorised and lie adjacent and to the north and west of the Nuweveld site. The total footprint from these projects is estimated at 600ha, while the Mura suite of PV projects associated with the current EGI Corridor would cover an area of approximately 1400 ha. While it is clear that there is a node of renewable energy development starting to develop south of Loxton, there are no facilities built to date and the current level of transformation in the area remains low. The contribution of the Mura EGI Corridor at 60 ha therefore considered to represent a low contribution and is therefore considered acceptable.

In terms of specific cumulative impacts, impacts on the Riverine Rabbit and Karoo Dwarf Tortoise would be a concern. However, the contribution of the Mura EGI Corridor to cumulative impact on these two species would be low as the total footprint within the associated habitats would be low and would not be likely to impact the viability of local populations of these species. As the broader area is still largely intact, and most direct impacts are associated with the relatively short, transient, construction phase, cumulative impacts associated with the current project are considered low and acceptable. There do not appear to be any ecological processes or corridors that would be specifically disrupted by the Mura EGI Corridor. In addition, should all the planned projects in the area be built, the overall extent of habitat loss would not be significant relative to the overall extent of the affected vegetation types. As such, the contribution of the current Mura

EGI Connection to habitat loss would not change the overall threat status of any vegetation types or special habitats and the overall level of cumulative impact in the area is considered acceptable.

4 MURA EGI CORRIDOR CONSTRAINTS

In order to ensure the maintenance of ecological processes within the grid corridor and the minimisation of impacts on terrestrial biodiversity, a constraints map for the corridor was produced (Figure 7). This should be used to inform the grid routing and ensure that impacts on the sensitive features of the site are maintained within acceptable limits. It should be noted that the constraints mapping applies to the physical footprint of the development (i.e pylon and switching stations placements and access roads), but no-go features can be traversed by the overhead lines themselves. There are numerous constraints operating across the corridor, associated firstly with the major drainage features of the corridor and associated Riverine Rabbit habitat and secondly with the mountains, slopes and dolerite outcrops of the corridor which are ecologically significant in their own right, but also represent Karoo Dwarf Tortoise habitat. The development footprint within the high sensitivity areas should to be reduced to the minimum possible. The major drainage features with areas of confirmed Riverine Rabbit habitat are mapped as no-go features as this is a restricted habitat that is vulnerable to disturbance and is home to a species with very high conservation concern. The areas of Karoo Dwarf Tortoise habitat have been mapped as high sensitivity since this habitat does not have confirmed Karoo Dwarf Tortoise observations and it would not be highly threatened by the development of the power line through these areas. As a result, the sensitivity of Karoo Dwarf Tortoise habitat is considered to be somewhat lower than the areas of optimal Riverine Rabbit habitat. Provided that the development footprint can avoid/be minimised within the areas identified as High sensitivity, the grid connection would be considered acceptable and would generate a low impact on fauna, flora and terrestrial biodiversity generally.

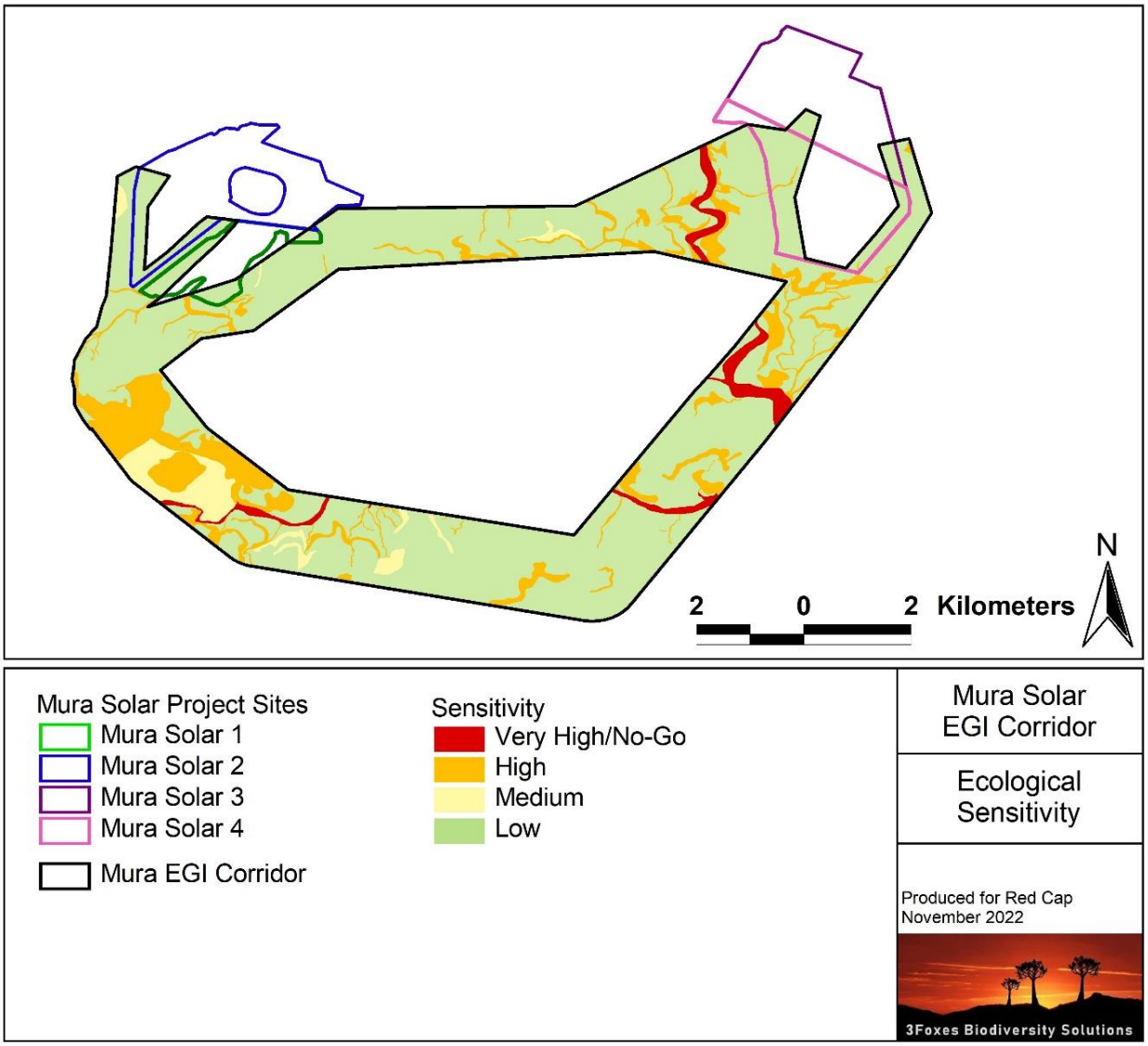

Figure 7. Ecological constraints map for the Mura EGI Corridor for all infrastructure.

5 IMPACTS AND ISSUES IDENTIFICATION

5.1 IDENTIFICATION OF POTENTIAL IMPACTS

The development of the Mura EGI Connection would result in a number of potential impacts on Terrestrial Biodiversity during the construction and operational phases of the development. During construction, the major impact would likely be habitat loss and anthropogenic disturbance while during the operational phase, direct disturbance would be much reduced although there may be some potential impact from operational and maintenance activities. The following impacts

are identified as the major impacts that are likely to be associated with the development of the Mura EGI Corridor on Terrestrial Biodiversity.

Impact 1. Impacts on CBAs and broad-scale ecological processes

As the large CBA that falls within the corridor cannot be avoided, there would be some habitat loss within the affected CBA as well as the ESAs of the site. During operation, the levels of disturbance along the grid route would be significantly reduced as compared to the construction phase, but there may still be some disturbance related to operational and maintained activities. As such, the assessment considers the direct habitat loss associated with the development as well as disturbance due to noise or maintenance activities.

Impact 2. Cumulative Impacts

The development of the Mura EGI Corridor infrastructure would result in habitat loss and an increase in overall cumulative impacts on fauna and flora in the area. The contribution of the Mura EGI Corridor at less than 60ha is not considered highly significant, especially given the linear nature of the development. Although the area currently experiences a relatively low level of impact, there are numerous renewable developments authorised or currently being planned in the area and it is likely that cumulative impacts will increase into the future. The affected vegetation types are however all still largely intact and the grid connection would not significantly increase cumulative impacts on these vegetation types at the national scale.

6 ASSESSMENT OF IMPACTS ON TERRESTRIAL BIODIVERSITY– MURA EGI CORRIDOR

An assessment of the likely significance of the impacts identified above is made below for the impacts of the Mura EGI Corridor on Terrestrial Biodiversity.

6.1 CONSTRUCTION PHASE IMPACT ON CBAS & ECOLOGICAL PROCESSES

Impact Nature: Construction phase impact on CBAs, ESAs and ecological processes within the EGI Corridors		
	Without Mitigation	**With Mitigation**
Extent	Regional (3)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (2)	Low (2)
Reversibility	Recoverable (3)	Recoverable (3)
Probability	Highly Probable (4)	Low Probability (2)
Significance	Moderate (48)	Low (22)

Status	Negative	Negative
Irreplaceable loss of resources	Yes	No
Can impacts be mitigated?	To a large degree, but some habitat loss associated with the project is unavoidable.	
Mitigation	• Minimise the development footprint as far as possible. • Locate temporary-use areas such as construction camps and lay-down areas in low sensitivity or previously disturbed areas. • Avoid mapped No-Go areas in the placement of pylons, switching stations and access tracks. • Minimise the development footprint in areas mapped as high sensitivity (i.e. near watercourses and other ecologically significant features). • Clearly demarcate riparian areas near to the development footprint as No-Go areas with appropriate signage and barriers. • Appropriate design of roads and other infrastructure to minimise faunal impacts and allow fauna to pass over, through or underneath these features as appropriate. • The fencing around the switching stations should not have any electrified strands within 30cm of the ground as this may result in tortoises being electrocuted. Alternatively, guard wires or mesh can be placed outside of the fence to prevent tortoises from accessing the electrified fence. • Monitoring of construction activities to ensure that the development footprint within CBAs is restricted to the authorised development footprint.	
Residual Risks	Some habitat loss within the CBAs cannot be avoided with the result that there will be a low residual risk associated with the development.	

6.2 OPERATIONAL PHASE IMPACT ON CBAS & ECOLOGICAL PROCESSES

Impact Nature: Operational phase impact on CBAs, ESAs and ecological processes within the EGI Corridors		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (2)	Low (1)
Reversibility	Recoverable (3)	Recoverable (3)
Probability	Probable (3)	Low Probability (2)
Significance	Moderate (33)	Low (20)
Status	Negative	Negative

Irreplaceable loss of resources	Yes	No
Can impacts be mitigated?	To a large degree, but some operational phase disturbance would occur as a result of maintenance activity.	
Mitigation	• All service vehicles on site should adhere to a low speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h. • Service staff should remain within the power line footprint areas and access routes and should not be allowed to wander into the veld. • No fauna including tortoises should be disturbed or removed from the veld. • A log should be kept detailing and fauna-related incidences or mortalities that occur on site, including roadkill, electrocutions etc. These should be reviewed annually by the Environmental Officer and used to inform operational management and mitigation measures.	
Residual Risks	The power line would require maintenance activities which would generate some disturbance within the areas of CBA. However, this would be occasional and the overall impacts associated with the operation of the power line would be very low.	

6.3 CUMULATIVE IMPACT 1. CUMULATIVE IMPACTS ON BROAD-SCALE ECOLOGICAL PROCESSES

Impact Nature: Cumulative habitat loss and impact on broad-scale ecological processes		
	Without Mitigation	**With Mitigation**
Extent	Regional (3)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (2)	Low (1)
Reversibility	Recoverable (3)	Recoverable (3)
Probability	Low Probability (2)	Low Probability (2)
Significance	Low (24)	Low (20)
Status	Negative	Negative
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	To a large degree, but some habitat loss associated with the development is unavoidable.	
Mitigation	• Avoid mapped No-Go areas in the placement of pylons, switching stations and access tracks.	

	• Minimise the development footprint in areas mapped as high sensitivity (i.e. near watercourses and other ecologically significant features). • Clearly demarcate riparian areas near to the development footprint as No-Go areas with appropriate signage and barriers.
Residual Risks	The long-term contribution of the Mura EGI Infrastructure to cumulative impact on ecolgical processes would be low. Much of the line is already in close proximity to existing roads and the dispersed nature of the footprint would result in low impacts on ecological processes.

6.4 NO-GO ALTERNATIVE

Assuming that the project does not go ahead, the grid would not be built and the current land use would continue into the future. The area is currently used for extensive livestock and/or game farming which are considered to be largely compatible with long-term biodiversity maintenance. Many fauna species are to some degree negatively affected by farming including many predators which are targeted due to their negative impact on livestock, while some species may also be vulnerable to habitat loss or degradation and may experience depressed populations within the farming landscape. In terms of vegetation and plant species, extensive grazing may result in changes in composition towards less palatable species and a reduction in plant cover. It is however important to recognise that the development does not represent an alternative to extensive livestock farming, but rather an additional impact independent of the current land use. Overall, the no-go alternative is considered to result in a low negative impact on terrestrial biodiversity.

7 CONCLUSION & RECOMMENDATIONS

The Mura EGI Corridor is mapped as falling primarily within the Eastern Upper Karoo vegetation type. However, the site verification and field assessment confirmed the presence of Upper Karoo Hardeveld and Southern Karoo Riviere within the corridor as well. All of these vegetation types have only been impacted to a limited extent by transformation and are classified as Least Threatened. In terms of fauna, there are several listed mammals which occur in the area and which would potentially be impacted by the development. This includes the Riverine Rabbit, Black-footed Cat, Brown Hyena, Grey Rhebok and Mountain Reedbuck. The Riverine Rabbit is of greatest potential concern as it has the highest threat status and has also been confirmed present within the Mura EGI Corridor. The extent of habitat loss within the areas of Riverine Rabbit habitat would however be minimal and would not compromise the local population of this species. The Karoo Dwarf Tortoises is also potentially present within the corridor and is

associated with the rocky hills of the Upper and Lower Karoo. The footprint within these areas would also be relatively low and would not significantly impact habitat availability for the Karoo Dwarf Tortoise.

A large proportion of the grid routes, especially the southern corridor would traverse an extensive CBA which characterises the region. As this CBA cannot be avoided as it occupies a significant proportion of the corridor, there would be some unavoidable impact through habitat loss within the affected CBA. The footprint within the CBA would be less than 30 ha and the pylons must be located entirely outside of areas mapped to be of very high ecological sensitivity. Given the linear, distributed nature of impact along the length of the power line, it would not compromise the ecological functioning of the CBA or destroy the underlying biodiversity features present. The impact of the development on CBAs and ESAs is therefore considered acceptable.

In terms of the sensitivity mapping conducted as part of this study, there are numerous constraints operating across the corridor, associated firstly with the larger drainage features of the corridor with associated Riverine Rabbit habitat and secondly with the mountains, slopes and dolerite outcrops of the corridor which are ecologically significant in their own right, but also represent Karoo Dwarf Tortoise habitat. The development footprint within the very high sensitivity areas will be avoided by pylon and switching stations placement and access roads and disturbance to high sensitivity areas will be reduced to the minimum possible and a significant impact on these features is not expected to occur. The power line is considered acceptable and would generate low impacts on fauna, flora and ecological processes, provided that key mitigation is strictly applied.

Impact Statement – Mura EGI Corridor Impact on Terrestrial Biodiversity

There are no impacts associated with the development of the Mura EGI Corridor on terrestrial biodiversity that cannot be mitigated to an acceptable level. As such, should all the proposed mitigation be implemented, the Mura EGI Corridor development is deemed acceptable from a terrestrial ecological impact perspective. In terms of cumulative impacts, the affected area has not been significantly impacted by renewable energy development to date and the contribution of the current power line development to cumulative impact is considered low and acceptable. It is thus the reasoned opinion of the specialist that the Mura EGI Corridor development should be authorised subject to the various mitigation and avoidance measures as indicated.

8 REFERENCES

Collins K, Bragg C, Birss C, Child MF. 2016. A conservation assessment of *Bunolagus monticularis*. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. *The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa*.

Collins K, Toit JT. 2016. Population status and distribution modelling of the critically endangered riverine rabbit (*Bunolagus monticularis*). *African Journal of Ecology* 54:195–206.

Duthie AG, Skinner JD, Robinson TJ. 1989. The distribution and status of the riverine rabbit, *Bunolagus monticularis*, South Africa. *Biological Conservation* 47:195–202.

Duthie AG. 1989. The ecology of the riverine rabbit (*Bunolagus monticularis*). Ph.D. Thesis. University of Pretoria, Pretoria, South Africa.

Skinner, J.D. & Chimimba, C.T. 2005. *The mammals of the Southern African Subregion*. Cambridge University Press, Cambridge.

South African National Biodiversity Institute (SANBI). 2020. *Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa*. South African National Biodiversity Institute, Pretoria. Version 1.2020.

Todd, S.W. 2021. Fauna and Flora Specialist Study for the Nuweveld North, East and West WEFs. 3Foxes Biodiversity Solutions for Zutari South Africa.