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16 May 2022

Mr D Holder
Senior Environmental Consultant
Cape EAPrac
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Via – email: dale@cape-eaprac.co.za

Dear Dale.

GROOTFONTEIN ACCESS ROAD – ECOLOGICAL COMMENT

An Environmental Authorisation was recently issued to Veroniva (Pty) Ltd, approving the establishment of three Photo Voltaic (PV) facilities within the remainder of Portion 4 of the farm Grootfontein 149, in the Western Cape Province. It is understood that the present owners of the site, Scatec (Pty) Ltd now wish to establish an additional access road *post facto*, the environmental authorisation, traversing the three approved Grootfontein PV facilities.

In consideration of the National Environmental Management Act (NEMA), this proposed access road constitutes a listed activity and thus requires Environmental Authorisation. As part of the Basic Assessment process, Cape EAPrac have appointed SDP Ecological and Environmental Services to review the proposed road routing in respect of the sites in question and present a statement relating to their understanding of the impacts that such additional roadway will elicit.

Based on the intensive data collection undertaken in 2020, an additional site reconnaissance was not deemed to be a requirement. This document aims to identify the potential impacts that may arise as a result of both the construction aspects and operation related aspects associated with the proposed roadway. Other mitigatory measures and general recommendations are also presented.

1. Proposed Development

The access road in question is to be designed and constructed in alignment with the document titled 'Access Road description and construction method – Grootfontein PV 1, 2 and 3' (Dated 11/02/2022), as indicated by Figure 1 below. The following construction related activities and design parameters are associated with the proposed access roadway.

- 12-meter road width
- 4 Kilometer length
- Surveying, grubbing and demarcation of the road path
- Grading and leveling of the pathway
- Application of a gravel wearing surface course
- Establishment of a shoulder area that slopes directly away from the edge of the driving surface.
- Installation of a stormwater furrow.

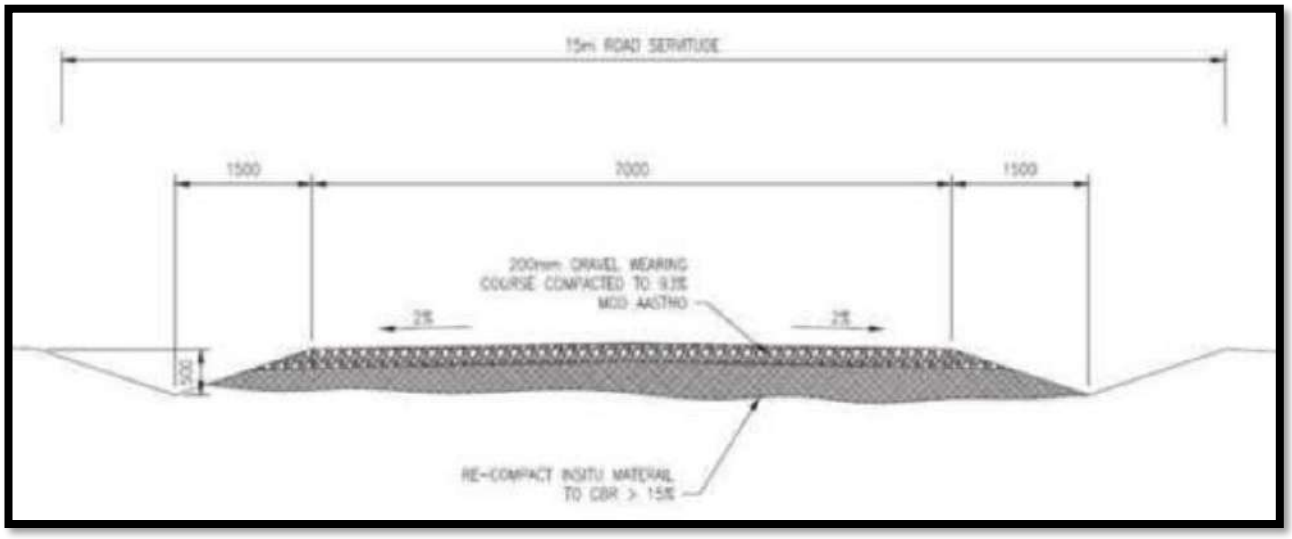

Figure 1. Cross sectional diagram of the proposed access road to be established across the Grootfontein subject site. (source; 'Access Road description and construction method – Grootfontein PV 1, 2 and 3' (Dated 11/02/2022)).

2. Nature of Receiving Environment

An assessment of the Grootfontein subject area was carried out during the initial EIA (Environmental Impact Assessment) phase in late 2020. The Grootfontein site can be described as an elevated plateau that acts as a watershed between drainage to the north and drainage to the south. The lower elevations of the site, particularly to the north are dominated by sheet wash plains and a larger ephemeral river system, the Droelaagte. Given this topography, two habitat forms or veld types are evident within the site, these being SKv 5 Tanqua Karoo, a form of the Succulent

Karoo Biome and Tanqua Wash Riviere (AZi 7) a riparian habitat form (Mucina and Rutherford 2006). Notably, both these veld types are considered "least threatened" from a conservation perspective.

Findings confirmed a low level of ecological significance associated broadly throughout the terrestrial environment of the site. However, areas of moderate and high ecological sensitivity were encountered along the scarp slopes and sheetwash environments (see Figure 2), which have the potential to provide suitable habitat for lithic and geophytic plants of conservation significance. Such observations conform with the sensitivity 'screening tool', confirming low levels of faunal diversity being evident on higher ground within the Grootfontein area and most faunal populations being associated with the riverine environments. Based on the above, it is anticipated that faunal populations are concentrated in and around riparian areas or sandy environments, in association with improved foraging and the availability of water. Thus, the riparian environments are allocated a "high level" of ecological sensitivity on account of the increased faunal populations identified within these areas and the evident intermittent flooding that may affect these areas.

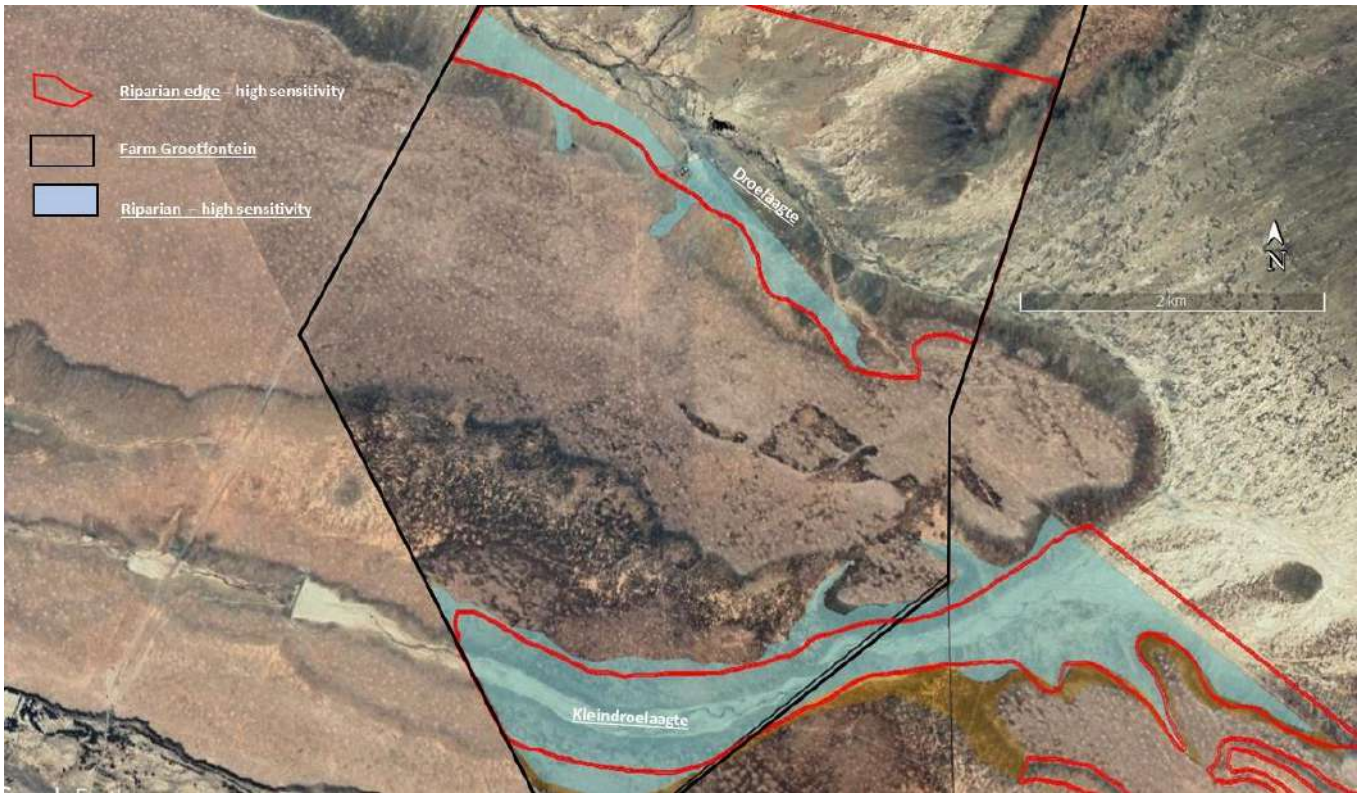

Figure 2. Map image indicating the sensitive features within the subject area.

3. Anticipated Impacts and Mitigation Measures

Given the design parameters of the access roadway within the context of the receiving environment, the following impacts are anticipated to be generated in respect of this proposed development:

3.1 Clearance of vegetation.

Grubbing of vegetation along the proposed road route is required in order to accommodate the access roadway. As mentioned, the roadway is positioned atop the crest of an elevated landform, along level terrain. The previous assessment in 2020 detailed that plant communities (as well as faunal populations) within the region generally show high levels of adaptation, occurring in specific areas with the utilisation of specific, niche environments, namely scarp slopes and riverine environments. Thus, the botanical community encountered along the level, rocky terrain is typically of low diversity, comprising primarily of *Salsola* spp.

Given the low conservation value attributed to portions of elevated plateaus, a minor loss in vegetated habitat within the confines of the subject site is anticipated. Such impact is of little significance within the local and regional context. However, despite the above, clearance activities should be strictly confined within the road servitude.

3.2 Disturbance of faunal refugia

Faunal associes are concentrated around riverine areas as well as along scarp interfaces with low levels of diversity encountered at higher elevations. Notably, *Chersina angulata* and *Parabuthus* spp are found at higher areas of elevation and have an increased probability of being affected by the proposed roadway. As the roadway avoids areas of exclusion (scarp and sheetwash areas), the disturbance of faunal refugia at this point is considered to be of low risk (Figure 3). Individuals, when encountered should be relocated off the road pathway.

3.3 Alteration of surface hydrology

Mean annual rainfall of less than (<) 60 mm gives rise to the xeric nature of the subject site. Thus, storm water control issues are not likely to pose an issue in this regard, with little or no change to factors such as surface water percolation, surface drainage and flow patterns. However, in order to prevent alteration of ambient water quality, all vehicles and machinery should be operated and maintained according to the existing EMPr, with a spill kit available on site to remedy the spillage of liquid and other noxious materials.

3.4 Dust, light, and other emissions

Aeolian driven particulate dust emissions are anticipated to increase during the construction phase as a consequence of vegetation clearance. Dust is considered to have a significant bearing on vegetation and photosynthetic function as well as browsing and grazing by herbivorous populations (Zeidal et al 2015). A cellulose based binding agent utilised to bind loose sediment along the roadway and related construction areas may be employed if aerial particulate matter becomes excessively problematic. To limit dust emissions, it is recommended that clearance is undertaken in phases, with the gravel surface layer installed at the earliest possible time while wind shields and general management related precautions be employed in and around the site.

Electrical light pollution is a significant factor affecting particularly faunal populations. It is recommended that no lighting be employed along this roadway and that chevrons and similar methods of “guidance” be employed along the roadway. Table 1 below presents a qualitative analysis of the level of impact associated with the proposed new roadway. This Table shows that change arising from the development can be broadly described as “low”.

Figure 3. Map image detailing the position of the proposed access road relative to the sensitive areas within the site.

Table 1. Impact description and significance with regards to the proposed establishment of the access roadway.

IMPACT	Intensity	Extent	Duration	Probability	Confidence	Reversibility	Resource Loss	Mitigation	Consequence	Significance
Alteration of the local hydrology	Low	Local	Permanent	Unlikely	High	Irreversible	Low	Yes	Low	Low
Loss of indigenous vegetation	Moderate	Local	Permanent	Definite	High	Irreversible	Moderate	Yes	Low	Low
Loss of faunal refugia	Low	Local	Permanent	Unlikely	Moderate	Irreversible	Low	Yes	Low	Low
Dust & ELP	Low	Local	Permanent	Likely	High	Reversable	Very low	Yes	Low	Low

Impact Significance	**Description**
Very low level	Generally indiscernible levels which have no negative externalities arising on the prevailing environment
Low level	Noticeable change but acceptable within the prevailing environment
Moderate level	Change is evident but acceptable within the prevailing environment with the introduction of some levels of mitigation
High level	Change arises and may be considered to have significant negative externalities arising on the prevailing environment
Very high level	Change is severe and may require the use of high levels of mitigation or avoidance mechanisms in order to alleviate the externalities arising from the activity.

Conclusion and Statement

SDP Ecological and Environmental Service were appointed by Cape EAPrac to provide a "statement" on the impacts of the establishment with regards to an alternative roadway through the Grootfontein Solar Park. The new road is the subject of an amended and additional Environmental Authorisation. In consideration of the information provided above in conjunction with the data collated in 2020, the following statements are provided:

- The road route in question avoids areas identified as "sensitive" or of "significance" from an ecological perspective. As indicated by Figure 2 above, the road is to be positioned atop the crest of an elevated landform, away from scarp and riverine habitats.

- The xeric nature of the habitat as well as historical high density grazing of livestock, has given rise to sparse vegetation cover, particularly along the upper, level terrain within the site. It follows that the loss of vegetation within the road route is generally limited and that the route is of low botanical diversity.

- The rudimentary design of the roadway further limits the overall impact on the receiving environment.

- Hard panning along the road path is unlikely to result in significant storm water runoff issues as the site is considered to be a rain shadow desert with mean annual precipitation ranging between 40mm – 60mm. Normal engineering design parameters should however apply to the roadway.

- The tortoise (Testudinidae) *Chersina angulata* and the scorpion species *Parabuthus* spp are most likely to be affected along the proposed roadway. Their presence is however likely to be transitory. Reasonable efforts to relocate any encountered individuals off the pathway is advised when possible. Other recorded fauna in this area are likely to be located primarily within the riverine habitats, some distance away from the access road.

Given the above, it is our understanding that the proposed establishment and operation of the access road within the approved development footprint of the Grootfontein complex of properties evidently presents a very low, direct impact with minor cumulative impacts upon the receiving environment (Table 1). It is clear that the proposed roadway is suitable for transformation based on the limited risk to the flora and fauna at this point.

From the above, it is evident that this development within Grootfontein should not be prohibited on biophysical or ecological grounds. It is recommended that the competent authority sanction this roadway, with construction and operational activities being subject to the stipulated conditions within the applicable environmental management documents.

Trusting that the above is of value.
Kind regards

L P Maingard

References

Zeidali A, H Barani M H Zadeh (2015) Assessment of Dust Impact on Rangeland and Livestock Production According to Ranchers Opinion (Case Study: Andimeshk District, Iran) Journal of Rangeland Science Volume 5, Issue 4 - Serial Number 4 October 2015

TERRESTRIAL BIODIVERSITY AND SPECIES SPECIALIST ASSESSMENT:

Basic Assessment for the Proposed Development of three 175 MW Solar Photovoltaic Facilities and associated Electrical Grid Infrastructure on the Farm Grootfontein (i.e. Grootfontein PV 1, Grootfontein PV 2 and Grootfontein PV 3), near Touws River, Western Cape

Report prepared for:	*Report prepared by:*
CSIR – Environmental Management Services	SDP Ecological & Environmental Services
P O Box 320	P O Box 1016
Stellenbosch	Ballito
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Version 1: October 2020
Final: February 2021

Executive Summary

Three 175 MW photovoltaic (PV) power generation plants (i.e. Grootfontein PV 1, Grootfontein PV 2 and Grootfontein PV 3) have been proposed for establishment on the Farm Grootfontein 149. In addition, these plants, would provide power through a 132kV overhead powerline that would connect with the Kappa Substation, some 12km to the south of the site.

An evaluation of the biophysical aspects of the Farm Grootfontein was undertaken during September 2020 in order to consider the nature of the area in question and to evaluate the impacts of the proposed development.

The Farm Grootfontein lies within the Tanqua Succulent Karoo Biome and comprises of two veld types, namely Tanqua Karoo and Tanqua Wash Riviere. The former is associated with elevated terrestrial environments while the latter is associated with sandy, riparian habitats. Both veld types are considered "least threatened".

In evaluating the ecological significance of the subject site, it was determined that while floral diversity and significance were not considered to be high, the importance of the Tanqua Wash Riviere habitat or lower riparian environments were important in terms of faunal diversity. These areas are considered important faunal habitat and are evidently also associated with extreme flood states, providing them with a high ecological sensitivity. These findings align with those of the Department of Environment, Forestry and Fisheries (DEFF) screening tool and the various data sets associated with the region.

Given the above, the proposed development of Grootfontein PV 1 Grootfontein PV 2 and Grootfontein PV 3 is expected to elicit a moderate ecological impact that may be reduced to "low" if suitable mitigation measures are employed. The overhead powerline is expected to elicit only a low impact, primarily associated with change that may arise in the riparian environments.

The proposed developments, if authorised should be approved with a number of conditions, in particular the placement of the development within the footprint identified and that a suitable game permeable fence should be instituted. A number of related mitigation and management measures are proposed.

From the above, it is evident that subject to the conditions outlined in this report, the development of three 175 MW PV facilities at Grootfontein cannot be precluded on ecological grounds.

Contents

List of Figures

List of Tables

List of Abbreviations

AIP	Alien Invasive Plant
AMSL	Above Mean Sea Level
BA	Basic Assessment
CBA	Critical Biodiversity Areas
DEA	Department of Environmental Affairs
DEFF	Department of Environment, Forestry and Fisheries
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EIS	Environmental importance and sensitivity
EGI	Electricity Grid Infrastructure
GPS	Global Positioning System
NEMA	National Environmental Management Act (Act 107 of 1998, as amended)
NEMBA	National Environmental Management Biodiversity Act
NFEPA	National Freshwater Ecosystem Priority Areas
PES	Present Ecological State
PV	Photovoltaic

Glossary

Definitions	
Arid	Areas which receive low levels of rainfall or there is a moisture deficit.
Aquifer	Underground layer of water-bearing permeable rock
Crepuscular	Fauna that is active at twilight
Dendrogram	A diagram showing relationships determined through a cluster analysis
Calcrete	A carbonate horizon formed in semi-arid regions. Also known as a caliche.
Dolerite	Form of igneous rock.
Drainage line	A geomorphological feature in which water may flow during periods of rainfall.
Dune	Landscape feature arising from the deposition of sediment, transported primarily by winds and resulting in a sandy feature that may or may not be stabilised by vegetation
Eco morphology	Pertaining to the relationship between the geomorphology of an environment and the biotic components that are adapted to it.
Edaphic	Pertaining to soils.
Fossorial	Pertaining to burrowing animals or those which live underground
Geophyte	Plants with underground storage organs.
Graminoid	Grasses or grass-like. Also monocotyledonous plants.
Gully	An erosion line exceeding 30cm in depth where water flow is concentrated and erosion resulting from flow is clearly evident.
Hydrogeomorphological	The interaction of geomorphic processes, landforms and /or weathered materials with surface and sub-surface waters.
Hygrophilous	Plants growing in damp or wet conditions
Multivariate analysis	A statistical method of evaluating non linear relationships between groups of data.
Non perennial	Flow is intermittent and irregular
Rill	Shallow erosion lines less than 30cm deep
Scarp	Physical feature determined by geology and comprises of a steep slope that differs from the slope of the prevailing landscape
Sheetwash	A mobile sheet of sediment deposited by water flow over a hill-slope or plain
Xeric	A dry, as opposed to wet (hydric) or mesic (intermediate) environment.

TERRESTRIAL BIODIVERSITY AND SPECIES SPECIALIST ASSESSMENT

This report serves as the Terrestrial Biodiversity and Species Specialist Assessment that was prepared as part of the Basic Assessments (BAs) for the proposed development of three 175 MW Solar Photovoltaic (PV) Facilities and associated Electrical Grid Infrastructure (EGI) on the Farm Grootfontein 149, near Touws River in the Western Cape. These projects are referred to as Grootfontein PV 1, Grootfontein PV 2 and Grootfontein PV 3.

1 Introduction

1.1 Scope, Purpose and Objectives of this Specialist Report

The Project Applicant is undertaking an Application for Environmental Authorisation to be submitted to the National Department of Environment Forestry and Fisheries (DEFF), which entails significant planning as well as the undertaking of BA processes. The Project Applicant is proposing to develop nine solar PV facilities, nine powerlines and associated infrastructure to link the proposed PV facilities to the Eskom Kappa Substation. There are nine separate Project Applicants. Two PV facilities are being proposed on the farm Witte Wall 171; three PV Facilities are being proposed on the farm Grootfontein 149; and four PV Facilities will be constructed on the Farm Hoek Doornen 172. This Terrestrial Biodiversity and Species Specialist Assessment specifically deals with the Grootfontein PV 1, Grootfontein PV 2 and Grootfontein PV 3 projects, as well as the associated EGI (Figure 1). This specialist study, is being undertaken as part of the BA process in order to evaluate the terrestrial habitats and biodiversity of the receiving environment in relation to the proposed development.

The biophysical reconnaissance and evaluation of a portion of the farm Grootfontein was undertaken during September 2020 and entailed both a literature review of the region, as well as on site evaluations, during which specific primary data was collected and evaluated. In addition, the identification of key terrestrial, ecological features on site and an interpretation of the prevailing habitat form were undertaken.

All data collected in the field and during the literature review was evaluated and interpreted in order to provide an understanding of the nature of the prevailing environment at a landscape and habitat level, together with specific evaluation of data relating to habitat form and structure. The evaluation also sought to identify any anomalies within the prevailing environment. Such variance may be considered to be indicative of differing habitat forms, which under consideration, may be of higher order ecological value in relation of the prevailing environment.

1.2 Details of Specialist

This specialist assessment has been undertaken by Messrs S C Bundy, L P Maingard and AM Whitehead of SDP Ecological and Environmental Services. The following information is provided in respect of the above:

S C Bundy	Ecologist	SACNASP No.400093/06
Supported by		
LP Maingard	Ecologist	SACNASP No.116639/16
AM Whitehead	Ecologist	SACNASP No 400176/10

Curriculae vitae are included in Appendix A of this specialist assessment, as well as specialist statements of independence.

1.3 Terms of Reference

The overall objectives of the Terrestrial Biodiversity and Species Specialist Study are:

- To identify and establish an understanding of the site under consideration at a landscape scale of evaluation with particular consideration being given to important terrestrial habitats, as they may be identified.

- To provide an evaluation and status of habitat composition and significance within the site in order to evaluate the potential impact of the proposed development on the ecological function of the site.

- To assess the actual and potential impacts arising from the proposed development on both the terrestrial habitat and fauna within the study site. Such impacts may be directly applicable to the site and contained within the site boundaries, or may be indirect impacts, which may have ramifications outside of the site boundary; or may be of a cumulative nature, in terms of impacts arising from similar developments or activities within the region.

- To provide guidance on the implementation of mitigation measures that may serve to moderate any negative impacts that may arise on site, as a consequence of the proposed development.

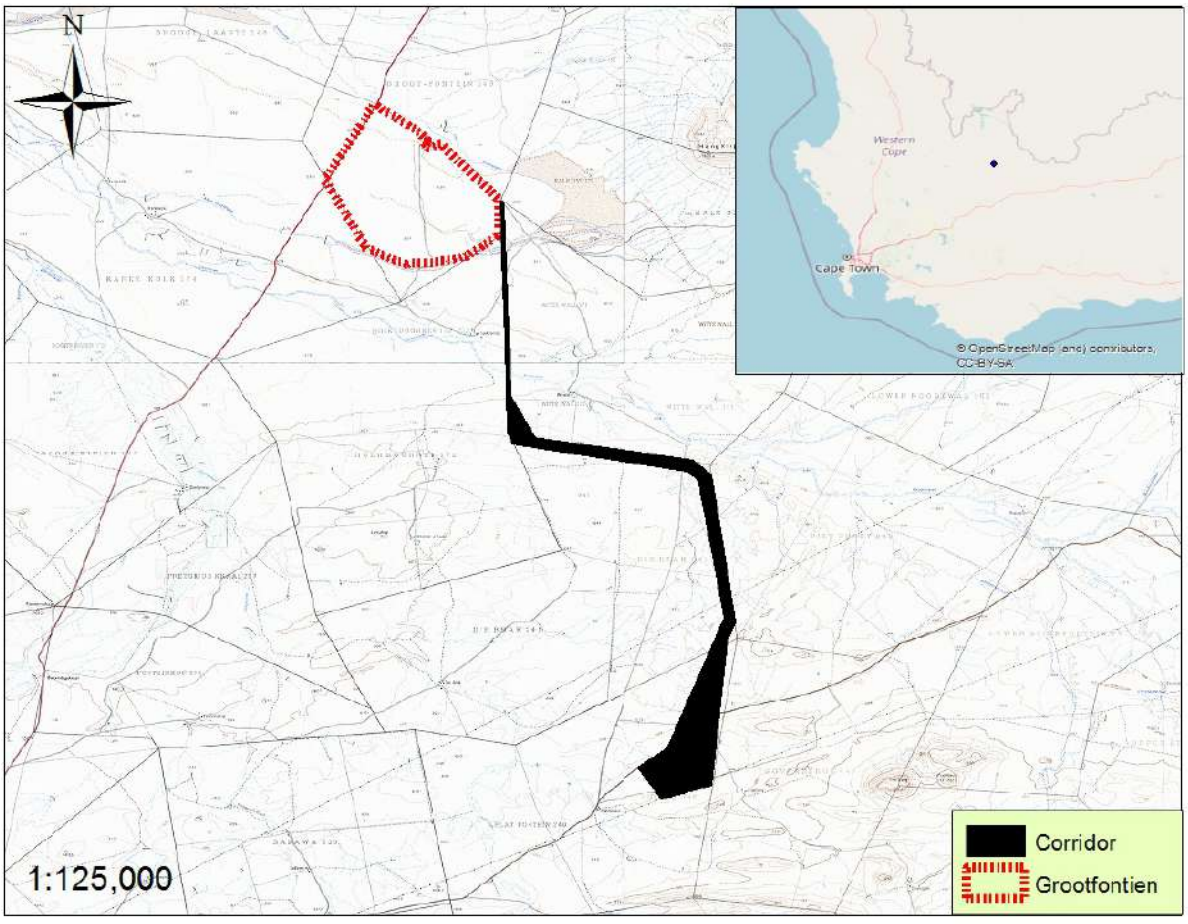

Figure 1. Topographic map indicating the study areas (outlined in red for the PV Facilities and black for the EGI Corridor) within the Farm Grootfontein Wall

The Scope of Work is based on the following broad Terms of Reference, which have been specified for this specialist study:

- Comply with the Assessment Protocols that were published on 20 March 2020, in Government Gazette 43110, GN 320; as well as all relevant legislation. Identify any additional protocols, legal and permit requirements that are relevant to this project and the implications thereof.
- Review detailed information relating to the project description and precisely define the environmental risks to the terrestrial environment and consequences for prevailing ecology.
- Compile a baseline description of the terrestrial ecology of the study area, and provide an overview of the entire study area in terms of ecological significance and sensitivity.
- Provide specific ecological data in respect of the terrestrial floral and faunal components of the site using ground-truthing methods, with an emphasis on those areas considered to be of “high” and possibly, “moderate” sensitivity.
- Based on the desktop study, undertake field work and sampling across the site to record relevant data and to compile an overview of the habitat under review. The site visit must also identify the level of sensitivity assigned to the project area on the National Web-based Environmental Screening Tool (Screening Tool), and to verify and confirm this sensitivity and land-use. A Site Sensitivity Verification Report must also be compiled based on the requirements documented in the Assessment Protocols published on 20 March 2020, in Government Gazette 43110, GN 320.
- Collate all data collected during the field work and undertake a statistical review using methodologies that allows for comparison of biological data.
- Undertake a faunal investigation on site based on relevant data and related information.
- Provide a detailed terrestrial sensitivity map of the site, including mapping of disturbance and transformation on site, as well as set-backs or buffers.
- Provide review input on the preferred infrastructure layout following the sensitivity analysis and layout identification.
- Identify any species of special concern or protected species on site.
- Identify and delineate wetlands that may occur on the site, using the relevant protocols established.
- Determine if a Water Use License (WUL) is required and if so, determine the requirements thereof.
- Identify and rate potential direct, indirect and cumulative impacts on the terrestrial ecology, communities and ecological processes within the site during the construction, operation and decommissioning phases of the project.
- Provide input to the EMPr, including mitigation and monitoring requirements to ensure that the impacts on the terrestrial ecology are limited.
- Review the Generic EMPr for 1) Power Lines and 2) Substations (GN 435) and confirm if there are any specific environmental sensitivities or attributes present on the site and any resultant site-specific impact management outcomes and actions that need to be included.
- Compile an assessment report qualifying the risks and potential impacts on terrestrial ecology in the study area and impact evaluations.
- Incorporate and address issues and concerns raised by Stakeholders, Competent Authority, I&APs and the public during the Public Participation Process (where relevant and applicable).

2 Approach and Methodology

A literature review and desktop analysis were undertaken prior to the field investigation, utilizing various sources including the South African National Biodiversity Institute (SANBI) data and other relevant sources. Recent and historical aerial imagery of the site was reviewed in order to identify points for investigation during the field survey.

Utilising the above information, a field investigation was undertaken from the 12 to 18 September 2020 whereby the key approach to evaluating the subject site is through the following actions:

- Identification of the key ecological drivers within the region and determination of their relevance within the site. e.g. wind may be a key ecological driver that determines the distribution and nature of habitats.

- Following the determination of these drivers the identification of habitat forms and structures within the subject site and identification of their ecological significance e.g. sand or lithic associated habitats and their relevance within the broader landscape.

- With the evaluation of the significance and relevance of identified habitats, consideration is given to the applicability of establishing the proposed development, namely a solar PV facility within the site, as well as associated infrastructure, and associated powerlines. Specific consideration is given to:

    a) The identification of areas where habitat forms will not be directly affected by the proposed development.
    b) The identification of areas of the site where the proposed development will not adversely affect the key drivers of terrestrial habitat.
    c) Consideration of the presence / absence of specific fauna within the subject site.
    d) The identification of areas of the site where biophysical factors will not adversely affect the proposed development.
    e) Other specific issues that may be of relevance e.g. specific high faunal populations within specific areas.

In order to evaluate faunal presence and composition the following actions were undertaken:

- A review of the site was undertaken to identify specific features, in particular habitat conducive to the presence of *Bunolagus monticularis* (riverine rabbit).
- Mr S Todd of 3 Foxes Biodiversity Solutions established cameras at select sites on the Farms Witte Wall, Grootfontein, and Hoek Doornen in compliance with the requirements of the Endangered Wildlife Trust. A separate report has been compiled regarding the Riverine Rabbit, and provided in Appendix F of this assessment report.
- Additional cameras were placed at points within Grootfontein by the author.
- Specific habitat was traversed on foot (river bed and across scarp) identifying *inter alia* evidence of fauna (through spoor, scat or other features) or actual siting of specimens. The presence of such species was noted in relation to the habitat under investigation.
- Nocturnal assessments were undertaken on two nights.

Further evaluation of specific literature was undertaken to confirm or corroborate findings, as well as to consider the likelihood of specific fauna that may be of conservation value.

2.1 Information Sources

The following data sources were consulted during this investigation.

Table 1. Data sources utilised during assessment

Data / Information	Source	Date	Type	Description
South African National Protected Areas Database (SAPAD)	Department of Environmental Affairs	2020, Q2	Spatial	Spatial delineation of protected areas in South Africa. Updated quarterly
Western Cape Biodiversity Spatial Plan (WCBSP)	CapeNature. 2017. Western Cape Biodiversity Spatial Plan 2017. http://bgis.sanbi.org/	2017	Report & Spatial	Spatial conservation planning units and associated management recommendations for the Western Cape province
National Biodiversity Assessment	South African National Biodiversity Institute	2018	Report and Spatial	Latest assessment of South African biodiversity and ecosystems, including, vegetation types, wetlands and rivers.
http://posa.sanbi.org/sanbi South African National Biodiversity Institute. 2016. Botanical Database of Southern Africa (BODATSA) [dataset]	SANBI Plants of Southern Africa	2016	Data	Plant list for Tankwa region.
www.vmus.adu.org.za. Animal Demography Unit (ADU).	ADU: University of Cape Town	2020	Data	Specific data on geographic occurrence and record for various taxa.
Tankwa Weather http://tankwaweather.co.za	Private weather station	2020	Data	A private Davis Vantage Pro 2 mounted 1.6m above the ground. And anemometer at 10m angle. Operation since: Jan 2015

2.2 Assumptions, Knowledge Gaps and Limitations

The following assumptions and limitations are presented in respect of this evaluation:

- Site reconnaissance was undertaken over a consecutive 5 day period during the early summer. Such field reconnaissance will not account for seasonal variations that may arise and reliance on collated and historical data from the region is required.
- During the period of reconnaissance, weather conditions may have affected findings, in particular, colder temperatures. From a botanical perspective, the early winter period is considered most ideal for the evaluation of plants in this region. Some fauna (particularly invertebrates) may also be in torpor or generally absent from the area on account of season and / or weather. This is however not considered a fatal flaw as prevailing habitat dominates.
- The area in general has been subject to an extended and significant drought, which is likely to have influenced habitat form at a limited level as well as faunal populations.
- Cumulative impacts have been considered on a regional basis over a 30km radius.

2.3 Consultation Processes Undertaken

Interaction was undertaken with local residents and interested parties who were considered to have specific knowledge of the area, these included:

- Mr Philip van Heerden
- Mr Andre Vermeulen.

The above persons provided anecdotal information which was verified and considered during the site evaluation as well as by further interrogation of the literature and data.

3 Description of Project Aspects relevant to Terrestrial Biodiversity

The development of a PV facility, associated infrastructure and EGI on the subject properties will by necessity, be undertaken on land that meets a number of criteria including, *inter-alia*, level or gradual falls, generally suitable founding conditions and avoidance of areas that may be inundated by flooding. As a consequence, the proposed PV facilities will avoid all riverine and wetland environments.

The proposed Grootfontein PV projects will see a land use change that differs significantly from the prevailing land use. The implementation of the proposed development will result in notable change to the prevailing catchment associated with the river systems in the area, primarily on account of the construction stage of the project, as well as the long-term operational stage. The development of the site for the PV facilities, associated infrastructure and EGI will see the following activities arise:

- Cordoning and fencing of the sites during both the construction and operational phases. This component of the project usually entails the establishment of an electrified fence (or palisade or mesh type) of about 2 – 3 m high which remains in situ for the lifetime of the project (i.e. for the operational phase). For the construction phase, the construction area and construction site camp may also be cordoned off with temporary fencing. Game fences will be constructed along the power line route to fence off the servitudes across the farm Witte Wall (suitable fencing will be placed along the power line corridor on Die Brak). No fencing will be constructed along the power line where it traverses the Platfontein Farm.

- Clearance or partial clearance of minor topographic features and vegetation, where applicable, during the construction phase.

- Establishment of roadways (i.e. access roads leading to the site and internal gravel access roads) and hard panning of surfaces, with minor stormwater management aspects being introduced during the construction and operational phases.

- Establishment of modular arrays with concomitant cabling and provision of invertors within the arrays. The footing of the module framework is founded into the ground using an earth screw or similar methods. Internal 33 kV power lines/underground cables are to be installed underground to maximum depth of 1.6 m or above ground with height of 9 m.

- Establishment of step up transformers and three on-site substations (one for each PV Facility). This facility is expected to occupy an area of approximately 2 ha each. It will be fenced and isolated from the balance of the site.

- A Lithium Ion Battery Energy Storage System (BESS) will be established at each PV Facility. The proposed BESS will cover an area of up to 8 hectares within the laydown area, and a height of up to 5 – 10 m.
- A laydown area of approximately 13 hectares in extent.

- Establishment of offices and related infrastructure.

- A yard for storage and general operations will be set aside, adjacent to the built offices.

- An overhead powerline (132kV) will be established per PV Facility from the on-site substation to the Kappa substation. The powerlines will traverse the Groot River and adjacent lands to the south, aligning with existing powerlines associated with adjacent renewable energy projects.

The commencement of construction on site will entail low to significant alteration of the prevailing habitat, depending upon the final design and layout of the PV facilities. A general sequestering of the subject area, through the fencing of the site from the surrounding habitat forms will thus arise.

While the construction phase will see temporary disturbances and transformation to the environment, these impacts on the prevailing ecology are likely to be significant in terms of impact, but of short temporal extent, as the construction project rolls out and a stability, albeit within a differing environment, arises on the subject site. It therefore follows that impacts on the ecology arising from this project can be divided into two aspects, namely: construction phase impacts and operational impacts.

4 Baseline Environmental Description

The Grootfontein farm lies within the southern extent of the Ceres Karoo, part of the Succulent Karoo Biome. The Succulent Karoo Biome is distinct from the neighbouring Nama-Karoo Biome. The Ceres Karoo is associated with a low altitude and generally flat to undulating landscape, not exceeding 1500m amsl (Low and Rebelo, 1996). According to the Koppen-Geiger climate classification method the area is classified “BSh”, which is indicative of an arid, hot environment. Such extremes have given rise to a regionally unique environment, both from an aquatic and terrestrial perspective. Some consideration of the broader terrestrial ecological features of the site are presented below.

4.1.1 Terrestrial Ecosystems

The subject site can be described as an elevated plateaux that acts as a watershed between drainage to the north and drainage to the south. The lower elevations of the site, particularly to the north are dominated by sheet wash plains and a larger ephemeral river system, the Droelaagte.

Given this topography, two habitat forms or veld types are evident within the PV sites, these being SKv 5 Tanqua Karoo, a form of the Succulent Karoo Biome and Tanqua Wash Riviere (AZi 7) a riparian habitat form (Mucina and Rutherford 2006) (Figure 2). Both these veld types are considered “least threatened” from a conservation perspective (Figure 3). The same applies to the EGI corridor running along Die Brak and Platfontein Farms. The sheet wash (AZi7) is however considered to show some botanical significance, primarily in respect of the occurrence of geophytes. However, it should be noted such specimens may only be evident from a seasonal perspective.

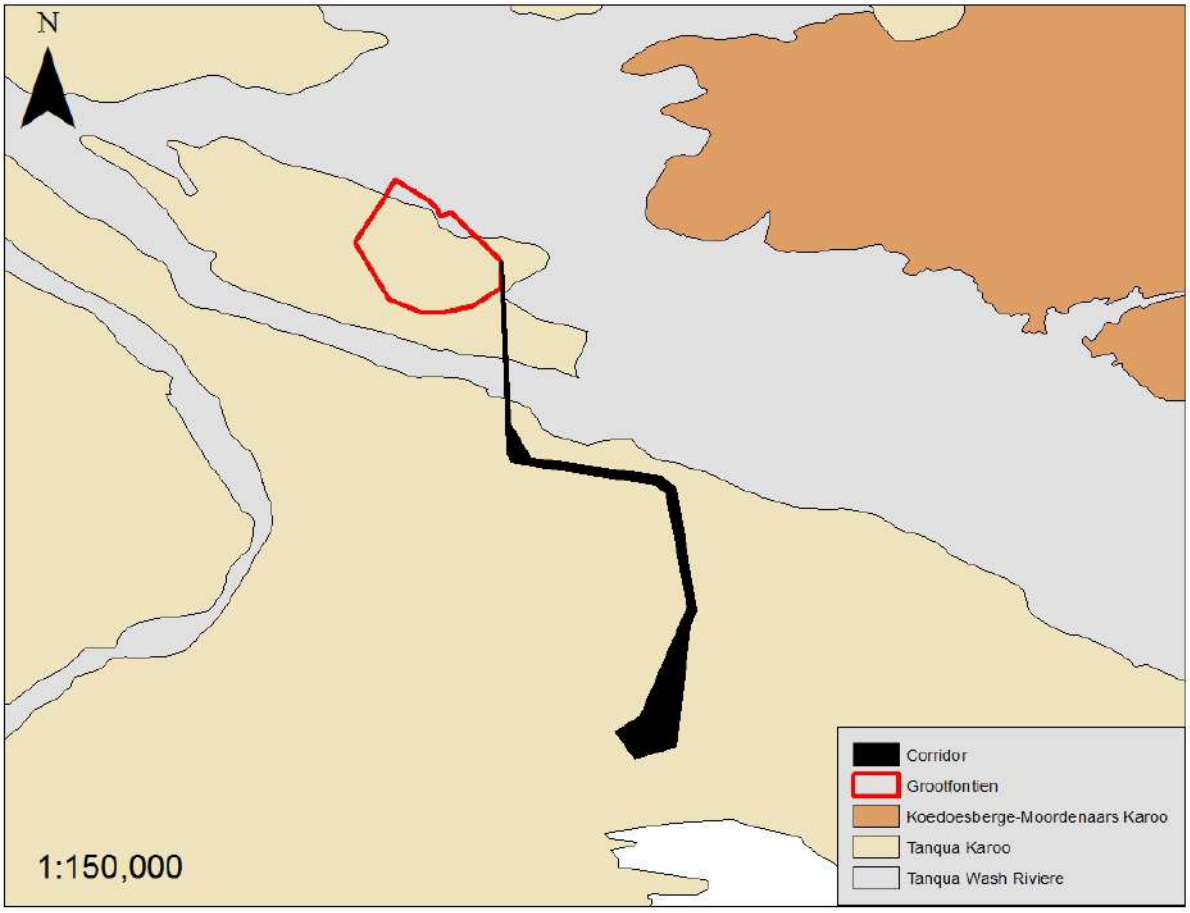

Figure 2. Map indicating veld types in relation to study area

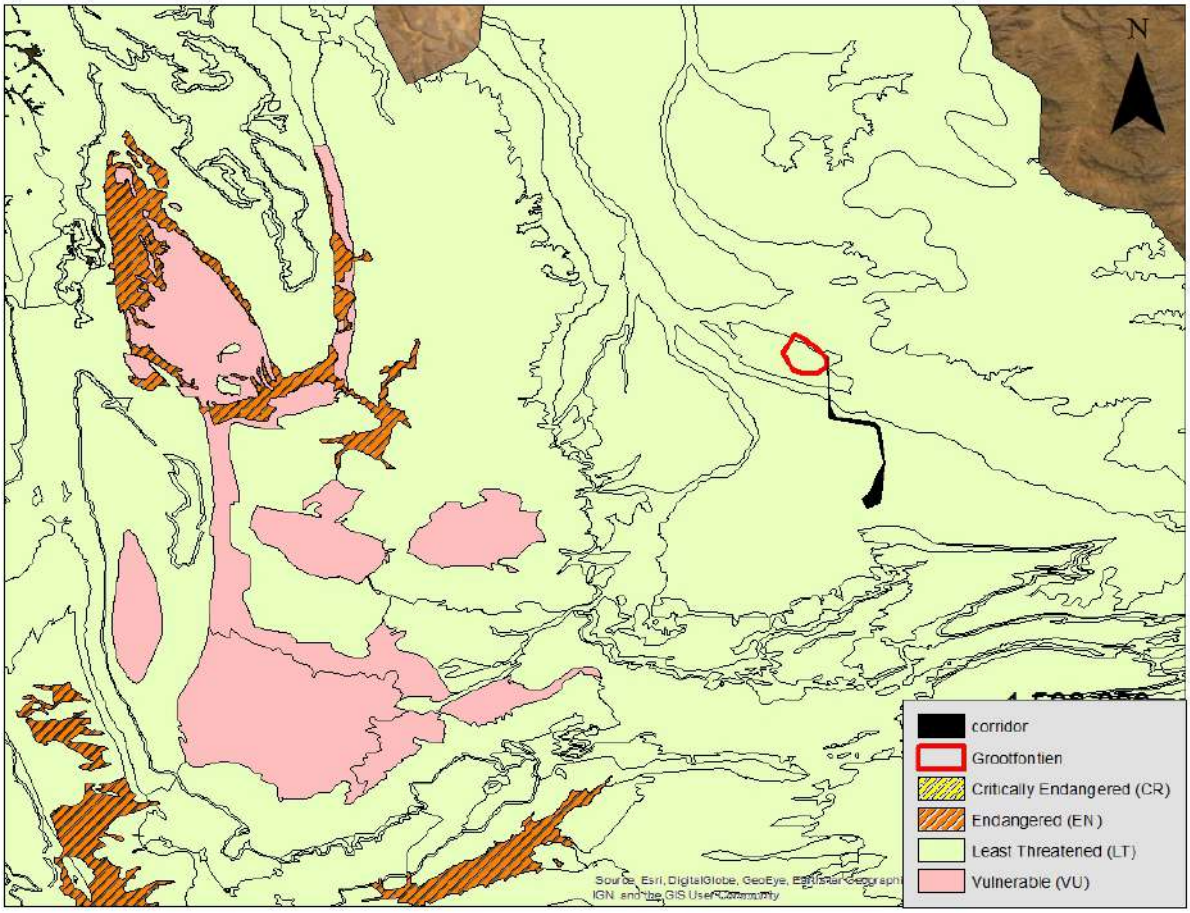

Figure 3. Map indicating site in relation to areas of conservation significance

4.1.2 Ecological Processes, Functioning and Drivers

Two principle factors are considered to be the master elements driving the localised ecology. These can be considered to be broadly, meteorological factors, namely wind, rainfall and temperature, while edaphics, particularly giving rise to lithic or sandy environments may be considered a geophysical driver. Notably, anthropogenic factors have over the previous century proven to be a key driver in contemporary habitat form and structure.

From a meteorological perspective the study area is a “xeric habitat”, with an average annual rainfall recorded over the last 5 years of between just over 40mm and 66mm in 2017. (2020 may exceed this record). There is evidently, high spatial and inter-annual variability in rainfall patterns across the region (Figure 4). According to Mucina and Rutherford (2006), the region may be considered to be a “rain shadow desert”, where topography influences rainfall patterns.

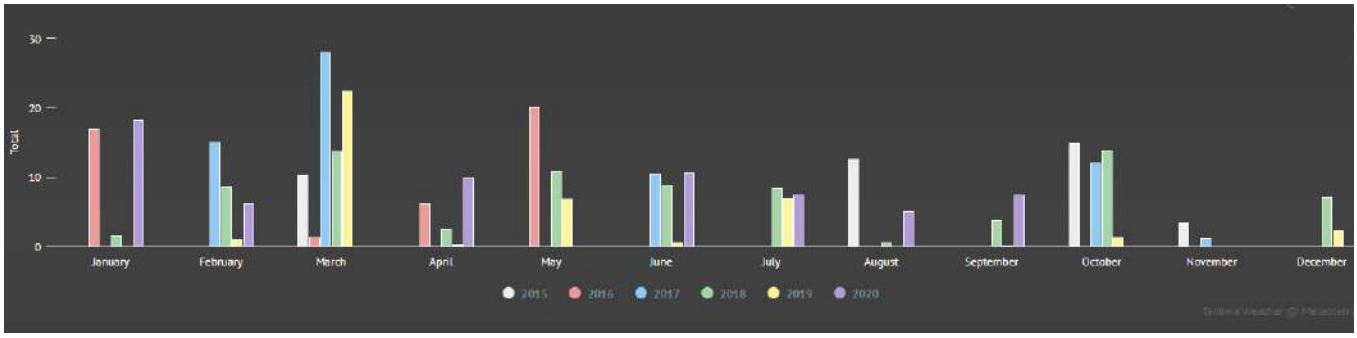

Figure 4. Graph showing monthly rainfall in Tankwa 2015 – date.

In addition to the above, wind is a key issue within the region, driving sediment movement and promoting aeolian, sediment transport in areas exposed to high winds and with little vegetative cover. Where vegetation cover has been compromised, aeolian transport generally prevents the natural re-establishment of plants. The dominant winds within the subject site are the north westerly and southerly wind, which are seasonally prevalent (Figure 5). Sheetwash is also conspicuous to the east of the site, where sediments transported from up-slope have been deposited, proximal to the riverine areas.

Temperatures in the region can be considered to be extreme, with the greatest range recorded in the area lying at 53 °C. The lowest recorded minimum temperature is -3 °C and the highest maxima being 50.2°C (http://tankwaweather.co.za/pages/station/climate.php). A mean maximum temperature of 35°C is recorded by the SA Weather Service. Such extremes are indicative of the requirement for floral and faunal species to be tolerant of the effects of frosting, as well as high insolation and transpiration states. As a consequence, plant communities and faunal populations in the region generally show high levels of adaptation, occurring in specific areas or zones and with the utilisation of specific, niche environments, e.g. scarp slopes and riverine environments by both floral and faunal communities, or behaviour concomitant with specific environments.

Given the above, anthropogenic factors have been a key determinant in the contemporary nature of the terrestrial habitat within the site. The current land use on the site is livestock, focussing on sheep and goat farming, which has been undertaken since the 1700s (http://media.withtank.coma). The demand for wool in the mid part of the 20th Century and the subsidisation of farming, saw unsustainable stocking levels of sheep in much of the Tanqua region (Simbi 1998). In addition, other crops have been utilised within the broader area including wheat and dates (A Vermeulen *pers comm*). It was also common practice to utilise the flood plains of proximal rivers on sites for the cultivation of crops and pasture and indeed this practice prevails today. Overgrazing has arisen across much of the region and is evident in Grootfontein.

The above natural and anthropogenic factors have given rise to a generally altered environment and concomitantly changed habitat. It follows that further land use change in the region, where livestock are excluded, may allow for the seral succession processes of habitats previously affected by farming activities to emerge. However, the prudent implementation of such development is required in order to achieve such goal.

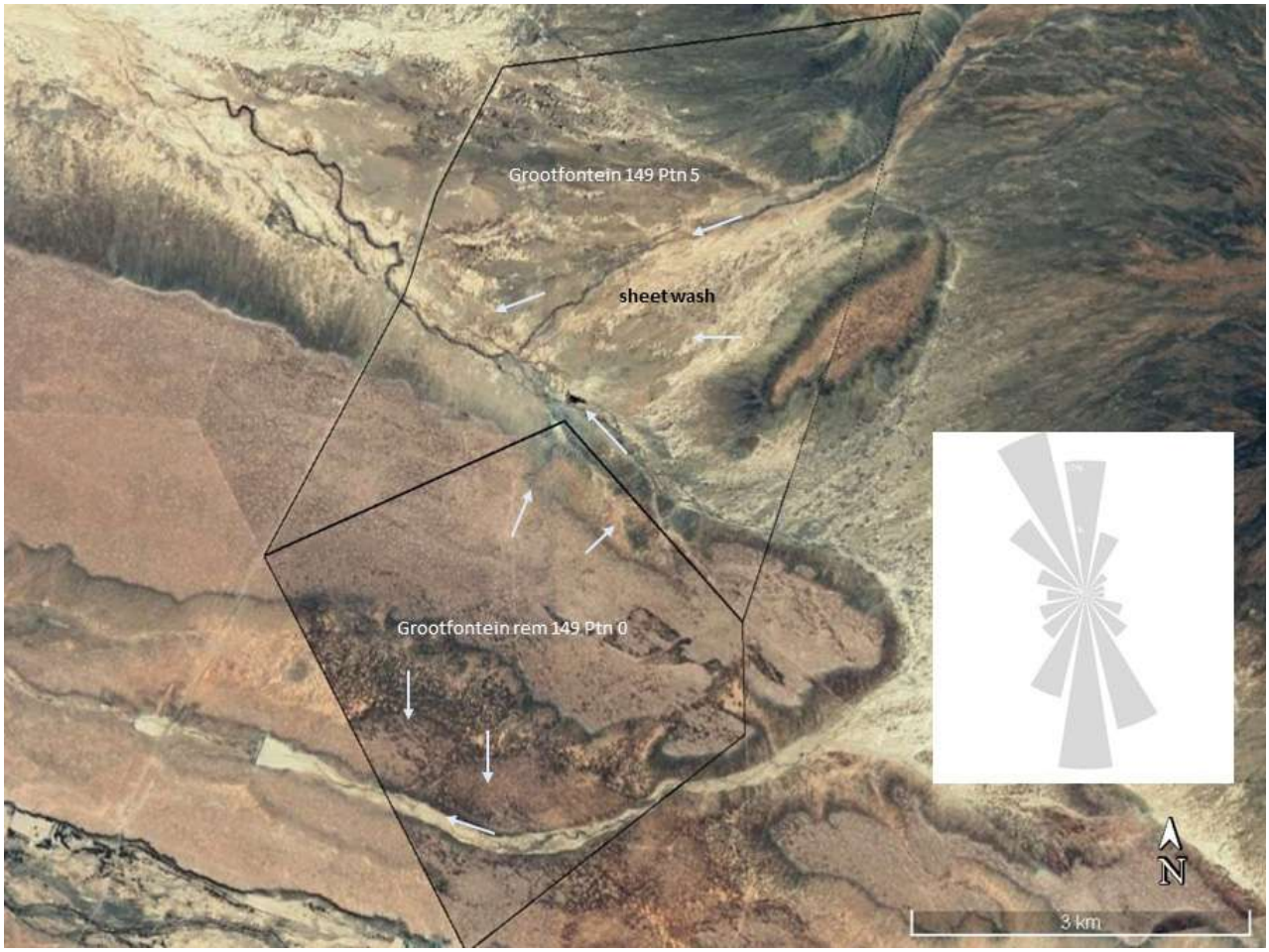

Figure 5. Aerial image showing the Grootfontein site, specific features, primarily associated with drainage and prevailing wind directions

4.1.3 Flora and Fauna

Although much of the land within and proximal to the site has been subject to significant change on account of previous land use practices (Acocks 1988), faunal populations and diversity can generally be described as moderate to high on account of limited anthropogenic presence. Botanical diversity is generally associated with niche environments, in particular rock ridges and sandy or stone wash plains (sheetwash), and in these areas geophytes may be evident. Tables 2 and 3 indicate the recorded botanical and faunal species common to the study area and surrounds.

The majority of the listed flora are aizoons of the Family Aizoaceae ("succulents") as well as *Salsola* spp. Of interest is *Haemanthus tristis* which is a rare species identified in the southern Tanqua Karoo, on the north bank of the Droelaagte river. Other important endemic species identified include *Tanquana prismatica*. Graminoids are limited to primarily the genus *Stipagrostis* (e.g. *S obtusa*), and are most frequently encountered in the more sandy regions.

Fauna recorded from the region are evidently weighted in favour of mammal species, with Muridae (rodents), being the dominant species on record. Only *Miniopterus schreibersii*, (long fingered hairy bat) is to be considered of conservation significance, being classified as "near threatened". Notable by its absence from Table 3 is *Bunolagus monticularis,* the riverine rabbit.

Table 2. List of *specimens* of plants recorded from the broader locale of the site by SANBI and others (SANBI Plants of Southern Africa (POSA))

Family	Genus	Species	Author	Ecology
Aizoaceae	*Conophytum*	*piluliforme*	(N.E.Br.) N.E.Br.	Indigenous; Endemic
Scrophulariaceae	*Selago*	*centralis*	Hilliard	Indigenous
Asteraceae	*Eriocephalus*	*aromaticus*	C.A.Sm.	Indigenous; Endemic
Aizoaceae	*Leipoldtia*	*sp.*		
Amaryllidaceae	*Haemanthus*	*coccineus*	L.	Indigenous
Amaryllidaceae	*Haemanthus*	*tristis*	Snijman	Indigenous; Endemic
Crassulaceae	*Tylecodon*	*striatus*	(Hutchison) Toelken	Indigenous; Endemic
Aizoaceae	*Hereroa*	*crassa*	L.Bolus	Indigenous; Endemic
Aizoaceae	*Lithops*	*sp.*		
Malvaceae	*Hermannia*	*sp.*		
Meliaceae	*Nymania*	*capensis*	(Thunb.) Lindb.	Indigenous
Aizoaceae	*Ruschia*	*centrocapsula*	H.E.K.Hartmann & Stuber	Indigenous; Endemic
Aizoaceae	*Ruschia*	*sp.*		
Apocynaceae	*Quaqua*	*mammillaris*	(L.) Bruyns	Indigenous
Hyacinthaceae	*Albuca*	*namaquensis*	Baker	Indigenous
Aizoaceae	*Hammeria*	*meleagris*	(L.Bolus) Klak	Indigenous; Endemic
Asteraceae	*Pteronia*	*fasciculata*	L.f.	Indigenous; Endemic
Aizoaceae	*Lampranthus*	*haworthii*	(Haw.) N.E.Br.	Indigenous; Endemic
Colchicaceae	*Ornithoglossum*	*undulatum*	Sweet	Indigenous
Aizoaceae	*Mesembryanthemum*	*junceum*	Haw.	Indigenous; Endemic
Aizoaceae	*Lampranthus*	*uniflorus*	(L.Bolus) L.Bolus	Indigenous; Endemic
Aizoaceae	*Peersia*	*macradenia*	(L.Bolus) L.Bolus	Indigenous; Endemic
Aizoaceae	*Ruschia*	*uncinata*	(L.) Schwantes	Indigenous; Endemic
Aizoaceae	*Mesembryanthemum*	*nitidum*	Haw.	Indigenous; Endemic
Aizoaceae	*Mesembryanthemum*	*tetragonum*	Thunb.	Indigenous
Aizoaceae	*Braunsia*	*apiculata*	(Kensit) L.Bolus	Indigenous; Endemic

Family	Genus	Species	Author	Ecology
Iridaceae	*Lapeirousia*	*pyramidalis*	(Lam.) Goldblatt	Indigenous; Endemic
Aizoaceae	*Tanquana*	*prismatica*	(Schwantes) H.E.K.Hartmann & Liede	Indigenous; Endemic
Aizoaceae	*Malephora*	*crassa*	(L.Bolus) H.Jacobsen & Schwantes	Indigenous; Endemic
Aizoaceae	*Braunsia*	*stayneri*	(L.Bolus) L.Bolus	Indigenous; Endemic
Iridaceae	*Watsonia*	*laccata*	(Jacq.) Ker Gawl.	Indigenous; Endemic
Aizoaceae	*Ruschiella*	*lunulata*	(A.Berger) Klak	Indigenous; Endemic
Malvaceae	*Anisodontea*	*procumbens*	(Harv.) Bates	Indigenous; Endemic

Table 3 Species list for *mammals*, reptiles, amphibians and some invertebrates recorded from the Tankwa region (source www.vmus.adu.org.za)

Family	Scientific name	Common name	Red list category
Mammalia			
Bovidae	*Alcelaphus buselaphus caama*	Red Hartebeest	Least Concern (2008)
Bovidae	*Antidorcas marsupialis*	Springbok	Least Concern (2016)
Bovidae	*Oryx gazella*	Gemsbok	Least Concern (2016)
Bovidae	*Raphicerus campestris*	Steenbok	Least Concern (2016)
Bovidae	*Sylvicapra grimmia*	Bush Duiker	Least Concern (2016)
Canidae	*Canis mesomelas*	Black-backed Jackal	Least Concern (2016)
Canidae	*Otocyon megalotis*	Bat-eared Fox	Least Concern (2016)
Canidae	*Vulpes chama*	Cape Fox	Least Concern (2016)
Felidae	*Felis silvestris*	Wildcat	Least Concern (2016)
Herpestidae	*Herpestes pulverulentus*	Cape Gray Mongoose	Least Concern (2016)
Leporidae	*Lepus capensis*	Cape Hare	Least Concern
Macroscelididae	*Macroscelides proboscideus*	Short-eared Elephant Shrew	Least Concern (2016)
Muridae	*Aethomys granti*	Grant's Rock Mouse	Least Concern
Muridae	*Aethomys namaquensis*	Namaqua Rock Mouse	Least Concern
Muridae	*Desmodillus auricularis*	Cape Short-tailed Gerbil	Least Concern (2016)
Muridae	*Gerbilliscus paeba*	Paeba Hairy-footed Gerbil	Least Concern (2016)

Family	Scientific name	Common name	Red list category
Muridae	*Micaelamys granti*	Grant's Micaelamys	Least Concern (2016)
Muridae	*Otomys irroratus*	Southern African Vlei Rat	Least Concern (2016)
Muridae	*Otomys unisulcatus*	Karoo Bush Rat	Least Concern (2016)
Muridae	*Parotomys brantsii*	Brants's Whistling Rat	Least Concern (2016)
Muridae	*Rhabdomys pumilio*	Xeric Four-striped Grass Rat	Least Concern (2016)
Mustelidae	*Mellivora capensis*	Honey Badger	Least Concern (2016)
Mustelidae	*Poecilogale albinucha*	African Striped Weasel	Near Threatened (2016)
Nesomyidae	*Malacothrix typica*	Large-eared African Desert Mouse	Least Concern (2016)
Nesomyidae	*Petromyscus barbouri*	Barbour's Pygmy Rock Mouse	Least Concern (2016)
Procaviidae	*Procavia capensis*	Cape Rock Hyrax	Least Concern (2016)
Soricidae	*Myosorex varius*	Forest Shrew	Least Concern (2016)
Vespertilionidae	*Miniopterus schreibersii*	Schreibers's Long-fingered Bat	Near Threatened
Viverridae	*Genetta genetta*	Common Genet	Least Concern (2016)
Viverridae	*Genetta tigrina*	Cape Genet	Least Concern (2016)
Reptilia			
Agamidae	*Agama atra*	Southern Rock Agama	Least Concern (SARCA 2014)
Agamidae	*Agama hispida*	Spiny Ground Agama	Least Concern (SARCA 2014)
Chamaeleonidae	*Bradypodion gutturale*	Little Karoo Dwarf Chameleon	Least Concern (SARCA 2014)
Cordylidae	*Karusasaurus polyzonus*	Karoo Girdled Lizard	Least Concern (SARCA 2014)
Elapidae	*Naja nivea*	Cape Cobra	Least Concern (SARCA 2014)
Gekkonidae	*Chondrodactylus angulifer angulifer*	Common Giant Ground Gecko	Least Concern (SARCA 2014)
Gekkonidae	*Chondrodactylus bibronii*	Bibron's Gecko	Least Concern (SARCA 2014)
Gekkonidae	*Goggia hexapora*	Cederberg Pygmy Gecko	Least Concern (SARCA 2014)
Gekkonidae	*Pachydactylus capensis*	Cape Gecko	Least Concern (SARCA 2014)
Gekkonidae	*Pachydactylus weberi*	Weber's Gecko	Least Concern (SARCA 2014)
Lacertidae	*Pedioplanis laticeps*	Karoo Sand Lizard	Least Concern (SARCA 2014)
Scincidae	*Trachylepis sulcata sulcata*	Western Rock Skink	Least Concern (SARCA 2014)

Family	Scientific name	Common name	Red list category
Scincidae	*Trachylepis variegata*	Variegated Skink	Least Concern (SARCA 2014)
Testudinidae	*Chersina angulata*	Angulate Tortoise	Least Concern (SARCA 2014)
Testudinidae	*Psammobates tentorius tentorius*	Karoo Tent Tortoise	
Amphibia			
Bufonidae	*Vandijkophrynus gariepensis gariepensis*	Karoo Toad (subsp. gariepensis)	
Pyxicephalidae	*Amietia fuscigula*	Cape River Frog	Least Concern (2017)
Invertebrates			
BUTHIDAE	*Parabuthus capensis*		
BUTHIDAE	*Parabuthus granulatus*		
BUTHIDAE	*Uroplectes carinatus*		
EREBIDAE	*Automolis meteus*		Not listed
EREBIDAE	*Utetheisa pulchella*		Not listed
GEOMETRIDAE	*Isturgia deerraria*		Not Threatened (NT)
GEOMETRIDAE	*Pseudomaenas intricata*		Not Threatened (NT)
LYCAENIDAE	*Aloeides apicalis*	Pointed russet	Least Concern (SABCA 2013)
LYCAENIDAE	*Aloeides depicta*	Depicta russet	Least Concern (SABCA 2013)
LYCAENIDAE	*Aloeides vansoni*	Roggeveld russet	Least Concern (SABCA 2013)
LYCAENIDAE	*Azanus ubaldus*	Velvet-spotted babul blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Chilades trochylus*	Grass jewel blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Chrysoritis beaufortia charlesi*	Charles's opal	Least Concern (SABCA 2013)
LYCAENIDAE	*Leptotes pirithous pirithous*	Common zebra blue	Least Concern (SABCA 2013)
NYMPHALIDAE	*Melampias huebneri huebneri*	Boland brown	Least Concern (SABCA 2013)
NYMPHALIDAE	*Stygionympha robertsoni*	Koppie hillside brown	Least Concern (SABCA 2013)
NYMPHALIDAE	*Tarsocera sp.*		
NYMPHALIDAE	*Tarsocera fulvina*	Karoo spring widow	Least Concern (SABCA 2013)
NYMPHALIDAE	*Torynesis mintha mintha*	Mintha veined widow	Least Concern (SABCA 2013)
NYMPHALIDAE	*Vanessa cardui*	Painted lady	Least Concern (SABCA 2013)
PIERIDAE	*Pontia helice helice*	Southern meadow white	Least Concern (SABCA 2013)
PTEROPHORIDAE	*FAMILY PTEROPHORIDAE*	Unidentified PTEROPHORIDAE	
Coenagrionidae	*Africallagma glaucum*	Swamp Bluet	LC
Gomphidae	*Paragomphus genei*	Common Hooktail	LC

Family	Scientific name	Common name	Red list category
Libellulidae	*Crocothemis erythraea*	Broad Scarlet	LC
Libellulidae	*Orthetrum trinacria*	Long Skimmer	LC
Libellulidae	*Sympetrum fonscolombii*	Red-veined Darter or Nomad	LC
Libellulidae	*Trithemis furva*	Navy Dropwing	LC
Libellulidae	*Trithemis kirbyi*	Orange-winged Dropwing	LC
Scarabaeidae	*Aphengoecus multiserratus*		
Scarabaeidae	*Epirinus rugosus*		
Scarabaeidae	*Euoniticellus intermedius*		

4.1.4 Conservation Planning

Critical Biodiversity Areas and Ecological Support Areas

Figure 6 below provides an illustration of the assessed area for the Grootfontein PV 1, Grootfontein PV 2 and Grootfontein PV 3 projects, and EGI corridor in relation to Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) in terms of the Western Cape Biodiversity Spatial Plan (2017).

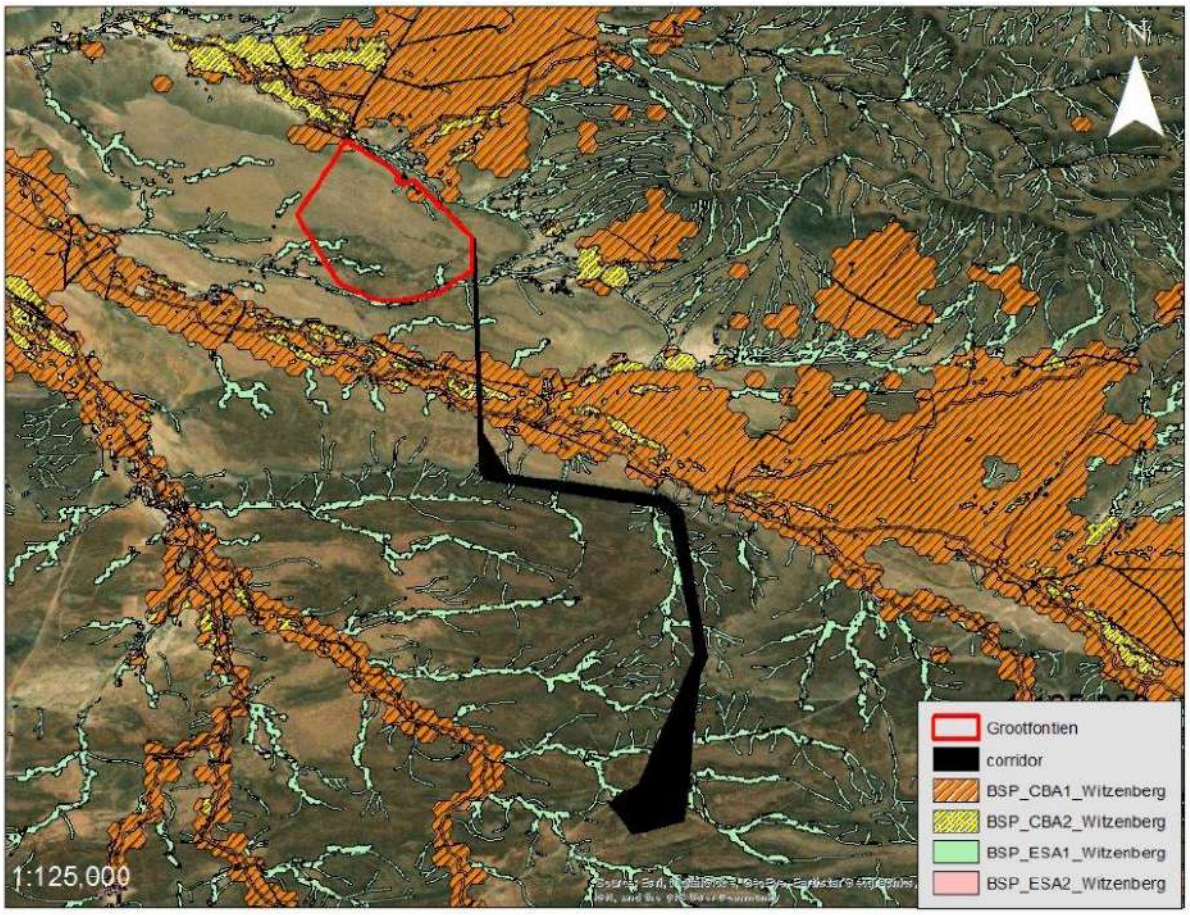

Figure 6. Map image detailing the Grootfontein PV site and associated infrastructure in relation to CBA and ESA areas as per the Western Cape Biodiversity Spatial Plan framework (Cape Nature, 2017).

The assessed area for the PV arrays and associated infrastructure, mainly the power lines, traverse a number of Terrestrial and Aquatic CBA and ESA delineated areas as indicated by Figure 6 above. However, the actual footprint of the Grootfontein PV facilities does not traverse any CBAs; however, covers a few minor areas of Aquatic ESA 1, mostly associated with drainage line watercourses, as well as extremely small portions of ESA 2. This preliminary data provided by the Western Cape Biodiversity Spatial Plan (WCBSP) is the product of a systematic biodiversity planning assessment which identifies portions of land that require safeguarding to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services, across terrestrial and aquatic realms (CapeNature 2017). These spatial priorities are used to inform sustainable development in the Western Cape Province.

In addition to the above, CBAs and ESAs are separated further into CBA 1 and 2 as well as ESA 1 and 2 respectively. It is important to note that CBA 1 show areas in a natural condition and those that are potentially degraded or represent secondary vegetation are considered to be CBA 2. Similarly, a

distinction is made between ESAs that are likely to be functional (i.e., in a natural, near-natural or moderately degraded condition; ESA 1), and ESAs that are likely severely degraded or have no natural cover remaining and therefore require restoration where feasible (ESA 2). The ESAs are not considered essential from a conservation perspective for meeting biodiversity targets; however, they may offer some ecological services.

As much of the floral and faunal diversity within the subject region is related to riparian environments, it is clear that by excluding the proposed development from these areas, impacts on areas or corridors that have significant ecological support functions are unlikely to be affected by the proposed development.

Critically Endangered and Threatened Ecosystems

According to the Biodiversity Geographic Information System (BGIS) developed by SANBI, there are no Critically Endangered and Threatened Ecosystems on the subject sites. The 'endangered' and 'threatened' eco-systems identified within the Cape Winelands District Municipal region are not located within the study areas. Figure 3 above indicates that such areas are located some 40 kilometres to the east and the west of the site, but do not extend into the subject area.

Protected Areas (PAs)

The project area does not fall within or adjacent to a Protected Area.

4.1.5 Key Landscape Features

The subject site, as indicated above, lies on an undulating ridge and plateaux complex with ephemeral riverine environments comprising of deep to moderately deep, alluvial sands. In some instances, there are distinct junctures between the terrestrial and riparian edge on account of steep, shale or sand cliffs. Sheet wash, associated with the foot of ridges, or occasionally around the more northern riverine environments are apparent at points.

A large impoundment has been established proximal to the existing farmhouse, however this dam appears to be generally inoperable. The system does however show deeper alluvial deposits and in effect acts as a form of sheet wash and depositional area. The riparian system of the Droelaagte, which lies to the north of the site, are associated with the southern extent of the catchment of the Tankwa River, where the confluence of the two systems is located, downstream of the Oudebaaskraal Dam. Refer to the separate Aquatic Biodiversity and Species Assessment for details on the aquatic features.

4.1.5.1 Indigenous Forests

The Farm Grootfontein encompasses two habitat forms, namely Tanqua Karoo and Tanqua Wash Riviere. The former is a definitive arid succulent vegetation form of low, forb-dominated vegetation and no natural forest habitat is present. Within the Tanqua Wash Riviere habitat form, woody habitat is evident dominated by *Vachellia karoo*. From a legal perspective, such areas may be considered forest (in terms of the National Forest Act (Act 84 of 1998)), however these small isolated communities do not align with the ecological definition using Raunkiaer Classification (1934) (Figures 7 and 8). In addition, given the proposed "footprints" of the development, these "wooded" environments would be avoided by the PV facilities.

V karoo or canopied environment would not be affected by the proposed PV facilities *in toto*. Howsoever, the establishment of the powerline servitude across the Groot River may see the need to remove some

specimens, subject to the placement of towers and the manner in which the line is strung. Final survey of the powerline would determine the need for an application in terms of the National Forest Act. It should be noted that under the National Forest Act, that three trees or more that form a contiguous canopy would require a permit in order to disturb, prune or remove such woody specimens.

Where felling of woody species is required, it is anticipated that this would relate to individual specimens or the pruning of individual trees.

1. Riparian zone showing alluvial deposit

2. Sheetwash

3. Shale cliff associated with riverine channel

4. Moderately steep ridge

Figure 7. Typical landscape features associated with site

Figure 8. Image showing typical woody associations within site.

4.1.5.2 Strategic Water Source Areas

Figure 9 below indicates the site in relation to designated strategic water source areas (SWSAs). As indicated, the site does not fall within an SWSA. As such, impacts on the terrestrial habitat of SWSAs; and the impacts of the proposed development on the SWSA water quality and quantity are not evident.

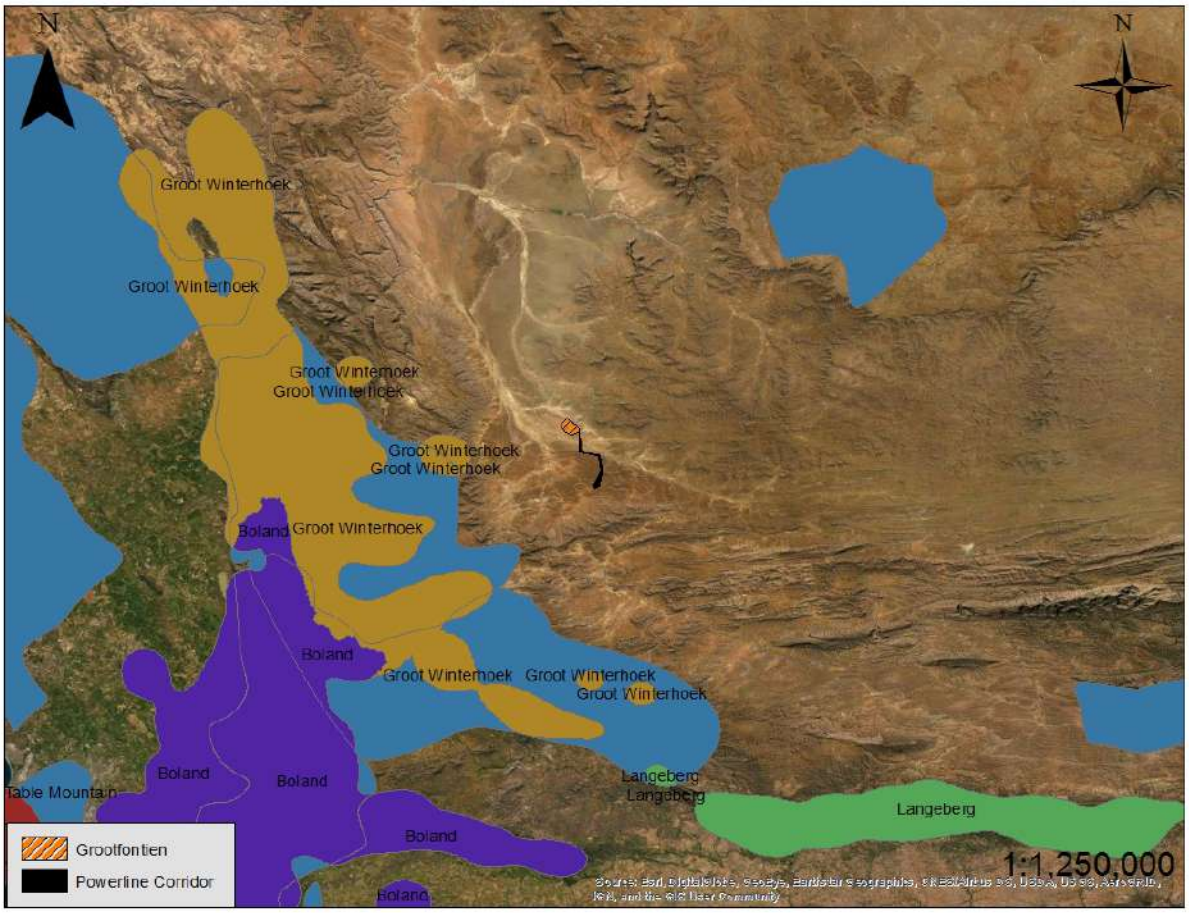

Figure 9. Map indicating site in relation to SWSAs within the Western Cape.

4.1.5.3 Freshwater Ecosystem Priority Area Sub Catchments

The subject site does not lie within any National Freshwater Ecosystem Priority Areas (NFEPA) sub catchments. As such there are no impacts of the proposed development on habitat condition and species in FEPA sub catchments.

4.2 Project Specific Description

The Grootfontein farm lies within the southern extent of the Ceres Karoo, part of the Succulent Karoo Biome associated with a low altitude and generally flat to undulating landscape. This area is of an arid, hot environment. Such extremes have given rise to a regionally unique environment, both from an aquatic and terrestrial perspective. The lower elevations of the site are associated with sheet wash plains and larger ephemeral rivers that are dominated by alluvial sands. Given this topography, two habitat forms or veld types are evident within the PV sites, these being SKv 5 Tanqua Karoo, a form of the Succulent Karoo Biome, and Tanqua Wash Riviere (AZi 7) a riparian habitat form. Both these veld types are considered “least threatened” from a conservation perspective (Figure 3). The same applies to the EGI corridor running along Die Brak and Platfontein Farms.

From a meteorological perspective the study area is a “xeric habitat” with inter-annual variability in rainfall patterns across the region. Temperatures in the region can be considered to be extreme, with the greatest range recorded in the area lying at 53 °C. The lowest recorded minimum temperature is -

3 °C (minus) and the highest maxima being 50.2°C. Natural and anthropogenic factors have given rise to a generally altered environment and concomitantly changed habitat.

The project includes the establishment of three PV Facilities, connected by powerlines to the Kappa Substation, located to the south of the site. The siting of these facilities is determined by engineering requirements, such as insolation and the grade of slope, but are also to be positioned within areas that are not considered to be of ecological significance or high sensitivity, nor where habitat is considered to adversely affect operations.

4.3 Identification of Environmental Sensitivities

4.3.1 Sensitivities identified by the National Web-Based Environmental Screening Tool

Figures 10 to 15 below present the ecological themed "sensitivities" associated with the subject site, as identified using the Screening Tool. It includes the Grootfontein Farm for the proposed PV Facilities, as well as for Die Brak and Platfontein Farms for the EGI Corridor.

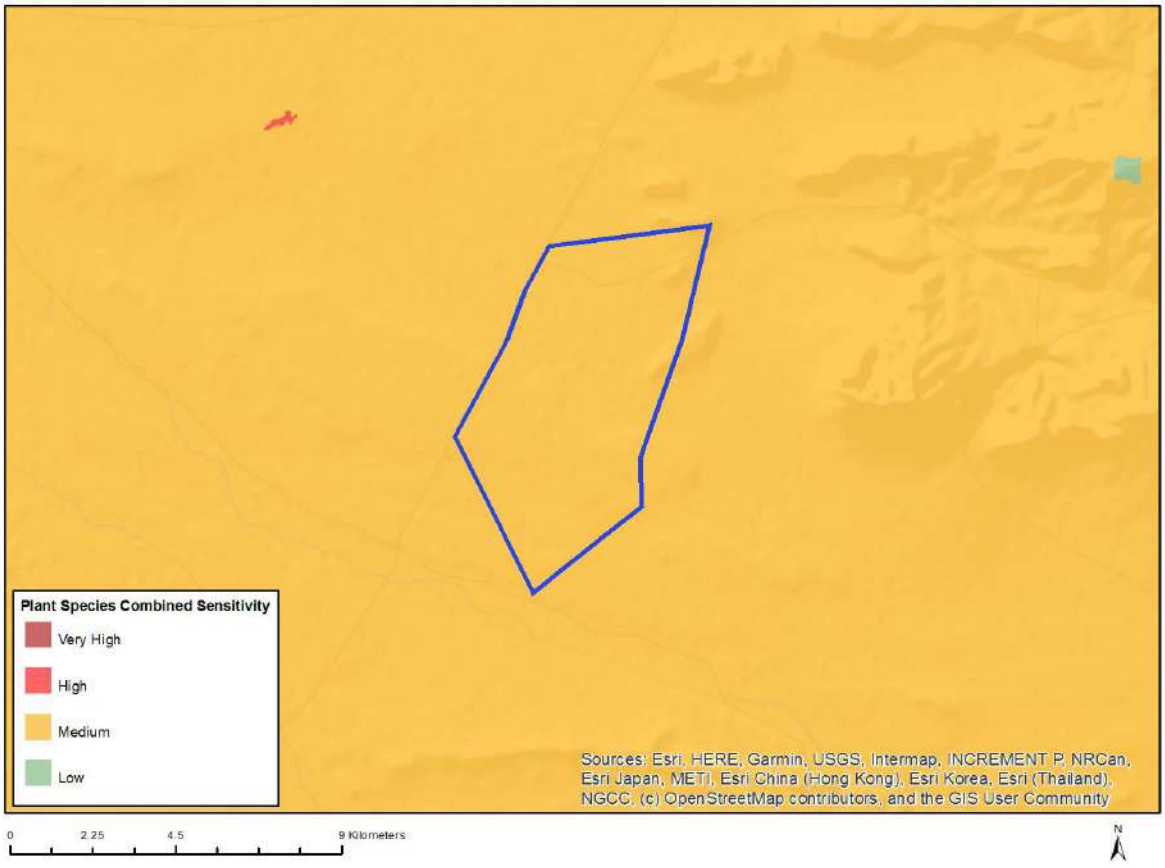

Figure 10. Map image indicating Plant Species sensitivity in relation to the farm Grootfontein for the Solar PV Facilities (Source: DEFF Screening Tool, 2020).

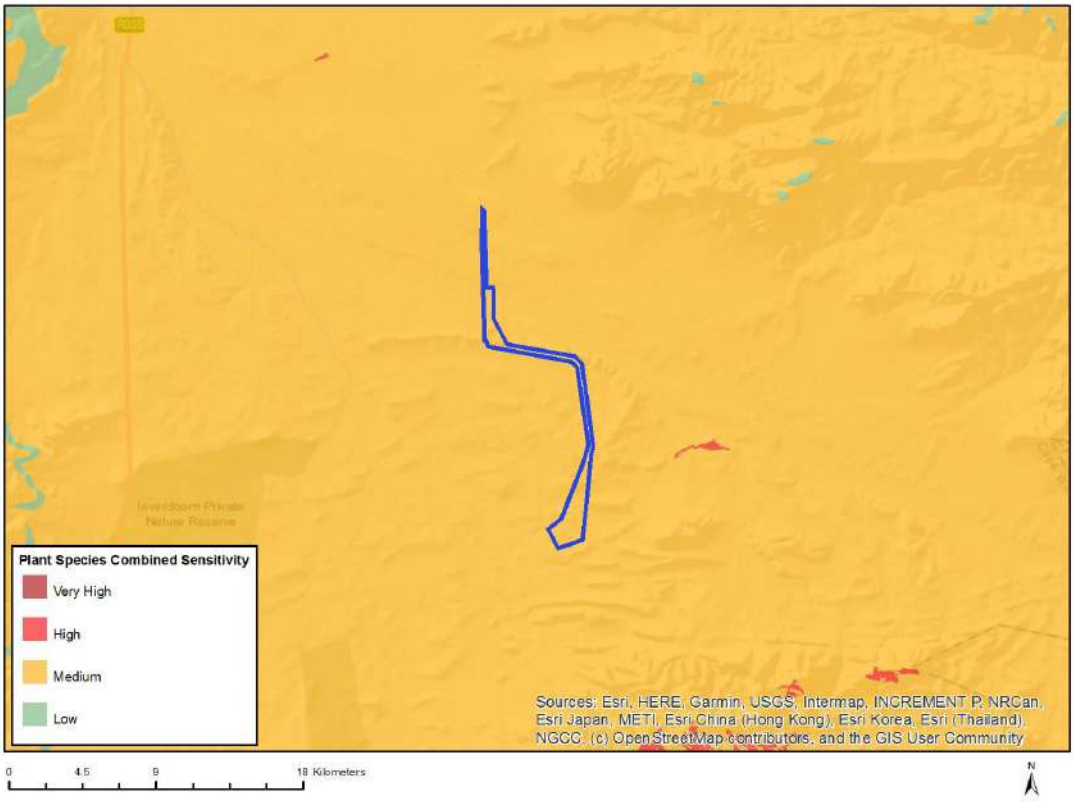

Figure 11. Map image indicating Plant Species sensitivity in relation to the farms Witte Wall, Die Brak and Platfontein for the EGI Corridor (Source: DEFF Screening Tool, 2020).

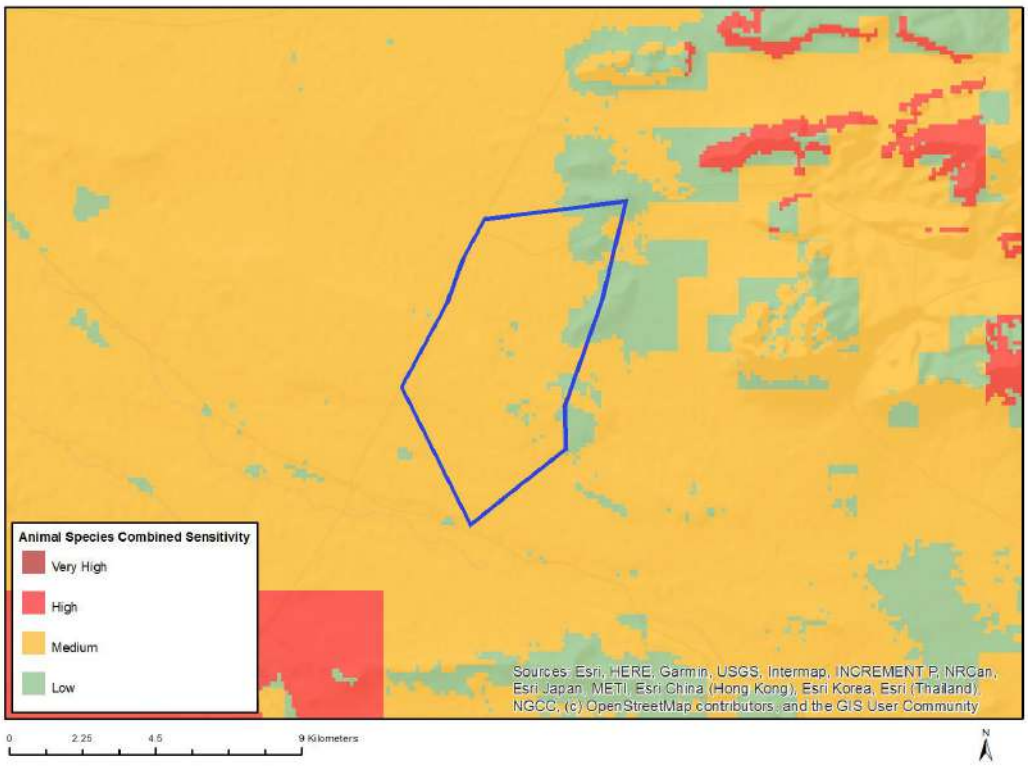

Figure 12. Map image indicating animal species sensitivity in relation to the farm Grootfontein for the Solar PV Facilities (Source: DEFF Screening Tool, 2020)

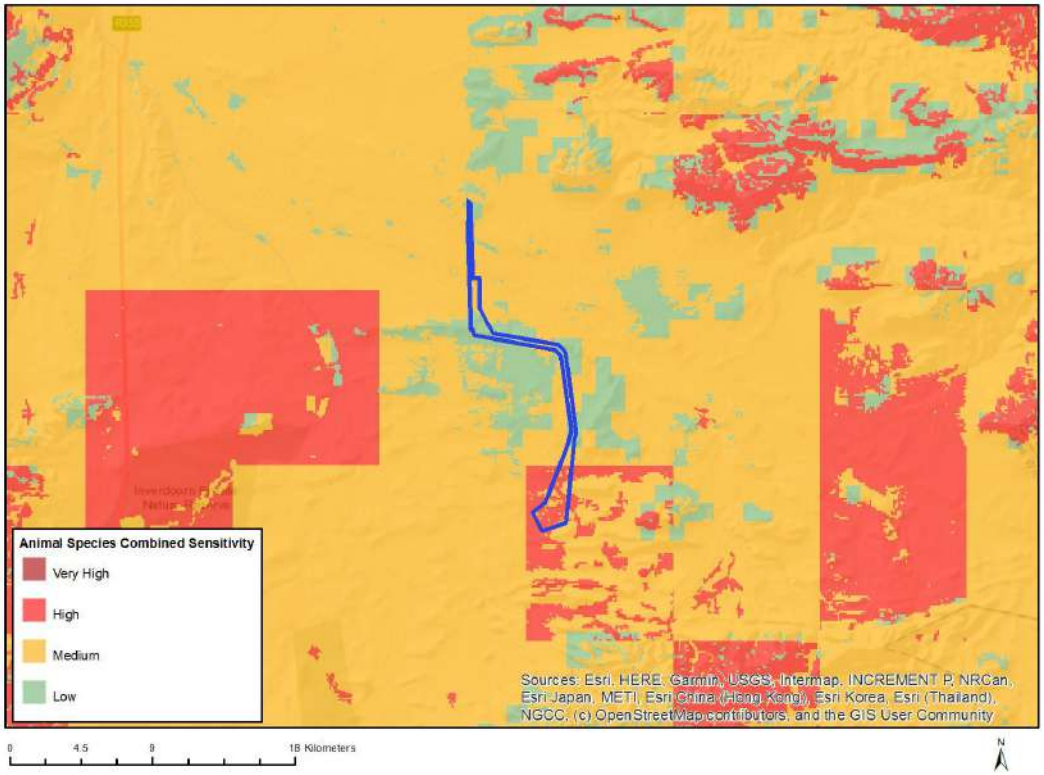

Figure 13. Map image indicating Animal Species sensitivity in relation to the farms Witte Wall, Die Brak and Platfontein for the EGI Corridor (Source: DEFF Screening Tool, 2020).

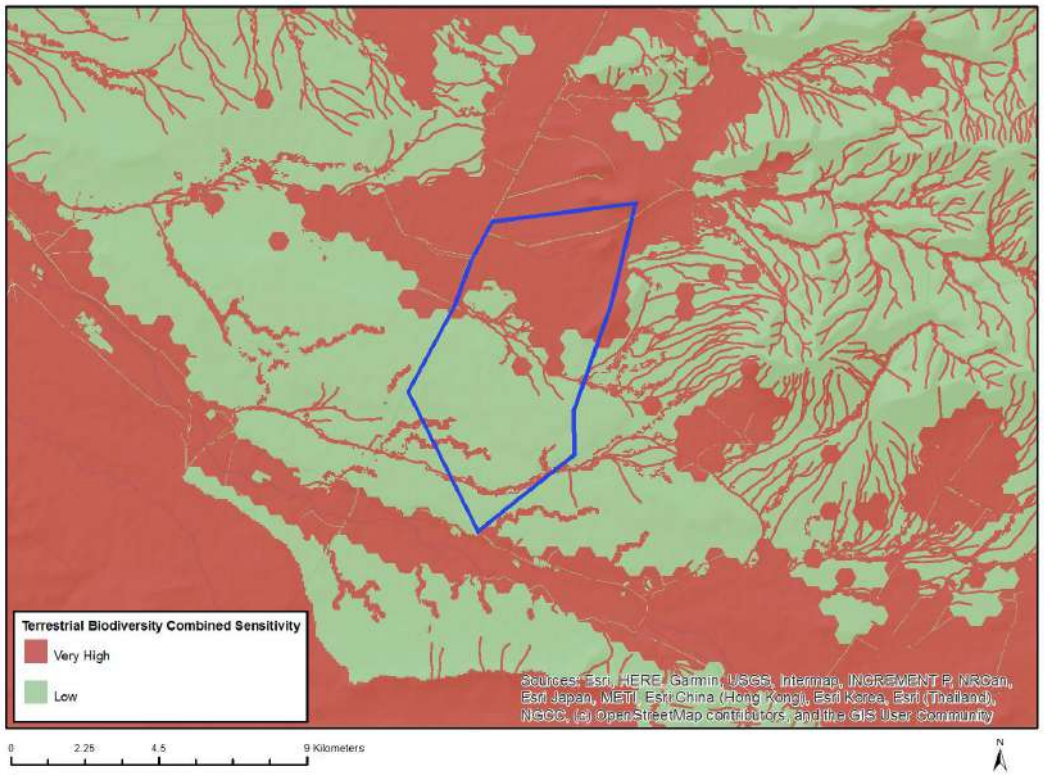

Figure 14. Map image indicating Terrestrial Faunal Combined Biodiversity sensitivity in relation to the farm Grootfontein for the Solar PV Facilities (Source: DEFF Screening Tool, 2020)

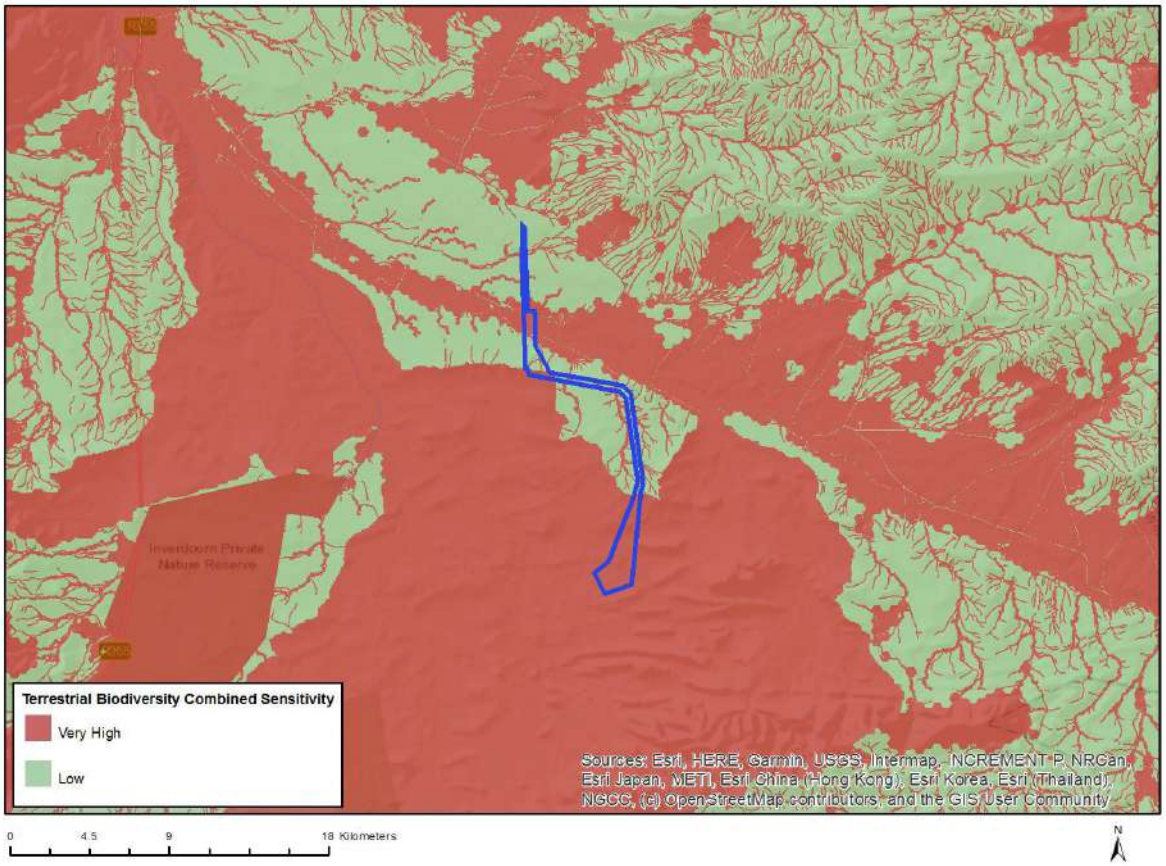

Figure 15. Map image indicating Terrestrial Faunal Combined Biodiversity sensitivity in relation to the farms Witte Wall, Die Brak and Platfontein for the EGI Corridor (Source: DEFF Screening Tool, 2020).

From the above, it is clear that the DEFF Screening Tool states:

- For the farm Grootfontein for the Solar PV Facilities:

  - Floral significance or sensitivity is deemed to be of medium significance (Figure 10), suggesting that there may be some occurrence of important botanical communities. With the exception of, *Haemanthus tristis*, this contention is supported by the evidence in Table 2 above. H tristis is however considered an important and singular geophyte located within the sheet wash of Grootfontein.

  - Faunal populations in the region are considered to range from "very high to low" ecological significance or "sensitivity", with the riverine or riparian environments being designated "very high", while elevated areas, being designated "low" as depicted by the terrestrial biodiversity combined sensitivity layer on the Screening Tool (Figure 14). In terms of the terrestrial biodiversity combined sensitivity layer on the Screening Tool, the northern portions of the Grootfontein farm have very high sensitivity areas owing to CBA 1 and 2 and ESA 1 and 2. However, the actual footprint of the Groofontein PV 1, PV 2 and PV 3 facilities contain a low to very high sensitivity in terms of the terrestrial biodiversity combined sensitivity layer due to small areas of ESA 1 and 2. The Animal Species sensitivity (Figure 12) indicates that the Grootfontein farm is mainly of medium to low sensitivity, which is the same for the actual footprint of the PV Facilities.

- For the farms Witte Wall, Die Brak and Platfontein encompassing the EGI Corridor:

- Floral significance or sensitivity is deemed to be of medium significance (Figure 11), suggesting that there may be some occurrence of important botanical communities, but this is not of a high probability. This result is supported by the evidence in Table 2 above.

- Faunal populations in the region are considered to range from "very high to low" ecological significance or "sensitivity", with the riverine or riparian environments being designated "very high", while elevated areas to the north of the site, being designated "low" (as depicted by the terrestrial biodiversity combined sensitivity layer on the Screening Tool (Figure 15). In terms of the terrestrial biodiversity combined sensitivity layer on the Screening Tool, the central portions of the Witte Wall farm have very high sensitivity areas owing to CBA 1 and 2 and ESA 1 and 2; and the southern portion of the EGI corridor has a very high sensitivity (i.e. CBA 1 and 2 and ESA 1 and 2; and freshwater ecosystem priority area quinary catchments) in terms of the terrestrial biodiversity combined sensitivity layer (Figure 15). The Animal Species sensitivity (Figure 13) indicates that the farms affected by the EGI corridor is mainly of medium to low sensitivity, with small areas of high sensitivity close to the Kappa Substation.

The above information was interrogated through literature review and site reconnaissance.

4.3.2 Sensitivity Analysis and Verification

4.3.2.1 Grootfontein PV 1, PV 2 and PV 3 – PV Facilities and Associated Infrastructure

The Grootfontein farm, encompassing the proposed PV facilities Grootfontein PV 1, PV 2 and PV 3 can be considered to fall within an area of just less than 800ha on the bank of the Grootdroei River (Figure 1). The area encompasses an undulating plateaux with a shallow scarp or ridges located to the south of the site. The highest elevation of the site lies at approximately 610m amsl. The riparian environments can be found some 20m lower and effectively bisects the Farm Grootfontein. Three ecomorphological habitats can be found within the terrestrial components of the site, these being:

1. The elevated plateux that effectively form a generally level terrain
2. A scarp slope with a gentle fall, located to the south
   and
3. Sheet wash environment, generally located proximal to the Droelaagte River in the north.

The riparian habitat is evaluated under the separate "Aquatic Biodiversity and Species Assessment" component of the BA.

In considering the nature and form of habitat on a historical basis consideration was given to aerial imagery of the region from 1982. This date is significant as it marks the period one year after the 1981 "Laingsburg flood", which was considered to be a significant event within the broader region. Imagery of Grootfontein at this time was not available (suitable), however comparison of the southern area (Groot River) with more recent imagery, shows little large scale eco-morphological change has arisen since that time. Most features, even those located around the ephemeral streams have remained unchanged.

The higher lying grounds show *low to moderate*, rocky slopes with a sparse vegetation cover. The dominant habitat is typical of commonly occurring species within the Tanqua Karoo (SKv 5), these being *Antimima hantamensis, Augea capensis*, *Ruschia spinosa* and *Lycium cymosum (*Figure 16). Vegetation cover is generally sparse (<40%), which may have been exacerbated by the prevailing drought in the region. Although showing a similar level of floral composition and cover, the sheetwash environments may be subject to occasional inundation. In addition, the more friable soils are

conducive to the presence of geophytic species such as the Amaryllid, *Haemanthus tristis* which may be seasonally or intermittently evident. *H trisitis* was according to the SANBI database recorded on site, within the sheetwash of the northern component of the site.

Figure 16. Typical Tanqua Karoo veld on moderate slopes, showing low cover

Figure 17. Image of sheet wash with evidence of occasional inundation by surface flows

Given the moderate or medium botanical sensitivity applied to Grootfontein and surrounds, consideration was given to faunal populations present within the area. Some of the larger mammals presented in Table 3 are evidently associated with game farming operations on adjacent properties, (e.g. Oryx, *O gazella*) while others are endemic and present on account of habitat requirements; or are relic and have adapted to the contemporary habitat. The latter populations are of particular importance from an ecological perspective. As noted above, 3Foxes Biodiversity Solutions (Mr S Todd) undertook to evaluate the presence of mammals within the subject site and beyond, with particular emphasis on the presence or absence of the riverine rabbit (*B monticularis*). A camera trapping exercise was undertaken on the affected farm portions (i.e. Farms Witte Wall, Grootfontein and Hoek Doornen), with an emphasis on recording the presence of larger mammalian species common to the area. Appendix F of this report indicates the findings of this report. Evidently, no specimens of *B monticularis* were identified on site, however a number of other mammals were recorded.

Site reconnaissance undertaken over a 5-days period revealed a number of smaller mammal and reptile species, of particular interest being common mole rat (*Cryptomys hottentotus*), a generally fossorial species and the angulate tortoise (*Chersina angulata*) (Figure 18). In addition, evidence of scorpions, most likely a Parabuthid, was identified on the steeper rocky slopes located just off the site.

With the exception of *C angulata* and the *Parabuthid*, all fauna identified on site were recorded from the lower, riverine environments, including *C hottentotus, Lepus capensis*, the Cape hare and a number of smaller antelope, in particular *Raphicerus campestris* (steenbok) and *Sylvicapra grimmia* (bushbuck). The only reptile recorded from the region, this being an agamid (probably *A hispida*), was also identified within the alluvial deposits of the Groot River.

It follows that the screening tool sensitivity maps presented in Figures 10 - 15 conforms with the findings of the site assessment with low levels of faunal diversity being evident on higher ground within the Grootfontein area and most faunal populations being associated with the riverine environments. This concentration of faunal assemblages can be anticipated on account of the increased vegetative cover evident within the river channels, offering improved refugia and browse for many herbivores and the sandy soils that favour fossorial species. In addition, the availability of water at these points would be a significant factor.

Given the above, areas that should be avoided in respect of the proposed development should include all riparian areas and the more extensive areas of sheetwash within the site, while steep, rocky ridges, which may favour small invertebrates and some floral species should also be excluded. Figure 19 below indicates these areas as they pertain to the site.

Figure 18. Angulate tortoise (*Chersina angulata*), common to site

Figure 19. Typical burrow associated with scorpion located on scarp

Figures 20 and 21, presents the proposed extent of the three solar PV facilities (i.e. Grootfontein PV 1, PV 2 and PV 3) in relation to the identified areas of sensitivity and ecological significance. Of note are:

- The proposed areas of Grootfontein PV 1, Grootfontein PV 2 and Grootfontein PV3 are associated with the level terrain within the site.

- Much of the land in question has been subject to extensive grazing and shows limited diversity and cover.

- Areas of potential improved botanical diversity or “niche” environments, in particular, the riparian environments, have been excluded from the proposed PV arrays, including the moderate slopes and scarps. Such areas include areas of significant sheet wash.

- A significant terrestrial buffer has been established around the Droelaagte and Klein Droelaagte Rivers, with a minimum distance of 100m being anticipated and most setbacks from the riparian zone approximating 180m. It is anticipated that 100m would be an acceptable distance from the riparian edge.

- The powerlines will traverse portions of land on the Farms Grootfonein, Witte Wall, Die Brak, and Platfontein, as well as the Groot River to the extreme west of the Witte Wall farm boundary, where an existing fenceline is evident.

4.3.2.2 EGI and Associated Infrastructure

In addition, Figure 23 presents the nature of the land associated with the proposed powerlines on Die Brak farm. Evidently, the establishment of towers will result in minor clearance of the land for the establishment of footings. The habitat along this servitude is similar to that found to the north on Witte Wall (as described in the separate Terrestrial Biodiversity and Species Assessment for the Witte Wall PV Facilities), and the servitude aligns with an existing roadway. Figure 22 presents the entire route and associated areas of ecological sensitivity. Notably, the Groot River is considered to be the only area showing ecological sensitivity. Refer to Annexure F of this study for the separate report that has been compiled regarding the Riverine Rabbit and other fauna found on site.

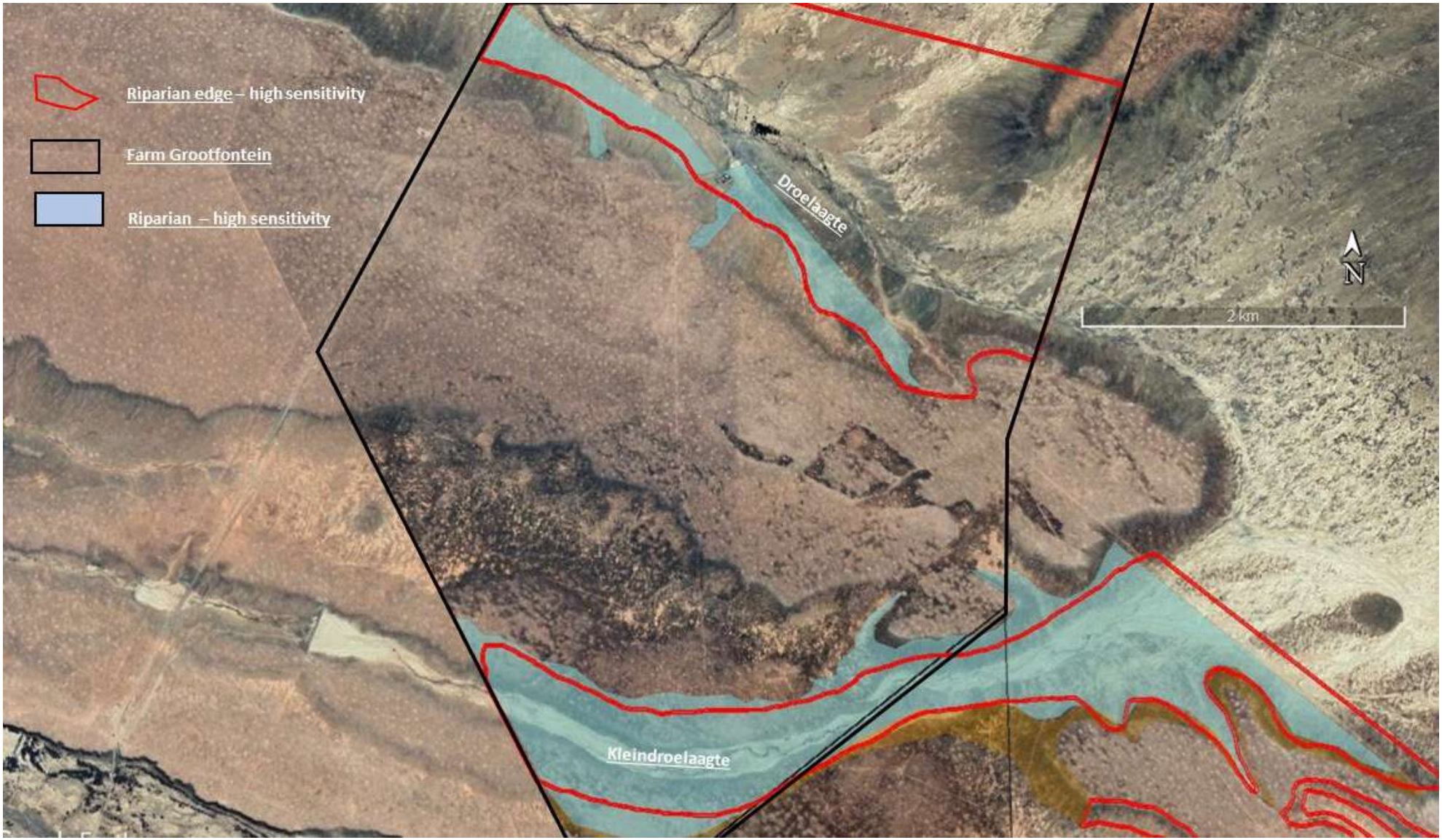

Figure 20. Aerial image of the site showing areas of high ecological sensitivity

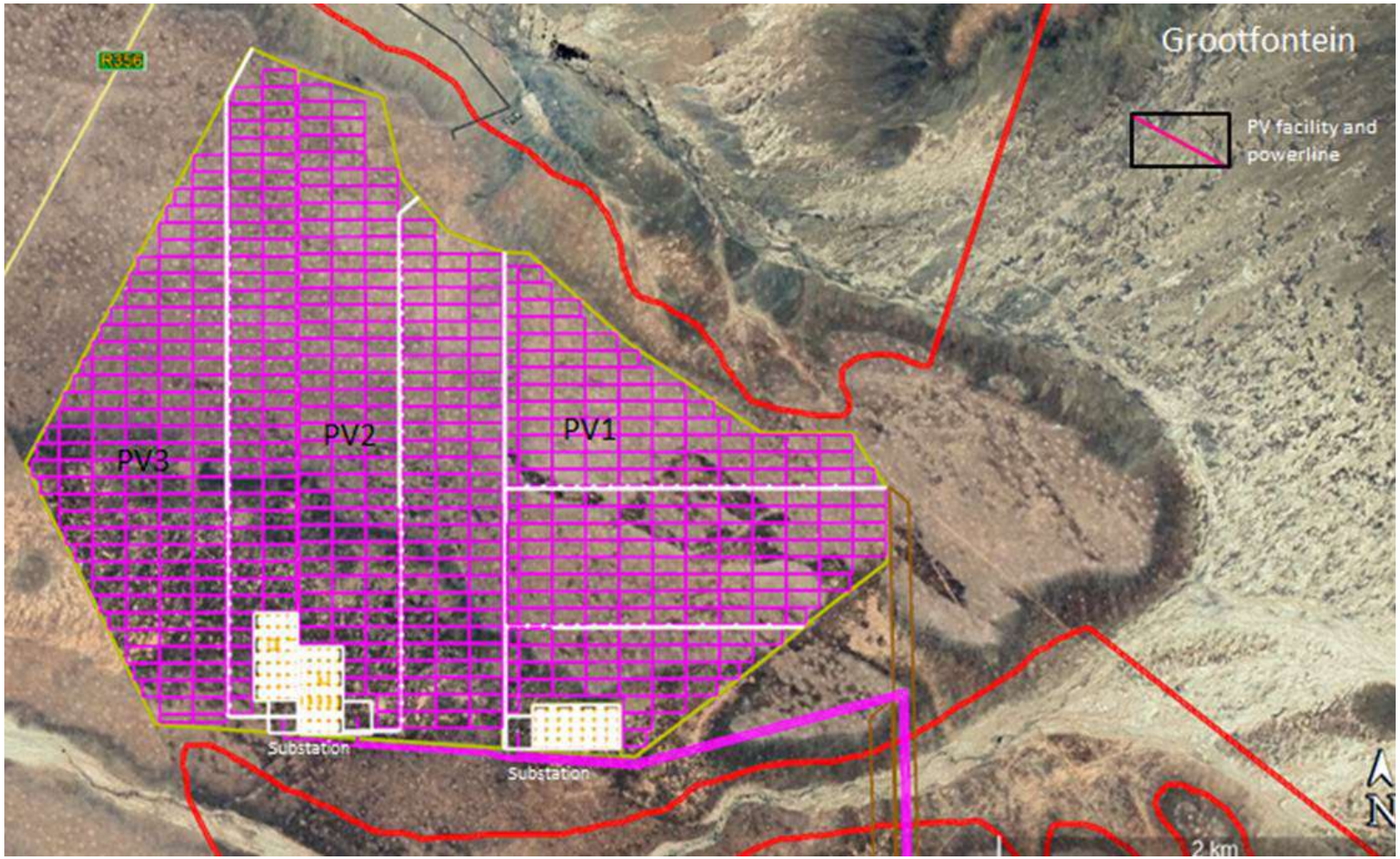

Figure 21. Aerial image showing Grootfontein PV 1, PV 2 and PV 3 layouts, with BESS and alignment of overhead lines to the Kappa substation. Image indicates that the PV facilities exclude riparian areas of high ecological sensitivity.

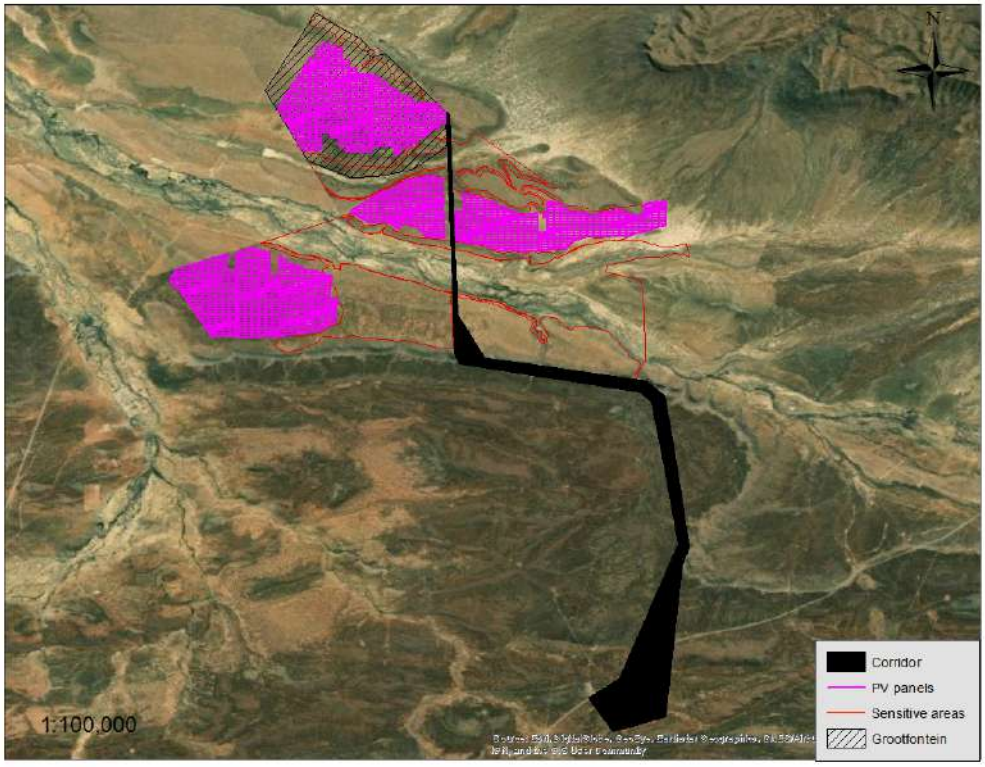

Figure 22. Aerial image showing the proposed Grootfontein PV facilities with proposed overhead powerlines connecting the Grootfontein PV facilities to the Kappa Substation. This image also shows the PV areas for the Witte Wall and Hoek Doornen[1] projects, which are the subject of separate assessments.

Figure 23. Image showing nature of the corridor to be traversed by the proposed electrical powerline serving the Kappa substation and existing powerlines proximal to the servitude in the Farm Die Brak.

[1] Note that the area of Hoek Doornen PV 3 has been reduced slightly. Refer to the Final BA Report for the Hoek Doornen Project for maps.

Given the above, the following Environmental Sensitivities can be attributed to the three PV sites and the EGI. Refer to Appendix C of this report for the Site Sensitivity Verification Report.

4.3.3 Sensitivity Analysis Summary Statement

The terrestrial environment within the Grootfontein site, encompassing Grootfontein PV 1, PV 2 and PV 3 show primarily low levels of ecological significance (Figures 20, 21 and 22). Improved areas of moderate and high ecological sensitivity are related to the scarp slopes and sheetwash environments associated with the riparian edge, which have the potential to provide suitable habitat for lithic and geophytic plants of conservation significance. Notably, the overhead powerline servitude shows only low ecological sensitivity or significance, being associated with primarily farmland and in proximity to existing powerline servitudes. Evidence indicates that faunal populations are concentrated in and around riparian areas or sandy environments, in association with improved foraging and the availability of water. Some invertebrates, such as scorpions may utilize the elevated scarp slopes as refugia, however larger mammals and most reptiles are generally only transitory in these areas. The riparian environments are allocated a “high level” of ecological sensitivity on account of the increased faunal populations identified within these areas and the evident intermittent flooding that may affect these areas. Figure 24 demonstrates a typical cross section through the site, showing areas for exclusion and inclusion in the development.

The above sensitivity analysis largely corroborates the findings of the Screening Tool, the sensitivities of which have been verified and utilized in the planning of the PV facilities at Grootfontein and for the EGI Corridor along the farms Platfontein and Die Brak, in order to develop the “preferred” alternative.

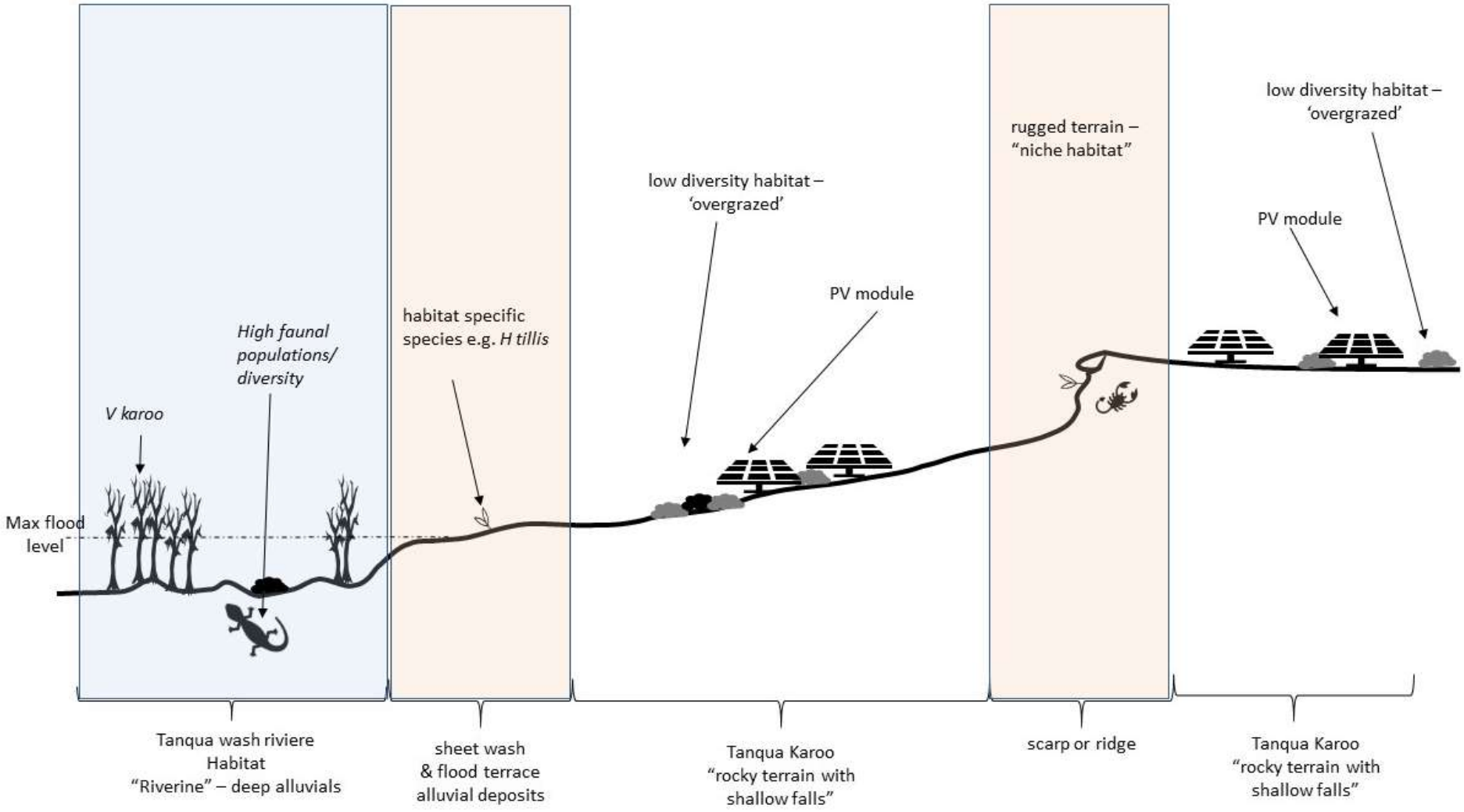

Figure 24. Schematic diagram indicating areas of high sensitivity and areas suitable for establishment of solar modules

5 Alternative Development Footprints

No site alternatives are being considered. However, the layout was designed after provision of sensitivity data by the specialists to ensure that it would have the least possible overall impact. One EGI corridor has been proposed but this is wide enough to allow some specific siting of the alignment to reduce impacts.

6 Issues, Risks and Impacts

6.1. Identification of Potential Impacts/Risks

A number of direct, indirect and cumulative impacts on the localised and broader ecology of the region can be identified as a consequence of the proposed PV and EGI developments being implemented. Direct impacts are those that are directly attributable to the implementation and operation of the project, while indirect impacts are consequential effects of the proposed project that may not be directly attributable to the development. Cumulative impacts are those externalities that arise from the proposed development and compound existing effects or influences on the ecology of the region. These impacts are also defined as originating from the construction phase or the operational phase and may include the 'decommissioning phase".

6.1.1 Construction Phase

Construction phase impacts through the establishment of the PV Facilities, EGI and associated infrastructure are listed below:

- Change in localised topography on account of excavation and site establishment. Areas of elevation and depression are likely to be altered to establish infrastructure.
- Change, both short and long term in localised hydrology – percolation rates, points of groundwater recharge, surface water flow will arise.
- Clearance of vegetation to establish roadways and other infrastructure.
- Isolation and cordoning off the site through fencing, affecting the movement of fauna.
- Dust – according to movement of traffic and other construction related factors will affect factors such as palatability of vegetation.
- Electrical light pollution – primarily associated with work at night, will alter faunal ethos of some species.
- Incidental pollution events, including the loss of solid waste, spillage of liquids such as hydrocarbons and other fuels as well as possible sewerage and other waste is likely to alter select points within the subject site, possibly affecting habitat form and other factors.
- General disturbance on account of pedestrian movement and activities on site.

The following potential impacts during the construction phase are therefore presented and assessed in this report:

- **Potential Impact 1**: Alteration of habitat structure and composition;
- **Potential Impact 2:** Ousting (and recruitment) of various fauna;
- **Potential Impact 3**: Changes in the geomorphological state of drainage patterns due to construction activities leading to change in the eco-morphology of lower lying areas and those immediately adjacent to it;
- **Potential Impact 4**: Increased electrical light pollution, leading to changes in nocturnal behavioural patterns of fauna;
- **Potential Impact 5**: Exclusion or entrapment of (in particular) large fauna, on account of the fencing of the site;
- **Potential Impact 6**: Changes in edaphics (soils) on account of excavation and import of soils, leading to the alteration of plant communities and fossorial species in and around these points;
- **Potential Impact 7**: Changes in subsurface water resources arising from alteration of percolation and recharge at points;
- **Potential Impact 8:** Changes in water resources and surface water in terms of water quality (i.e. impact on water chemistry) as a result of construction activities;
- **Potential Impact 9**: Exotic weed invasion;
- **Potential Impact 10**: Clearance of vegetation to establish roadways and other infrastructure;
- **Potential Impact 11**: Increased dust levels due movement of traffic and other construction related factors will affect factors such as palatability of vegetation;
- **Potential Impact 12**: Incidental pollution events, including the loss of solid waste, spillage of liquids such as hydrocarbons and other fuels as well as possible sewerage and other waste is likely to alter selected points within the subject site, possibly affecting habitat form and other factors; and
- **Potential Impact 13**: General disturbance on account of pedestrian movement and activities on site.

6.1.2 Operational Phase:

Operational phase impacts through the utilization of the PV Facilities, EGI and associated infrastructure are listed below:

- Altered topography within and adjacent to site will give rise to differing habitat regimen with variation in floral and faunal forms and ecology on site.

- Change in the localised hydrology will see variation in topography as surface run off establishes new primary drainage channels and areas of sheet wash and other depositional features. Structures alter flow and percolation rates across site

- Secondary vegetation will arise following a possibly different seral process that will be driven by features including variation in solar irradiance (increased shade from modules), ongoing disturbance (clearance of larger vegetation affecting modules) and plant communities will alter on account of changing hydrology and topography.

- The isolation of the site by a fence (perhaps electrified), will alter faunal ethos, while a changed habitat within the site may act to encourage faunal passage into the site. The fence may also alter predator – prey relationships both within and adjacent to the site, where prey is cordoned on account of the presence of fencing (e.g. jackals may use fencing to direct and run down prey).

- Electrical light pollution. Some points within the PV may be flood lit for security and other reasons. Such lighting or “ELP” may alter the ethos of fauna that are either attracted to lights

or use light for predation. This may be a minor and generally latent impact, but is a likely state in the operational phase.

- Incidental pollution events are likely to continue throughout the operational stage. If tracking modules are utilised spills of hydraulic fluid may arise or other spillages may be evident. Small volumes of sewerage may be introduced into the localised environment from operational offices, while solid waste may arise within the site from time to time.

- General disturbance on account of pedestrian movement and activities on site.

The following potential impacts during the Operational Phase can be summarized:

- **Potential Impact 14**: Continued alteration of habitat structure and composition on account of continuing low level anthropogenic impacts, such as "shading of vegetation" from arrays;
- **Potential Impact 15**: Ousting (and recruitment) of various fauna on account of long term changes in the surrounding habitat/environment;
- **Potential Impact 16**: Changes in the geomorphological state of drainage lines on account of long term climatic changes and the concomitant change in the nature of the catchment arising from the land use change;
- **Potential Impact 17**: Changes in water resources and water quality (i.e. impact on water chemistry) as a result of operational activities. Such changes will be related to the long term activities on site, but are likely to be negligible; and
- **Potential Impact 18**: Exotic weed invasion as a consequence of regular and continued disturbance of site.

6.1.3 Decommissioning Phase:

Such alterations and changes will be dependent upon the expectant post-decommissioning land use and operation cease of the PV Facilities, EGI and associated infrastructure. However, abandonment of the site would probably result in:

- **Potential Impact 19**: A reversion to an early seral stage
- **Potential Impact 20**: A reversion of present faunal population states within the study area, with some variation to these populations being possible
- **Potential Impact 21**: Changes in the geomorphological state of drainage lines as hydraulic changes arise within the catchment; and
- **Potential Impact 22**: Exotic weed invasion as a consequence of abandonment of site and cessation of weed control measures.

6.1.4 Indirect Impacts

The following indirect impacts apply to the PV Facilities, EGI and associated infrastructure:

- **Potential Impact 23**: Changes in broader landscape ecology through alteration of eco-morphological drivers.
- **Potential Impact 24:** Changes in faunal ethos as a result of the establishment of the PV facilities on Grootfontein.

6.1.5 Cumulative Impacts

The following cumulative impacts below apply to the PV Facilities, EGI and associated infrastructure.

The cumulative assessment also considers all nine proposed PV plants and nine power lines as part of this suite of developments (referred to as the Ceres PV Development) and 11 other renewable energy projects that have received EA on some 50 000 ha of farm land within 30 km of the subject site. The cumulative impact assessment also considers other proposed, approved and existing power lines within the 30 km radius.

Given the above, cumulative impacts arising from the implementation of this project and other land use changes in the region are likely to exhibit the following:

- **Potential Impact 25**. Alteration of habitat structure and composition, albeit primarily sporadic in nature, over an extensive and wide area.
- **Potential Impact 26**. Changes in faunal populations through exclusion of certain species and beneficiation of others over an extensive and wide area – primarily on account of change in habitat as well as the implementation of security fencing;
- **Potential Impact 27**. Increased change in the geomorphological state of drainage lines and watercourses on account of long term and extensive change in the nature of the catchment;
- **Potential Impact 28**. Changes in water resources and surface water in terms of water quality (i.e. impact on water chemistry) on account of extensive changes in the catchment; and
- **Potential Impact 29**. Exotic weed invasion as a consequence of regular and continued disturbance across an extensive area of site.

It must also be noted that in terms of the no-go option, this will result in no additional impacts on biodiversity and will result in the ecological status quo being maintained, which will be to the advantage of the biodiversity. However, that being said, no fatal flaws were discovered in the course of the investigations for the proposed development.

6.2 Summary of Issues identified during the Public Consultation Phase

Interaction with local residents in the region indicated that:

- Historically, farming activities over the preceding 150 years was seen to have altered the prevailing habitat;
- Fauna were confined to the riverine areas in general; and
- Flood events could be severe, with a rapid rise in the water levels within rivers being noted following rain in the upper catchments.

Additional points raised by the local residents are captured in Table 4 below.

Table 4: Comments Received from Stakeholders / Local Residents during the Field Work component of this *Terrestrial* Biodiversity and Species Assessment

Comment	Commenter	Response
The removal of natural vegetation containing threatened, protected and endemic species as a result of the proposed project	Mr Andre Vermeulen	The general approach to construction of the proposed facilities, associated infrastructure and EGI is to maintain vegetation on site. No "blading" of areas, other than along roads, within substations and in the laydown area is to be undertaken
An increased exotic infestation due to disturbance caused by the proposed project	Mr Andre Vermeulen	An Alien Invasive Plant (AIP) management system is to be introduced at an early stage of implementation and undertaken on an ongoing basis.
Increased dust deposition during construction activities	Mr Andre Vermeulen	This is a likely scenario. Mitigation measures will have to be employed including "damping", traffic speed limitations and other management measures

Additional comments were received from stakeholders and Interested and Affected Parties during the 30-day comment period on the Draft BA Report. Refer to Appendix D of the Final BA Report for the complete Comments and Responses Report, which includes all comments relating to Terrestrial Biodiversity, as well as detailed responses from the specialist team. Most of the comments relate to the sensitivity delineations, ecological corridors, plant species, Riverine Rabbit and legal status of the conservation planning in the Western Cape. These comments have been adequately addressed and responded to in the Comments and Responses Report in Appendix D of the Final BA Report.

7 Impact Assessment

The nature of impact / risk of PV Facilities, EGI and associated infrastructure is discussed below. The impacts described below apply to Grootfontein PV 1, Grootfontein PV 2, and Grootfontein PV 3 projects (i.e. they are the same and have not been repeated).

7.1 Potential Impacts during the Construction Phase

Potential Impact 1: Alteration of habitat structure and composition

Change in localised topography on account of excavation and site establishment will occur. Areas of elevation and depression are likely to be altered to establish infrastructure. This impact will arise as an ecological response to disturbances and will be reflected in the composition of habitat. Given the generally depauperate habitat within the proposed development areas, such impacts may be generally of a "moderate" negative sensitivity at the construction phase. Improved management of the site during construction should minimize this impact to "low" significance.

Potential Impact 2: Ousting (and recruitment) of various fauna

Fauna are likely to emigrate from the region as behavioral ethos and refugia will be affected by construction and the high level of disturbance. This is rated as a direct, negative impact. Exclusion areas should be maintained, cordoning off site to prevent inward migration of fauna and other general management principles will reduce such impacts from "high" to "moderate" significance, during the construction phase.

Potential Impact 3: Changes in the geomorphological state of drainage patterns due to construction activities leading to change in the eco-morphology of lower lying areas and those immediately adjacent to it

As construction proceeds the natural drainage patterns, sediment transport mechanisms and other related factors will alter, with concomitant change in the ecology associated with these factors. This is rated as a direct, negative impact. Implementation of management principles will reduce these impacts from "high" to "moderate" significance and possibly "low", during the closing of the construction phase.

Potential Impact 4: Increased electrical light pollution (ELP), leading to changes in nocturnal behavioural patterns of fauna

ELP will alter faunal ethos of some species, particularly during construction, primarily associated with work at night. ELP can be addressed through initially, interventions in respect of lighting during the construction phase such as reduced security lighting, downward lighting and restriction on lumens employed. This is generally a low significance impact before and after implementation of mitigation measures.

Potential Impact 5: Exclusion or entrapment of (in particular) large fauna, on account of the fencing of the site

Entrapment of larger mammals within the PV facilities is common. Regular flushing of the area is required, throughout the construction phase. This is rated as a low significance impact.

Potential Impact 6: Changes in edaphics (soils) on account of excavation and import of soils, leading to the alteration of plant communities and fossorial species in and around these points

As per the eco-morphological change, soil structure and form will alter on account of construction activities, where excavation and compaction, for example arise. Ruderal vegetation may replace more resilient species with minor alteration of faunal ethos. This is rated as a low significance impact on account of the existing habitat forms.

Potential Impact 7: Changes in subsurface water resources arising from alteration of percolation and recharge at points:

This impact relates to the change, both short and long term, in localised hydrology, which will influence percolation rates, points of groundwater recharge, and surface water flow. This impact would be most prevalent in and around the sandy environments of the site. However, the impact is likely to be less significant on the upper elevations of the site where the development is to be positioned. This impact is rated with a low significance. Adequate storm water controls to ensure that attenuation of storm water runoff emanating from the PV panels and other hard panned surfaces is achieved.

Potential Impact 8: Changes in water resources and surface water in terms of water quality (i.e. impact on water chemistry) as a result of construction activities

During the construction phase, increased mobilization of sediments, minor spills of materials and other factors may alter surface water chemistry. This impact would however be low significance, with the employment of suitable management measures during the construction stage. Such measures include to 1) ensure all hazardous materials are adequately stock piled in a leak proof receptacle and 2) Ensure a spill kit is placed on site in order to contain any hydrocarbon leaks if necessary.

Potential Impact 9: Exotic weed invasion

Exotic weed invasion may arise through disturbance (e.g. *Atriplex lindleyi*). However, weed invasion is limited in this habitat and selective redress of exotic weeds during and after construction would render this impact of low significance.

Potential impact 10: Clearance of vegetation to establish roadways and other infrastructure

Clearance of vegetation results in the exposure of bare soil, leaving the affected area susceptible to erosion as well as the invasion and proliferation of exotic species. In order to lessen this impact from moderate (3) to Low (4) significance the following mitigation measures are to be carried out, 1)

Specimens to be relocated if possible, through plant rescue, 2) Clearance activities are to be strictly confined to the development foot print, and 3) Clearance is to be carried out where needed to accommodate infrastructure.

Potential impact 11: Increased dust – according to movement of traffic and other construction related factors will affect factors such as palatability of vegetation

In order to reduce the significance of this impact from moderate the most effective mitigation would be to Impose a speed limit on construction vehicles operating within the construction site. Such an action would reduce the impact to low significance. Furthermore, the use of a water bowser has been discounted based on the lack of water availability in the area.

Potential impact 12: Incidental pollution events, including the loss of solid waste, spillage of liquids such as hydrocarbons and other fuels as well as possible sewerage and other waste is likely to alter selected points within the subject site, possibly affecting habitat form and other factors.

In order to limit the effect of incidental pollution events, the following mitigation measures are recommended to be carried out; 1) A waste management plan is to be compiled and implemented onsite 2) A spill kit is to be placed on site in order to curtail and contain any hydrocarbon spill; and 3) A designated waste area is to be placed within a suitable place onsite, which is to be identified by the appointed Environmental Control Officer (ECO). The implementation of management actions will render the significance of this impact as low.

Potential impact 13: General disturbance on account of pedestrian movement and activities on site

General pedestrian movement from labour on foot extends the overall impact extent of the development, albeit marginally, restrictions on movement within the subject site is likely to reduce general litter and other undesirable pollution. In order to limit this impact to Low significance, environmental inductions as well as the necessary signage are to convey acceptable areas in which to traverse within the subject site.

7.2 Impact Summary Tables: Construction Phase

The impact ratings are described in this section for the construction phase.

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
CONSTRUCTION PHASE – Direct Impacts						
Impact 1: Alteration of habitat structure and composition	Status	Negative	Moderate (3)	• Implement general management principles as per the EMPr to ensure that the site is managed appropriately.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
Impact 2: Ousting (and recruitment) of various fauna	Status	Negative	High (2)	• Exclusion areas should be maintained. Maintain scarp slopes and ensure that they are unimpeded by the proposed development. • Avoid extensive alteration of sheet wash areas. • Cordon off the sites to prevent inward migration of fauna. • Implement other general management principles as per the EMPr.	Moderate (3)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Severe				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
Impact 3: Changes in the geomorphological state of drainage patterns	Status	Negative	High (2)	• Exclusion areas should be maintained. Maintain scarp slopes unimpeded by development. Avoid extensive alteration of sheet wash areas. • Cordon off the sites to prevent inward migration of fauna • Implement other general management principles as per the EMPr.	Moderate (3) to Low (4)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Severe				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
Impact 4: Increased ELP	Status	Negative	Low (4)	• Ensure reduced security lighting, downward lighting and restriction on lumens employed	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
Impact 5: Exclusion or entrapment of (in particular) large fauna	Status	Negative	Low (4)	• Ensure regular flushing of the area throughout the construction phase	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
Impact 6: Changes in edaphics (soils) due to excavation and import of soils, leading to the alteration of plant communities and fossorial species in and around these points	Status	Negative	Low (4)	• Ensure construction activities are limited to the development foot print in order to minimise the extent of impact	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
Impact 7: Changes in subsurface water resources arising from alteration of percolation and recharge at points	Status	Negative	Low (4)	• Provide adequate storm water controls to ensure that attenuation of storm water runoff emanating from the PV panels and other hard panned surfaces is achieved.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
Impact 8: Changes in water resources and surface water in terms of water quality	Status	Negative	Moderate (3)	• Ensure all hazardous materials are adequately stock piled in a leak proof receptacle. • Ensure a spill kit is placed on site in order to contain any hydrocarbon leaks if necessary.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
Impact 9: Exotic weed invasion	Status	Negative	Moderate (3)	• Limit construction activities to the development foot print to lessen disturbance within the area • The removal through mechanical or application of a herbicide is likely to be required in order to curtail proliferation. Note that the appointed Environmental Control Officer (ECO) of the project is to be consulted prior to application of the herbicide.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Low				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
	Irreplaceability	Low				
Impact 10: Clearance of vegetation to establish roadways and other infrastructure	Status Spatial extent Duration Consequence Probability Reversibility Irreplaceability	Negative Local Medium Substantial Likely Low Low	Moderate (3)	• Specimens to be relocated if possible, through plant rescue. • Clearance activities are to be strictly confined to the development foot print. • Clearance is to be carried out where needed to accommodate infrastructure.	Low (4)	High
Impact 11: Dust – according to movement of traffic and other construction related factors will affect factors such as palatability of vegetation	Status Spatial extent Duration Consequence Probability Reversibility Irreplaceability	Negative Local Medium Substantial Likely Low Low	Moderate (3)	• Impose a speed limit on construction vehicles operating within the construction site.	Low (4)	High
Impact 12: Incidental pollution events, including the loss of solid waste, spillage of liquids such as hydrocarbons and other fuels as well as possible sewerage and other waste is likely to alter select points within the subject site, possibly affecting habitat form and other factors.	Status Spatial extent Duration Consequence Probability Reversibility Irreplaceability	Negative Local Medium Substantial Likely Low Low	Moderate (3)	• A waste management plan is to be compiled and implemented onsite • A spill kit is to be placed on site in order to curtail and contain any hydrocarbon spill. • A designated waste area is to be placed within a suitable place onsite, which is to be identified by the appointed ECO.	Low (4)	High
Impact 13: General disturbance on account of pedestrian movement and activities on site	Status	Negative	Moderate (3)	• Limit pedestrian/labour movement to within the confines of the site. • Appropriate signage and environmental induction are to be carried out in order to convey this point to onsite labourers (i.e. convey acceptable areas in which to traverse within the subject site).	Low (4)	High

7.2.1 Operational Phase:

The following potential impacts during the Operational Phase can be summarised:

Potential Impact 14: Continued alteration of habitat structure and composition on account of continuing low-level anthropogenic impacts, such as "shading of vegetation" from arrays.

This impact will be of moderate significance as drivers will alter within the PV facilities on account of the exclusion of the animal element of the system as well as other management interventions (e.g. washing of PV modules). The impact may however not necessarily be "negative" if some faunal components are retained and management of the facility is ecologically driven". These mitigation measures would reduce the impact from Moderate (3) to Low (4).

Potential Impact 15: Ousting (and recruitment) of various fauna on account of long-term changes in the surrounding habitat/environment

As some drivers have changed on site, this will favour certain fauna and alter faunal ethos. It follows that small ecological shifts may transpire within the region and particularly within the PV facilities and powerline corridors. Such impacts may not necessarily be negative, however there is likely to be some short-term changes in populations of specific species or possible introduction of undesirable species (e.g. Rattus rattus – house rat). Exclusion areas should be maintained. Maintain scarp slopes and ensure that they are unimpeded by the proposed development. Mitigation of this impact would result in a low rating.

Potential Impact 16: Changes in the geomorphological state of the subject site on account of long-term climatic changes and the concomitant change in the nature of the catchment arising from the land use change

As climatic factors change within the region, natural bio-physical responses, including changes in habitat or faunal population shifts may be affected on account of the presence of the PV facilities and power line corridors. This impact is considered "low" significance on account of the generally limited extent of the site in relation to surrounding habitats. Mitigation measures include the cordoning off the sites to prevent inward migration of fauna as well the implementation of other general management principles as per the EMPr.

Potential Impact 17: Changes in water resources and water quality (i.e. impact on water chemistry) as a result of operational activities

Such changes to water resources and quality will be related to the long-term activities on site, but are likely to be negligible. Alteration in water quality are surmised to stem primarily from unintended hydrocarbon leaks from operating vehicles and other machinery on site. However, impacts of this nature during the operational phase are considered to be of "low" significance with mitigation measures including to retain spill kits on site.

Potential Impact 18: Exotic weed invasion as a consequence of regular and continued disturbance of site.

As per the construction phase, exotic weed invasion is likely to arise on account of ongoing disturbance. If managed correctly through the implementation of a weed eradication plan, this impact can be classified as "low" significance.

7.2.1.1 Impact Summary Tables: Operational Phase

The impact ratings are described in this section for the operational phase.

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
OPERATIONAL PHASE – Direct Impacts						
Impact 14: Continued alteration of habitat structure and composition on account of continuing low level anthropogenic impacts, such as "shading of vegetation" from arrays	Status	Neutral	Moderate (3)	• Ensure that the faunal components are retained and management of the facilities are ecologically driven. • Implement other general management principles as per the EMPr.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
Impact 15: Ousting (and recruitment) of various fauna on account of long-term changes in the surrounding habitat/environment	Status	Negative	Moderate (3)	• Exclusion areas should be maintained. Maintain scarp slopes and ensure that they are unimpeded by the proposed development. • Avoid extensive alteration of sheet wash areas. • Implement other general management principles as per the EMPr.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
Impact 16: Changes in the geomorphological state of the subject site on account of long-term climatic changes and the concomitant change in the nature of the catchment arising from the land use change	Status	Negative	Low (4)	• Exclusion areas should be maintained. Maintain scarp slopes unimpeded by development. Avoid extensive alteration of sheet wash areas. • Cordon off the sites to prevent inward migration of fauna • Implement other general management principles as per the EMPr	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
Impact 17: Changes in water resources and water quality (i.e. impact on water chemistry) as a result of	Status	Negative	Low (4)	• All stagnant/parked vehicles operating within the site are to have a drip tray placed underneath the engine. • A spill kit is to be placed onsite in order to limit any impact	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Moderate				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
operational activities	Probability	Likely		• Limit access to the riverine areas.		
	Reversibility	Low				
	Irreplaceability	Low				
Impact 18: Exotic weed invasion as a consequence of regular and continued disturbance of site	Status	Negative	Low (4)	• Implementation of a weed eradication plan	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				

7.2.2 Potential Impacts during the Decommissioning Phase

The following potential impacts during the Decommissioning Phase can be summarised:

Potential Impact 19: A reversion to an early seral stage
Once decommissioning has taken place, much of the affected area may revert to an early seral stage, although it is anticipated that some vegetation may have entered higher seres on account of the limitation of grazing. Mitigation measures include the specific rehabilitation of the site throughout the overall development and operation foot print. This impact is not considered to be significant and may be classed as “low” significance.

Potential Impact 20: A reversion to present faunal population states within the study area, with some variation to these populations being possible.
On account of both the abovementioned seral state of the land as well as other factors, decommissioning and reversion to a land use, akin to the present, should see some alteration of faunal populations and a reversion to present populations with some ousting and recruitment of species. This impact is rated as “low” significance before and after the implementation of management actions such as 1) ensure that there is appropriate disposal of materials and waste during decommissioning activities as well as 2) manage stabilisation and reinstatement of the land.

Potential Impact 21: Changes in the geomorphological state of drainage lines as hydraulic changes arise within the catchment
The decommissioning of the site and reversion to the present land use, may see some alteration of drainage patterns and general surface hydraulics. This impact is rated as “low” significance.

Potential Impact 22: Exotic weed invasion as a consequence of abandonment of site and cessation of weed control measures.
Disturbance to the site through cessation and decommission of activities may result in further proliferation of any existing exotic species on site. Thus, weed eradication should continue post decommissioning of the project to ensure limited spread of exotic species. This mitigation would maintain the impact as low.

7.2.3 Impact Summary Table: Decommissioning Phase

The impact ratings are described in this section for the decommissioning phase.

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
DECOMMISSIONING PHASE – Direct Impacts						
Impact 19: A reversion to an early seral stage	Status	Neutral	Low (4)	• Ensure that there is appropriate disposal of materials and waste during decommissioning activities • Manage stabilisation and reinstatement of the land	Low (4)	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
Impact 20: A reversion to present faunal population states within the study area, with some variation to these populations being possible	Status	Neutral	Low (4)	• Ensure that there is appropriate disposal of materials and waste during decommissioning activities • Manage stabilisation and reinstatement of the land	Low (4)	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
Impact 21: Changes in the geomorphological state of drainage lines as hydraulic changes arise within the catchment	Status	Neutral	Low (4)	• Cordon off access to dendritic drainage lines.	Low (4)	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
Impact 22: Exotic weed invasion as a consequence of abandonment of site and cessation of weed control measures	Status	Neutral	Low (4)	• Post bi-yearly monitoring of the site to hinder proliferation of exotic species as a result of the development	Low (4)	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				

7.2.4 Indirect Impacts

The following indirect impacts are anticipated to be associated with the establishment of the PV Facilities, EGI and associated infrastructure on the farm Grootfontein. Indirect impacts arising from the establishment of the site are likely to be of low significance, and generally latent in nature.

Potential Impact 23: Changes in the broader landscape ecology through alteration of eco-morphological drivers

The development of the PV facilities on Grootfontein may alter habitat form and structure beyond the boundaries of the PV facilities as support infrastructure (e.g. roads) are established, or as physical or biological factors change (e.g. drainage patterns change or grazing pressures increase at other points). The impacts may however prove to be of low impact significance.

The decommissioning of the site and reversion to the present land use, may see some alteration of drainage patterns and general surface hydraulics. This impact is considered to be "low" significance.

Potential Impact 24: Changes in faunal ethos due to the establishment of the PV Facilities

Changes in faunal ethos on account of the establishment of the PV facilities on Grootfontein, some faunal populations may emigrate from the area, while others may favour other factors around the site. Behavioural change in faunal populations will drive ecological change beyond the boundaries of the PV Facilities. This impact is rated as "low" significance without and with the implementation of mitigation measures.

7.2.5 Impact Summary Table: Indirect Impacts

The impact ratings for indirect impacts are described in this section.

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
Operational Phase – Indirect Impacts						
Potential impact 23. Changes in broader landscape ecology through alteration of eco-morphological drivers.	Status	Neutral	Low (4)	• Appropriate management of the site must be undertaken along ecological integration approaches. • Cordon off access to dendritic drainage lines	Low (4)	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
Potential impact 24. Changes in faunal ethos due to the establishment of the PV Facilities	Status	Neutral	Low (4)	• Implementation of security fencing is likely to arise.	Low (4)	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				

7.2.6 Cumulative Impacts stemming from both the construction and operational phases of the development

The cumulative assessment also considers all nine proposed PV plants and nine power lines as part of this suite of developments (referred to as the Ceres PV Development) (i.e. two PV facilities are being proposed on the farm Witte Wall 171; three PV Facilities are being proposed on the farm Grootfontein 149; and four PV Facilities will be constructed on the Farm Hoek Doornen 172). As noted above, notably there are approximately 11 authorised renewable energy projects on some 50 000 ha of land within 30 km of the subject site (Figure 25). The majority of these projects employ wind turbines, which present fundamentally different impacts and externalities that may affect the broader ecology of the region, although three smaller sites located some 30 km south of Grootontein will employ PV technology for power generation. The cumulative impact assessment also considers other proposed, approved and existing power lines within the 30 km radius. Given the above, cumulative impacts arising from the implementation of the proposed projects and other land use changes in the region are likely to exhibit the following:

Potential impact 25. Alteration of habitat structure and composition, albeit primarily sporadic in nature, over an extensive and wide area

This impact would be extensive, being associated with the exclusion of fauna from extensive ranges within the area and the apparent change in some ecological drivers within PV facilities. The impact is however to be considered only of low negative significance as some beneficiation may arise from this state. However, construction should be limited to the approved development footprint and clearance of vegetation should take place only where necessary to ensure this impact is low.

Potential impact 26. Changes in fauna, faunal ethos and related factors

Faunal populations through exclusion of certain species and beneficiation of others over an extensive and wide area – primarily on account of change in habitat as well as the implementation of security fencing is likely to arise. In addition, as the range of most larger vertebrate populations may change across the broader area, this too will affect faunal ethos and impact on localized ecology at points. This impact could be considered “moderate” but may also offer some beneficiation, particularly where habitat improvement arises within the region whereas post mitigation this impact is considered to be ‘low’.

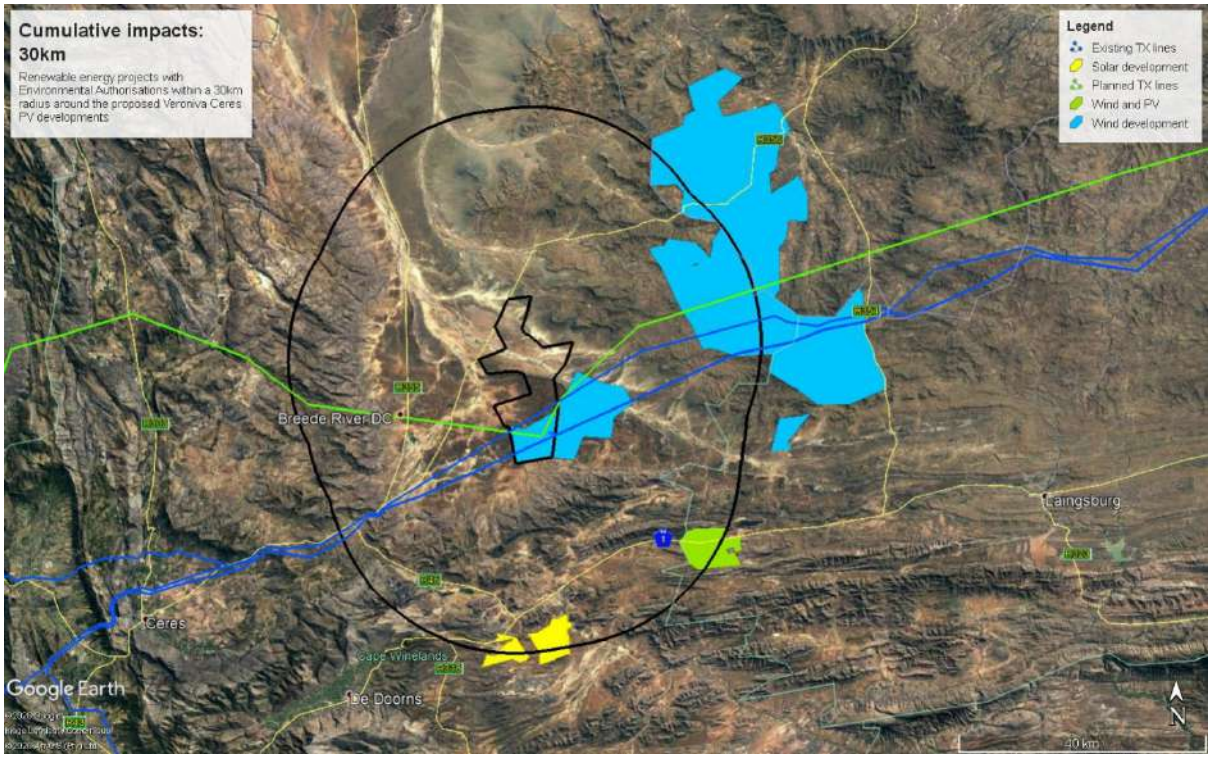

Figure 25. Map indicating renewable energy projects within 30 kilometres of the project site (van Rooyen, 2020)

Potential impact 27: Increased change in the geomorphological state of drainage lines and watercourses on account of long term and extensive change in the nature of the catchment

This impact will be a long term impact which may be considered "negative" but of low significance. Additional hard panning as a result of the establishment of the PV facilities and associated infrastructure contributes to the change in the geomorphological state of the drainage lines. Stormwater controls are to be incorporated into the development to ensure attenuation of flow.

Potential Impact 28: Changes in water resources and surface water in terms of water quality (i.e. impact on water chemistry) on account of extensive changes in the catchment

Excessive run off and potential hydrocarbon spills from vehicles and plant may enter into the water sources and alter such water quality. The consequence of this impact is rated as moderate, and the probability is rated as likely, resulting in a low significance before and after mitigation. The mitigation measures provided below are to be carried out.

Potential impact 29. Exotic weed invasion as a consequence of regular and continued disturbance across an extensive area of site.

This impact is likely to be driven by levels of disturbance across the site. Sound site management at each project should avert extensive AIP establishment on site, but is likely to be common place across the region. This impact is considered to be of a low significance, however the implementation of an eradication plan is recommended to be carried out to ensure this impact is low.

7.2.7 Impact Summary Table: Cumulative Impacts

The impact ratings are described in this section for the cumulative impacts during the construction and operation phase.

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
Construction and Operational phase – Cumulative Impacts						
Impact 25: Alteration of habitat structure and composition, albeit primarily sporadic in nature, over an extensive and wide area	Status	Negative	Low (4)	• Ensure construction is limited to the approved development footprint • Clear vegetation only where necessary.	Low (4)	High
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				
Impact 26: Changes in fauna, faunal ethos and related factors	Status	Negative	Moderate (3)	• Allow for permeability in fence line for greater ease of migration for fauna.	Low (4)	High
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				
Impact 27: Increased change in the geomorphological state of drainage lines and watercourses on account of long term and extensive change in the nature of the catchment	Status	Negative	Low (4)	• Ensure storm water controls are adequately attenuate storm water runoff. • Limit scour and erosion	Low (4)	High
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				
Impact 28: Changes in water resources and surface water in terms of water quality (i.e. impact on water chemistry) on account of extensive changes in the catchment	Status	Negative	Low (4)	• All stagnant/parked vehicles operating within the site are to have a drip tray placed underneath the engine. • A spill kit is to be placed onsite in order to limit any impact • Limit access to the riverine areas.	Low (4)	High
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
	Irreplaceability	Low				
Impact 29: Exotic weed invasion as a consequence of regular and continued disturbance across an extensive area of site	Status	Negative	Low (4)	• Co-ordinated and sustained management of all nine PV and EGI Projects associated with this BA	Low (4)	High
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				

8 Impact Assessment Summary

The overall impact significance (with the implementation of mitigation measures) associated with the PV facilities and the electrical powerlines is presented below (Table 5 and Table 6, respectively). The overhead power line will also traverse the Groot River and in this regard, reference should be made to the separate Aquatic Biodiversity and Species Assessment.

Table 5: Overall Impact Significance (Post Mitigation) of the proposed PV facilities and associated infrastructure

Phase	**Overall Impact Significance**
Construction	Moderate
Operational	Low
Decommissioning	Low
Nature of Impact	**Overall Impact Significance**
Cumulative - Construction	Low
Cumulative - Operational	Low
Cumulative - Decommissioning	Neutral

Table 6: Overall Impact Significance (Post Mitigation) of the proposed EGI to support the PV Facilities

Phase	**Overall Impact Significance**
Construction	Moderate
Operational	Low
Decommissioning	Low
Nature of Impact	**Overall Impact Significance**
Cumulative - Construction	Low
Cumulative - Operational	Low
Cumulative - Decommissioning	Neutral

9 Legislative and Permit Requirements

The proposed establishment of the Grootfontein PV 1, Grootfontein PV 2, and Grootfontein PV 3 facilities, associated infrastructure and EGI on the subject site are considered to elicit a requirement for compliance with the following legislation.

1. The National Environmental Management: Biodiversity Act (Act 10 of 2004, as amended)

The National Environmental Management: Biodiversity Act (Act 10 of 2004, as amended) (NEMBA) may be applicable to site, particularly in respect of matters pertaining to threatened or protected species encountered on or around the sites or the matter of redress of AIPs. This may apply in respect of the establishment of the powerlines across the riverine habitats.

2. The National Water Act (Act 36 of 1998)

As noted above, the proposed Grootfontein PV 1, Grootfontein PV 2 and Grootfontein PV 3 facilities are considered to be suitably set back from the riparian environments associated with both the Groot River and the Klein Droelaagte Rivers and as such, maintain these riverine environments as both a faunal and intermittent hydrological pathway and corridor as well as offering improved refugia for fauna. The sensitivity map in Figures 11 and 12 indicates that for the Grootfontein PV 1, Grootfontein PV 2 and Grootfontein PV 3 projects, areas of terrestrial importance and a "buffer" at the interface of the terrestrial and riparian areas have been demarcated, which approximates 100 m and includes areas of sheet wash and flood extremes. In addition, no wetland environments are associated with the PV and associated infrastructure development footprints (including the powerlines).

The powerlines will, however, cross the Klein Droelaagte River and Groot River and would require the establishment of one or two towers within the riparian environment of the Groot River. The Klein Droelaagte can be easily traversed by the powerlines. In addition, one of the options of the access road leading to the Grootfontein PV 1, Grootfontein PV 2 and Grootfontein PV 3 sites (i.e. Option 1) would need to be upgraded as part of the proposed projects. Sections of the access road upgrade may take place within 100 m of the Droelaagte River. However, if the alternative option to access the Grootfontein PV sites is used, then this will be greater than 100 m away from the Klein Droelaagte River and Groot River.

The requirement for a General Authorisation or Water Use License in terms of Section 21 (c) and 21 (i) of the National Water Act may be required where activities arise within the bed of the river in respect of the establishment of towers for the overhead powerlines and the road upgrading. Therefore, the following projects likely require a Water Use License or similarly a General Authorisation:

- Grootfontein PV 1 – for the access road upgrade using Road Access 1 and power line specifically;
- Grootfontein PV 2 – for the access road upgrade using Road Access 1 and power line specifically; and
- Grootfontein PV 3 – for the access road upgrade using Road Access 1 and power line specifically.

The Department of Human Settlements, Water and Sanitation are to confirm such prerequisite legal requirements.

3. The National Forest Act (Act 84 of 1998)

The clearance of "natural forest" may be applicable, where, particularly in the establishment of the power line that traverses the Groot River, there may be the requirement to remove associations of V karoo. Although not strictly "forest" in ecological terms, the *contiguous canopy* definition of forest would apply under Section 7 of the National Forest Act (Act 84 of 1998).

4. The Cape Nature and Environmental Conservation Ordinance 19 of 1974 (also the Western Cape Nature Conservation Laws Amendment Act (2000))

This act should be given consideration following EA with particular respect to Chapters IV, (The protection of wild animals other than fish) and Chapter VI, (The protection of flora). The requirement for permits when removing and relocating specific flora that may be encountered or alternatively addressing fauna that may be encountered around the sites would require due consideration. A

review of site prior to the commencement of construction will confirm the need for application in terms of the Ordinance.

5. Draft Western Cape Biodiversity Bill, 2019.

This law has not been promulgated however some aspects of Chapter 7, in particular may apply to the sites, once promulgated.

In consideration of the applicable legislation listed above, it is important to note that the requirement for approval is to be confirmed by the competent authority on the matter.

6. The National Environmental Management Act 107 of 1998

The establishment of PV facilities and associated infrastructure within 32 meters of a water course as well as within areas designated CBA require EA as such activity's 'trigger' listed activities in the 2014 NEMA EIA Regulations.

10 Environmental Management Programme Inputs

Reference is made to the EMPR in respect of the terrestrial environment at Grootfontein. The following key management interventions are proposed for the Grootfontein PV 1, Grootfontein PV 2, and Grootfontein PV 3, should they be approved. Further detail on these actions is proposed in the EMPr.

- Avoidance of major drainage lines identified in the report, in particular, the Groot River. The development footprint should align with the recommended / approved layout in Figures 20, 21 and 22.

- Avoidance of excessive clearance of vegetation within the site, with restriction to roads, substations and laydown areas and related built structures;

- Management of exotic weed invasion that may arise at points.

- Management of fauna within the site and surrounds, as well as the incorporation of "wildlife porosity" into fence lines and the implementation of measures on the energised fence line to avoid mortalities to wildlife See Figure 26 below.

- Suitable stormwater management measures to redress excessive surface flows from site towards drainage lines

- General land management practices to avoid excessive erosion, dust emissions and possible sources of pollution to ground and surface water resources.

Figure 26. Image showing "critter path" within electrified fence. Similar measures should be implemented on the site.

10.1 Powerline/electrical grid infrastructure

General management measures associated with the powerlines are akin to those associated with this Terrestrial Biodiversity and Species Assessment as much of the powerlines lie within this environment. Howsoever, the management principles associated with the traversing of the river systems are of some significance and reference to the Aquatic Biodiversity and Species Assessment and EMPr is required. Nonetheless, the primary issues that should be incorporated into the management of the powelines are:

- Tower footings should be subject to review by the ECO or an ecologist prior to the commencement of construction;
- Plant rescue operations should be implemented where species of ecological significance are encountered or identified;
- Service roads associated with the powerline routes should be suitably designated to ensure that vehicles remain within these routes; and
- Minimum driving speeds should be implemented for all vehicles utilising these roads, (<30km/h).

11 Final Specialist Statement and Authorisation Recommendation

11.1 Statement and Reasoned Opinion

Given the information presented above it is evident that should the Applicants establish the proposed development within the identified footprint on Grootfontein that Grootfontein PV 1, PV 2, and PV 3 may proceed with limited impact on the broader ecological processes and those areas deemed to be of ecological significance (namely the lower riparian environments and sand wash environments).

It therefore follows that:

- Grootfontein PV 1
- Grootfontein PV 2 and
- Grootfontein PV 3

show a low level ecological impact within the sites identified and subject to the implementation of the prescribed management recommendations and conditions should not be precluded from development on ecological grounds.

11.2 EA Condition Recommendations

Should the mandated authorities approve the proposed development, the following broad management recommendations are recommended for incorporation into the EA:

- Maintenance and establishment of an ambulatory set back of >100m from the identified riparian areas and points of sheet wash as per the layout plan presented

- That construction and establishment of modules be undertaken without the clearance of vegetation. Where vegetation proves excessively tall and effects either construction or operation, pruning may be effected.

- A detailed stormwater management and drainage plan be developed that considers inter alia, surface flows arising from elevated areas above the PV facility and its discharge from the facility. This philosophy must include attenuation and energy dissipation mechanisms and redress of erosion and sheet flow across site.

- The laydown area for the PV facilities should be subject to compaction and the use of dust suppressants when in operation, to prevent excessive particulate matter becoming airborne.

- Management of fauna within the site and surrounds, as well as the incorporation of “wildlife” porosity into fencelines and the implementation of measures on the energised fenceline to avoid mortalities to wildlife

- Management of exotic weed invasion that may arise.

- A detailed plan relating to the limiting of ELP on site must be compiled.

- General land management practices to avoid excessive erosion, dust emissions and possible sources of pollution to ground and surface water resources.

It is our opinion that with the implementation of the above, the project proposal, subject to final design and adherence to the above recommendations, should be authorised.

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van Rooyen, C. and Froneman, A. 2020. Avifauna Assessment for the Proposed Development of two 175 MW Solar Photovoltaic Facilities (Witte Wall PV 1 and Witte Wall PV 2), and associated Electrical Grid Infrastructure near Touws River, Western Cape. Unpublished report prepared for Veroniva (Pty) Ltd, Cape Town: Chris van Rooyen Consulting.

APPENDICES

Appendix A - Specialist Expertise

NAME Simon Colin Bundy
PROFESSION Ecologist / Environmental Assessment Practitioner
DATE OF BIRTH 7 September 1966
MEMBERSHIP OF PROFESSIONAL BODIES: South African Council of Natural Scientific Professionals No. 400093/06 – Professional Ecologist
EDUCATION
BSc Biological Science (1990) University of Natal
Diploma Project Management (1997) Executive Education
MSc (2004) University of KwaZulu Natal
PhD. Candidate: Department of Engineering, University of Kwa Zulu Natal
1998: Guest of Konrad Adenhauer Foundation to Berlin to consider "sustainable development initiatives" in Europe
2000: Training course: "Environmental Economics and Development". University of Colorado (Boulder) USA.
2008: Certificate in Coastal Engineering: Stellenbosch University

KEY COMPETENCIES AND EXPERIENCE

Simon Bundy has been involved in environmental and development projects and programmes since 1991 at provincial, national and international level, with employment in the municipal, NGO and private sectors, providing a broad overview and understanding of the function of these sectors. With a core competency in coastal ecological systems and coastal management, Bundy has worked on coastal projects in the Seychelles, Mozambique, Mauritius and Tanzania as well as South Africa, providing ecological and general environmental advice and support. In addition, Bundy has worked in Rwanda, Lesotho and Zambia. Within South Africa, Bundy has been involved in a number of large-scale mega power projects as well as the development of residential estates, infrastructure and linear developments in KwaZulu Natal, Eastern Cape and Western Cape. In such projects Bundy has provided both technical support, as well as the undertaking of rehabilitation programmes.

From a technical specialist perspective, Bundy focusses on coastal ecological systems in the near shore environment and is competent in a large number of ecological and analytical methods including multivariate analysis and canonical analysis. Bundy is competent in wetland delineation and has formulated ecological coastal set back methodologies for EKZN Wildlife and for the Department of Economic Development Tourism and Environmental Affairs in conjunction with the Oceanographic Research Institute. In 2015, Bundy formulated the coastal set back line method for the iSimangaliso Wetland Park, funded by the Global Environment Fund of the United Nations. Bundy acts as botanical and environmental specialist for Eskom Eastern Region and provides technical support to the IEM division of the Council for Scientific and Industrial Research, Stellenbosch.

SELECTED RELEVANT PROJECT EXPERIENCE

Task Team Chair and Project Ecologist: Task Team for Coastal Disaster Management, KwaDukuza 2007 - 2011
Management of coastal rehabilitation, re-engineering and clean-up programme immediately following March storm event of 2007. Activities included introduction of geofabric bag protection options, coastal retreat implementation policy development.
Environmental Assessment Practitioner Project Ecologist: eThekweni Municipality – evaluation of impacts and rehabilitation recommendations 2007.

Evaluate the impact of the 2007 storm event on coastal infrastructure along the eThekweni coastline with recommendations on rehabilitation. Undertake application to Provincial and National Departments for rehabilitation in terms of NEMA

Ecological investigations Tongaat and Illovo Desalination Plants: CSIR – (2013 - 2016)

Review of eco-physiological state of the coastal environments in and around the proposed Illovo and Tongaat desalination plants for associated EIA process.

Ecological Review and Rehabilitation Planning: Sodwana Bay: iSimanagaliso Wetland Park Authority – (2014 - 2015)

Analysis and review of state of dune cordon in and around Sodwana Bay with modelling of the impacts of removing exotic trees from site to rejuvenate dune and beach dynamics

Review of Project Leader and Coastal Specialist: Addington Farm Strategic Environmental Assessment (2016)

Evaluation of coastal habitat and beach-dune interface for the generation of setback lines for the proposed Addington Farm residential development.

Aquatic and Ecological evaluation of the impacts of in-water hull cleaning, Port Louis, Mauritius and Port of Durban – Aquatech / Divetech Solutions(2014 to date)

Investigations and review of the chemo-physical impact of in-water hull cleaning in the Durban and Port Louis Ports for accreditation with the International Maritime Organisation.

Coastal ecological evaluation of the Van Riebeeckstrand coastline, Cape Town for the establishment of inter-continental telecommunication cables. Acer Africa (2016)

Specialist investigation into the impact of establishing marine cables at Van Riebeeckstrand Cape Town for MTN. Client: Acer Africa.

Review and report on impact of the Fairbreeze Mine at Mtunzini on aquaculture operations at Mtunzini Aquaculture – Supporting document for legal argument presented on behalf of Mtunzini Aquaculture. (2017)

Specialist review and investigation of groundwater discharge and dune mobility at Siyaya, Mtunzini and its effect on the marine intake supplying the Mtunzini Fish Farm. Client: Mtunzini Fish Farm / Eversheds

Coastal ecological evaluation of the Margate – Lucien Beach sewer reticulation and outfall, Hibiscus Coast KZN. Client: Enaq (2018)

Specialist investigation into the impact of waste water discharge at Lucien Beach, Margate and recommendations on discharge points for additional works.

Ecological evaluation and monitoring: Plastic pellet (nurdles) clean-up MSC Susanna Marine Pollution Event: West of England Insurance, United Kingdom (2018 - 2019)

Location, evaluation and monitoring of plastic pellets within the coastal habitats between Durban and Richards Bay with Resolve Marine, AR Brink and Assoc's and Drizit Environmental. Objective is to maintain a defendable but efficient level of pellet contamination across coastline.

Rehabilitation Projects: (2010 - 2015)

- Dune rehabilitation of Durban Harbour southern breakwater 2009 – 2010 for Group 5. Sculpt, establish and maintain.
- Mangrove forest rehabilitation of Hugh Dent pump station 2015 for Sembcorp Siza Water.
- Dune rehabilitation of Ballito beachfront 2009 for KwaDukuza Municipality, following 2007 storm surge event
- Ulundi TSC rehabilitation for Eskom Eastern Region, 2016
- Mangethe substation rehabilitation of area for Eskom Eastern region, 2016.

PUBLICATIONS

Bundy S C. 2018 "The great coastal conservation conundrum". EKZNWildlife Conservation Symposium

Smith AM, Bundy SC, Cooper (2016) "Apparent dynamic stability of the south east African coastline, despite sea level rise" Earth Surface Processes and Landforms DOI 10. 1002

Bundy, S. C. and Forbes, N. T., 2015. *"Coastal dune mobility and their use in establishing a setback line*" 9th West Indian Ocean Marine Science Conference 2015
Smith AM, SC Bundy 2012 "Review of Coastal Defence Systems in Southern Africa" Article for Springer Scientific Publications through Ulster University, Pilkey and Cooper
Bundy, S. C., Smith, A. M., Mather, A. A. 2010. "Dune retreat and stability on the Northern Amanzimtoti Dune Cordon", EKZN Wildlife Conservation Symposium 2010
Smith, A Mather AM Bundy SC, Cooper AS Guastella L, Ramsay PJ and Theron A; 2010 "*Contrasting styles of swell-driven coastal erosion: examples from KwaZulu-Natal, South Africa*" Geology Journal", Cambridge University Press
Bundy SC AM Smith, (2009) "*A Review of Select Dune Rehabilitation Initiatives and a Proposed Methodology towards Ensuring a Prudent Approach towards the "Greening of Dunes*" VI International Sandy Beaches Symposium Emphakweni Port Alfred
Bundy, S. C. and Smith, A. M. 2009 *"Analysis of the Recovery of Two Separate Coastal Dune Systems Following the 2006 – 2007 Marine Erosion Event and Assessment of the Artificial Dune System in Coastal Management*" KZN Marine and Coastal Management Symposium, Durban South Africa.
Smith A and Bundy S 2009 "*Coastal erosion: reparative work on the Ballito coastline, KwaZulu-Natal, South Africa, was it enough?*" 2009 International Multi-Purpose Reef and Coastal Conference, Jeffrey's Bay South Africa
Smith A, Mather A, Theron A, S Bundy 2008 **"***The 2006-2007 KwaZulu – Natal Coastal Erosion Event in Perspective*" 2009 Contribution to the South African Environmental Observation Network publication "Climate Change in Southern Africa"

Name:	Alexander Michael Whitehead
Profession:	Environmental Consultant/Ecologist
Date of Birth:	30/08/1983
Current Employment:	Sustainable Development Projects cc
Position:	Ecologist/Environmental Consultant
Years of experience:	14
Nationality:	South African
Email address:	alex@ecocoast.co.za
Tertiary Qualifications:	BSc (Hons.) Ichthyology and Fisheries Science (Rhodes University)

Professional Affiliations:

South African Council for Natural Scientific Professions – Reg. No. 400176/10 (Ecological Science)

Key Skills and experience:

- Computer skills – (MS Word, STATISTICA, Excel, MS Access, PRIMER 5 (multivariate statistical program), CAP 4 (multivariate statistical program));
- Bioassessment - Experience in sampling aquatic invertebrates (SASS 5) and ichthyofauna (Electrofishing and estuarine sampling techniques);
- Water quality - Experience in carrying out water samples and interpreting results in both freshwater and estuarine environments;
- Wetland and riparian habitat delineation – Delineation of wetland and riparian areas using accepted methods (DWAF 2005, 2008);

- Wetland functionality assessments – Assessment of wetland functionality using ecological indicators and standard methods such as Wet-Ecoservices and Wet-Health.
- Aquatic assessments – Assessment of freshwater ecosystems using bioassessment/sampling protocols, water quality data and ecological indicators.
- Terrestrial ecological assessments – General biodiversity assessments and identification of sensitive habitats.
- Alien invasive plant management
- Environmental Impact Assessment (EIA) and Basic Assessment (BA) Processes –
- Environmental management – Compilation of practical EMPr documents and environmental management processes.
- Rehabilitation – Compilation of wetland and terrestrial rehabilitation plans as well as practical experience in planning and conducting weed eradication and re-vegetation programs.
- Environmental monitoring and auditing –
- Open space and conservation planning – Identification of areas of open space or conservation importance.
- Botanical/protected species permits and Risk Assessments – Permit applications under the National Forest Act (84 of 1998), Natal Nature Conservation Ordinance (15 of 1973) and National Environmental Management: Biodiversity Act (10 of 2004).

Name:	Luke Patrick Maingard
Profession:	Environmental Consultant/Ecologist
Date of Birth:	15/09/1993
Current Employment:	SDP Ecological and Environmental Services cc
Position:	Ecologist/Environmental Consultant
Years of experience:	5
Nationality:	South African
Email address:	Luke@ecocoast.co.za
Tertiary Qualifications:	BSc (Hons.) Environmental Science (Rhodes University)

Professional Affiliations:

South African Council for Natural Scientific Professions – (Ecological Science)

Key Skills and experience:

- Geographic Information Systems
- Wetland and riparian habitat delineation – Delineation of wetland and riparian areas using accepted methods (DWAF 2005, 2008);
- Terrestrial ecological assessments – General biodiversity assessments and identification of sensitive habitats.
- Alien invasive plant management
- Environmental legislation
- Storm water control and management design and implementation
- Environmental Impact Assessment (EIA) and Basic Assessment (BA) Processes –

    - Environmental management – Compilation of practical EMPr documents and environmental management processes.
    - Environmental Control Officer to numerous construction sites
    - Data management and analysis
- Aquatic assessments – Assessment of freshwater ecosystems using bioassessment/sampling protocols, water quality data and ecological indicators.

Appendix B - Specialist Statement of Independence

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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

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

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

PROJECT TITLE

Basic Assessments for the Proposed Development of three 175 MW Solar Photovoltaic Facilities and associated Electrical Grid Infrastructure (i.e. Grootfontein 1; Grootfontein 2; and Grootfontein 3), near Touws River, Western Cape

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

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

1. SPECIALIST INFORMATION

Specialist Company Name:	SDP Ecological & Environmental Services			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	ex	Percentage Procurement recognition	
Specialist name:	Simon C Bundy			
Specialist Qualifications:	BSc MSC Dip Proj Man			
Professional affiliation/registration:	SACNASP			
Physical address:	6 Salisbury Road, Ballito			
Postal address:	P O Box 1016, Ballito			
Postal code:	4420	Cell:	082 446 4847	
Telephone:	032-586 1218	Fax:		
E-mail:	simon@ecocoast.co.za			

2. DECLARATION BY THE SPECIALIST

I, ___Simon C Bundy_____, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

S. D. [illegible]
P.O. BOX 1016, BALLITO
TEL: 032 946 [illegible]

Name of Company:

17/11/20
Date

3. **UNDERTAKING UNDER OATH/ AFFIRMATION**

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

Signature of the Specialist

SDP Ecological

Name of Company

17/11/20

Date

Signature of the Commissioner of Oaths

Date

COMMISSIONER OF OATHS
ASHLEY PUCCAY
BRANCH MANAGER: ZAMBALI
SHOP 28, LIFESTYLE CTR
BALLITO 4420
DATE: 18/11/2020

Appendix C: Site Sensitivity Verification

Prior to commencing with the Terrestrial Biodiversity Specialist Assessment in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity (Government Notice 320, dated 20 March 2020), a site sensitivity verification was undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

The details of the site sensitivity verification are noted below:

Date of Site Visit	12 – 18 September 2020
Specialist Name	S C Bundy
Professional Registration Number	
Specialist Affiliation / Company	SDP Ecological & Environmental
Date of Site Visit	12 – 18 September 2020
Specialist Name	L P Maingard
Professional Registration Number	
Specialist Affiliation / Company	SDP Ecological & Environmental

Site sensitivity verification was undertaken using the following means:

1. Preliminary desktop analysis achieved by reviewing and overlaying a variety of geospatial data. Review of literature and general review of planning information
2. On site traverse of site by vehicle and by foot
3. Establishment of camera traps
4. Interaction with local residents with specific knowledge of site
5. Determination and consideration of ecological drivers including soils, slope, hydrology etc.

   Review of the above led to the confirmation that the site shows general conformation with the screening tool.

Appendix D: Impact Assessment Methodology

The following impact assessment methodology was adopted:

- *the nature, significance and consequences of the impact and risk;*
- *the extent and duration of the impact and risk;*
- *the probability of the impact and risk occurring;*
- *the degree to which impacts and risks can be mitigated;*
- *the degree to which the impacts and risks can be reversed; and*
- *the degree to which the impacts and risks can cause loss of irreplaceable resources.*

As per the DEFFT Guideline 5: Assessment of Alternatives and Impacts, the following methodology is applied to the prediction and assessment of impacts and risks. Potential impacts and risks have been rated in terms of the direct, indirect and cumulative:

- *Direct impacts are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.*
- *Indirect impacts of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.*
- *Cumulative impacts are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.*

The impact assessment methodology includes the following aspects:

- *Nature of impact/risk - The type of effect that a proposed activity will have on the environment.*

- *Status - Whether the impact/risk on the overall environment will be:*
    - *Positive - environment overall will benefit from the impact/risk;*
    - *Negative - environment overall will be adversely affected by the impact/risk; or*
    - *Neutral - environment overall not be affected.*

- *Spatial extent – The size of the area that will be affected by the impact/risk:*
    - *Site specific;*
    - *Local (<10 km from site);*
    - *Regional (<100 km of site);*
    - *National; or*
    - *International (e.g. Greenhouse Gas emissions or migrant birds).*

- *Duration – The timeframe during which the impact/risk will be experienced:*
    - *Very short term (instantaneous);*
    - *Short term (less than 1 year);*
    - *Medium term (1 to 10 years);*
    - *Long term (the impact will cease after the operational life of the activity (i.e. the impact or risk will occur for the project duration)); or*
    - *Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient (i.e. the impact will occur beyond the project decommissioning)).*

- *Consequence – The anticipated consequence of the risk/impact:*
    - *Extreme (extreme alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they permanently cease);*
    - *Severe (severe alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);*

- *Substantial (substantial alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);*
- *Moderate (notable alteration of natural systems, patterns or processes, i.e. where the environment continues to function but in a modified manner); or*
- *Slight (negligible alteration of natural systems, patterns or processes, i.e. where no natural systems/environmental functions, patterns, or processes are affected).*

- *Reversibility of the Impacts - the extent to which the impacts/risks are reversible assuming that the project has reached the end of its life cycle (decommissioning phase):*
  - *High reversibility of impacts (impact is highly reversible at end of project life i.e. this is the most favourable assessment for the environment);*
  - *Moderate reversibility of impacts;*
  - *Low reversibility of impacts; or*
  - *Impacts are non-reversible (impact is permanent, i.e. this is the least favourable assessment for the environment).*

- *Irreplaceability of Receiving Environment/Resource Loss caused by impacts/risks – the degree to which the impact causes irreplaceable loss of resources assuming that the project has reached the end of its life cycle (decommissioning phase):*
  - *High irreplaceability of resources (project will destroy unique resources that cannot be replaced, i.e. this is the least favourable assessment for the environment);*
  - *Moderate irreplaceability of resources;*
  - *Low irreplaceability of resources; or*
  - *Resources are replaceable (the affected resource is easy to replace/rehabilitate, i.e. this is the most favourable assessment for the environment).*

Using the criteria above, the impacts have been further assessed in terms of the following:

- *Probability – The probability of the impact/risk occurring:*
  - *Extremely unlikely (little to no chance of occurring);*
  - *Very unlikely (<30% chance of occurring);*
  - *Unlikely (30-50% chance of occurring)*
  - *Likely (51 – 90% chance of occurring); or*
  - *Very Likely (>90% chance of occurring regardless of prevention measures).*

To determine the significance of the identified impact/risk, the consequence is multiplied by probability (qualitatively as shown in Figure D.1).

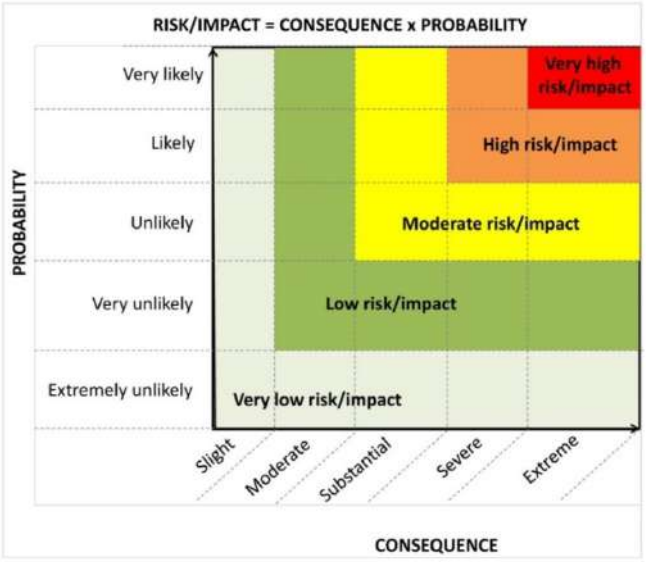

Figure D.1. Guide to assessing risk/impact significance as a result of consequence and probability.

- *Significance – Will the impact cause a notable alteration of the environment?*
    - *Very low (the risk/impact may result in very minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);*
    - *Low (the risk/impact may result in minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);*
    - *Moderate (the risk/impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated);*
    - *High (the risk/impact will result in major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making); and*
    - *Very high (the risk/impact will result in very major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making (i.e. the project cannot be authorised unless major changes to the engineering design are carried out to reduce the significance rating)).*

With the implementation of mitigation measures, the residual impacts/risks are ranked as follows in terms of significance:

- *Very low = 5;*
- *Low = 4;*
- *Moderate = 3;*
- *High = 2; and*
- *Very high = 1.*

Confidence – The degree of confidence in predictions based on available information and specialist knowledge:

- *Low;*
- *Medium; or*
- *High.*

Appendix E: Compliance with the Terrestrial Biodiversity Protocol (GN 320, 20 March 2020)

Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity	***Section where this has been addressed in the Specialist Report***
The assessment must provide a baseline description of the site which includes, as a minimum, the following aspects: *2.3.1. a description of the ecological drivers or processes of the system and how the proposed development will impact these;*	*Section 4*
2.3.2. ecological functioning and ecological processes (e.g. fire, migration, pollination, etc.) that operate within the preferred site;	*Section 4.2*
2.3.3. the ecological corridors that the proposed development would impede including migration and movement of flora and fauna;	*Section 4. The perceived corridors relate to riparian environments, which are excluded from the development footprint.*
2.3.4. the description of any significant terrestrial landscape features (including rare or important flora- faunal associations, presence of strategic water source areas (SWSAs) or freshwater ecosystem priority area (FEPA) sub catchments;	*Section 4*
2.3.5. a description of terrestrial biodiversity and ecosystems on the preferred 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;*	*Sections 4.1.1, 4.1.2 and 4.1.3* *a. Tanqua Karoo and Tanqua Wash River* *b. These systems are not threatened* *c. Connectivity relates to the riparian environments* *d. No significant species were identified or associated with the development footprints*
2.3.6. the assessment must identify any alternative development footprints within the preferred site which would be of a low" sensitivity as identified by the screening tool and verified through the site sensitivity verification; and	*Section 5 (Not applicable)*
2.3.7. the assessment must be based on the results of a site inspection undertaken on the preferred site and must identify: *2.3.7.1. terrestrial critical biodiversity areas (CBAs), including:* *a) the reasons why an area has been identified as a CBA;* *b) an indication of whether or not the proposed development is consistent with maintaining the CBA in a natural or near natural state or in achieving the goal of rehabilitation;* *c) the impact on species composition and structure of vegetation with an indication of the extent of clearing activities in proportion to the remaining extent of the ecosystem type(s);* *d) the impact on ecosystem threat status;* *e) the impact on explicit subtypes in the vegetation;* *f) the impact on overall species and ecosystem diversity of the site; and* *g) the impact on any changes to threat status of populations of species of conservation concern in the CBA;*	*Section 4.1.4* *1. The assessed area contains CBA and ESAs; however the actual development footprints for the PV facilities only infringe on ESAs. The power line corridor towards the middle and south contain ESAs and CBAs;* *2. The site is not critical to the maintenance of a CBA* *3. The development is not foreseen to impact on the remaining eco system type due to high levels of habitat transformation* *4. No change to ecosystem threat change is envisaged* *5. No "sub types" of vegetation were identified due to high levels of transformation* *6. Ecosystem diversity may*

Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity	*Section where this has been addressed in the Specialist Report*
	improve in some respects, while change on account of exclusion from areas may alter faunal movement *7. No change to populations in general are expected from the proposed development*
2.3.7.2. terrestrial ecological support areas (ESAs), including: *a) the impact on the ecological processes that operate within or across the site;* *b) the extent the proposed development will impact on the functionality of the ESA; and* *c) 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;*	*Section 4.1.4*
2.3.7.3. protected areas as defined by the National Environmental Management: Protected Areas Act, 2004 including- *a) an opinion on whether the proposed development aligns with the objectives or purpose of the protected area and the zoning as per the protected area management plan;*	*The project area is not within or adjacent to a protected area (Section 4.4)*
2.3.7.4. priority areas for protected area expansion, including- *a) the way in which in which the proposed development will compromise or contribute to the expansion of the protected area network;*	*The site does not lie within an area identified for protected area expansion*
2.3.7.5. SWSAs including: *a) the impact(s) on the terrestrial habitat of a SWSA; and* *b) the impacts of the proposed development on the SWSA water quality and quantity (e.g. describing potential increased runoff leading to increased sediment load in water courses);*	*Section 4.1.5*
2.3.7.6. FEPA sub catchments, including- *a) the impacts of the proposed development on habitat condition and species in the FEPA sub catchment;*	*Section 4.1.5*
2.3.7.7. indigenous forests, including: *a) impact on the ecological integrity of the forest; and* *b) percentage of natural or near natural indigenous forest area lost and a statement on the implications in relation to the remaining areas.*	*Section 4.1.5*
3.1. The Terrestrial Biodiversity Specialist Assessment Report must contain, as a minimum, the following information:	
3.1.1. contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	*Appendix A*
3.1.2. a signed statement of independence by the specialist;	*Appendix B*
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 and Appendix C*
3.1.4. a description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	*Section 2*
3.1.5. 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;	*Section 2.2*
3.1.6. a location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	*Sections 4 and 11.2*

Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity	***Section where this has been addressed in the Specialist Report***
3.1.7. additional environmental impacts expected from the proposed development;	*Sections 4, 6 and 7*
3.1.8. any direct, indirect and cumulative impacts of the proposed development;	*Sections 6 and 7*
3.1.9. the degree to which impacts and risks can be mitigated;	*Section 7*
3.1.10. the degree to which the impacts and risks can be reversed;	*Section 7*
3.1.11. the degree to which the impacts and risks can cause loss of irreplaceable resources;	*Section 7*
3.1.12. proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	*Sections 7, 10 and 10.1*
3.1.13. a motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a "low" terrestrial biodiversity sensitivity and that were not considered appropriate;	*Section 4.7* *The PV facilities were positioned to exclude areas of high sensitivity and lie upon areas of low sensitivity*
3.1.14. a substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and	*Section 11.1*
3.1.15. any conditions to which this statement is subjected.	*Section 11.2*
3.2. The findings of the Terrestrial Biodiversity Specialist 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, where relevant.	*Sections 7 and 10 of this report include mitigation and monitoring measures. These are to be included and incorporated into the BA Report.*
3.2.1. A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	*Appendix B of this report. This report is included as an appendix to the BA Report.*

Appendix F: Riverine Rabbit Camera Trapping Exercise Report

Refer to the separately attached document.

KAPPA PV FACILTIES:

Riverine Rabbit Habitat Assessment and Camera trapping Survey

PRODUCED FOR CSIR/VERONIVA

October 2020

3Foxes Biodiversity Solutions

Simon.Todd@3foxes.co.za

TABLE OF CONTENTS

LIST OF FIGURES

SHORT CV/SUMMARY OF EXPERTISE – SIMON TODD

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

- Environmental Impact Assessment for the Proposed Komsberg East and Komsberg West Wind Farms and Associated Grid Connection Infrastructure: Fauna & Flora Specialist Impact Assessment. Arcus Consulting 2014.
- Proposed Rietkloof & Brandvallei Wind Farms and Associated Grid Connection Infrastructure: Fauna & Flora Specialist Impact Assessment Report. EOH 2016.
- Proposed Gunstfontein Wind Farm and Associated Grid Connection Infrastructure: Fauna & Flora Specialist Impact Assessment Report. Savannah Environmental 2016.
- Tooverberg Wind Energy Facility and Grid Connection. Sivest 2018.

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: ____24 October2020_____

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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

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

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

PROJECT TITLE

Basic Assessments for the Proposed Development of three 175 MW Solar Photovoltaic Facilities and associated Electrical Grid Infrastructure (i.e. Grootfontein 1; Grootfontein 2; and Grootfontein 3), near Touws River, Western Cape

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

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

1. SPECIALIST INFORMATION

Specialist Company Name:	3Foxes Biodiversity Solutions			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100%
Specialist name:	Simon Todd			
Specialist Qualifications:	BSc. (Zool. & Bot.), BSc Hons (Zool.), MSc (Cons. Biol.)			
Professional affiliation/registration:	SACNASP 400425/11			
Physical address:	23 De Villiers Road, Kommetjie 7975			
Postal address:	23 De Villiers Road, Kommetjie			
Postal code:	7975	Cell:	082 3326502	
Telephone:		Fax:		
E-mail:	Simon.Todd@3foxes.co.za			

2. DECLARATION BY THE SPECIALIST

I, _____Simon Todd_____, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

3Foxes Biodiversity Solutions

Name of Company:

17 November 2020

Date

Details of Specialist, Declaration and Undertaking Under Oath

3. UNDERTAKING UNDER OATH/ AFFIRMATION

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

Signature of the Specialist

3Foxes Biodiversity Solutions

Name of Company

17 November 2020

Date

SUID-AFRIKAANSE POLISIEDIENS
COMMUNITY SERVICE CENTRE
17 NOV 2020
OCEAN VIEW W.C.
SOUTH AFRICAN POLICE SERVICE

Signature of the Commissioner of Oaths

2020-11-17

Date

Details of Specialist, Declaration and Undertaking Under Oath

1 INTRODUCTION

Veroniva (Pty) Ltd, the Project Developer, is proposing to develop a series of 9 solar PV projects, associated infrastructure and electricity grid infrastructure on a ca. 10 000ha site situated in the Tanqua Karoo about ~40km north of Touwsrivier in the Western Cape. In this report, the proposed development is referred to as the Ceres/Kappa PV development. CSIR are conducting the required Basic Assessment (BA) processes and 3Foxes Biodiversity Solutions has been appointed to provide specialist faunal input for the proposed development, with particular reference on the Riverine Rabbit *Bunolagus monticularis*, which is listed as Critically Endangered and considered one of the most threatened mammals in South Africa. This species is known from the area and has been recorded on some of the adjacent properties to the proposed project site. The potential presence of this species at the proposed project site is a concern and represents a potential fatal flaw associated with the proposed development. As a result, Veroniva (Pty) Ltd have commissioned this study to address the above concerns with the following Terms of Reference:

- Conduct a field assessment to evaluate the Riverine Rabbit habitat suitability of the site.
- Conduct a camera trapping campaign at the site to evaluate the presence of the Riverine Rabbit at the site.
- Provide a Riverine Rabbit sensitivity map for the affected area with any associated buffers and development constraints.
- Provide an assessment of the impact of the development on the Riverine Rabbit with associated mitigation and avoidance measures.

1.1 RELEVANT ASPECTS OF THE DEVELOPMENT

The Kappa PV site is illustrated below in Figure 1 and includes the location and of the 9 different PV facilities and the electricity grid corridor to the Eskom Kappa Substation. The assessed layout of the PV development sites is illustrated below and it is important to note that this layout has been informed by the current study and the mapping of Riverine Rabbit sensitivity as well as the other environmental constraints present at the site.

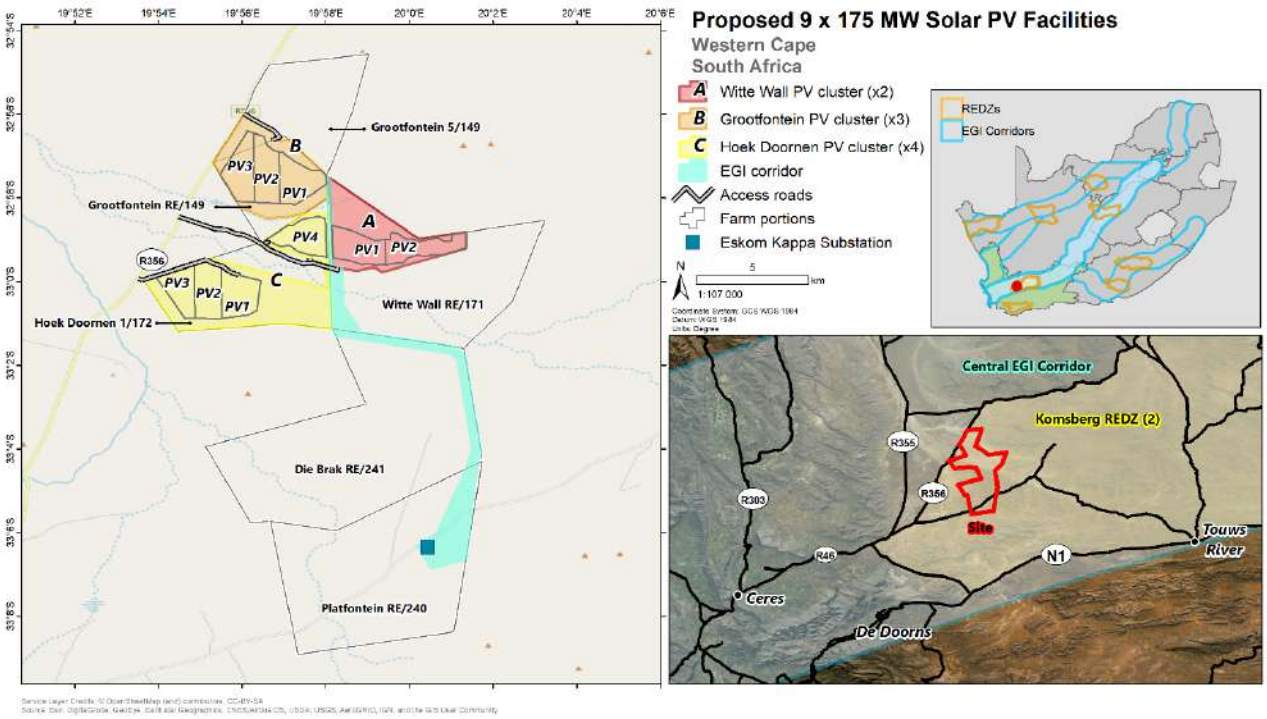

Figure 1. Image showing the location and layout of the Kappa PV cluster and grid corridor to the Kappa Substation.

2 METHODOLOGY

2.1 CAMERA TRAPPING & FIELD ASSESSMENT

As the Riverine Rabbit is the vertebrate species of particular concern at the site, camera trapping was used across the whole Kappa PV site to establish the presence or absence of the Riverine Rabbit and also to characterise the fauna of the site more generally. A total of 30 camera traps were distributed across the site (Co-ordinates in Annex 1), on the 8th and 9th of September 2020 and retrieved on the 21st and 22nd of October 2020, giving rise to 6 weeks of continuous camera trapping. Due to the association of Riverine Rabbits with riparian floodplain habitats, camera traps were concentrated within riparian areas identified as potential habitat for this species. This amounted to approximately two-thirds of the cameras in riparian areas and the remainder were located in other habitats. In order to increase the number of fauna captured, the cameras were placed along paths, fences etc. where fauna are likely to pass and be captured by the cameras.

Before going to the field, the different habitats present at the site were mapped from satellite imagery of the site. This allowed the identification of the riparian areas and other areas where Riverine Rabbits are more likely to be present and also aid in camera trap placement. In the field, these different areas were assessed based on plant species composition and substrate conditions for habitat suitability in order to inform the sensitivity classification of these different areas.

2.2 SENSITIVITY MAPPING & ASSESSMENT

A Riverine Rabbit sensitivity map of the site was produced by integrating the results of the field assessment and camera trapping results. The sensitivity of the mapped units was rated according to the scale as indicated below.

- **Low** – Areas outside of riparian habitats where it is considered highly unlikely that the Riverine Rabbit is present or uses these areas on a regular basis. Development can proceed within these areas with little impact on the Riverine Rabbit.
- **Medium**- Areas where it is considered unlikely but possible that the Riverine Rabbit is present. These are areas of sub-optimal habitat where it is considered unlikely that there are any resident Riverine Rabbits present, although it is possible that rabbits move through this area occasionally. Some development in these areas is considered acceptable.
- **High** – Riparian areas where it is considered potentially likely that Riverine Rabbits are present. These are not areas of optimal habitat, but rather smaller drainage lines where the extent of suitable habitat and presence of food plants is limited. These areas are likely important for connectivity and it is likely that Riverine Rabbit utilise these areas when traversing the landscape.
- **Very High** – Riparian areas considered to represent optimal or near-optimal areas of habitat where the probability of Riverine Rabbit presence is high. However, even if no rabbits are located in these areas through camera trapping, they are considered essential for connectivity and as potential habitat. These areas are usually no-go areas from a developmental perspective and should be avoided as much as possible. It is however acceptable for access roads and power lines to traverse these areas where necessary.

2.3 LIMITATIONS & ASSUMPTIONS

The current study is based on two site visits with six weeks of camera trapping as well as an associated desktop study. This significantly reduces the assumptions required for the current study and in particular the Riverine Rabbit sensitivity mapping. It is however important to note that the camera traps were in the field for 6 weeks which is a relatively short period of time and a failure to capture any images of Riverine Rabbits does not confirm that they are not present on the site. It does however suggest that the abundance of Riverine Rabbits is low, especially when considered against the high numbers of the ecologically similar Cape Hare that were observed. Based on results from other nearby sites with Riverine Rabbits, this species tends to be restricted to areas of favourable habitat where it can be picked up by camera traps relatively easily. As such, the failure to capture any Riverine Rabbits in the current study suggests that the site is at the very least not an important area for Riverine Rabbits and is unlikely to support an extensive population. The aridity of the site may be an important factor in this regard as the other places in the Tanqua Karoo where Riverine Rabbits have been observed have generally all been near to the surrounding fold mountains in areas that receive greater rainfall than the current site. Overall, the camera trapping information is considered to represent an important activity which lends significant weight to the findings of this report. In addition, given the high conservation status of the Riverine Rabbit, a

conservative approach is required with the result that the failure to confirm the presence of Riverine Rabbits on the site is an important finding, but does not change the sensitivity of the areas assessed as having suitable habitat. The lack of observations of Riverine Rabbits at the site, is however used to confirm the low sensitivity of the surrounding plains where this species is considered highly unlikely to be present. Given the extent of the site and the number of cameras deployed, the camera trapping density was relatively high and the six week trapping period is considered adequate to provide a reliable representation of the faunal community of the site.

3 RIVERINE RABBIT HABITAT EVAUATION

This section provides an illustration and description of the habitats present at the site and their sensitivity based on their habitat suitability for Riverine Rabbits and the likelihood that Rabbits are present in these areas. Each habitat observed is illustrated and described briefly below. All images are taken from actual camera trap locations.

Tanqua Karoo Plains

The majority of the site is classified as the Tanqua Karoo vegetation type. Within the site at least, this is a generally homogenous vegetation type which occupies the extensive plains of the site. There are however several different communities associated with this vegetation type, determined by the substrate conditions. On calcrete soils, the vegetation tends to be dominated by *Pteronia paniculata*, while on most other soil types, the vegetation is dominated by *Ruschia intricata*. This is not considered to represent an important habitat type for Riverine Rabbits and it is highly unlikely that they occur in this habitat type. As a result, this habitat type is considered low sensitivity and development can proceed within this habitat with minimal potential consequence for Riverine Rabbits. Under the layout of the proposed development as assessed, the majority of the development footprint is located within this habitat type.

Figure 2. Typical view of the Tanqua Karoo plains of the site, showing the homogenous nature of this habitat, here dominated by *Ruschia intricata*.

Figure 3. Where the Tanqua Karoo plains are on shallow caclrete soils, the vegetation tends to be dominated by *Pteronia paniculata*, but has similar low sensitivity to those areas dominated by *Ruschia intricata*.

Tanqua Karoo Dunes

There is a relatively small extent of habitat within the farm Hoek Doornen that consists of aeolian sands, dominated by leaf-succulent shrubs such as *Leipoldtia* spp. and scattered *Stipagrostis* tussocks. This habitat has a moderate probability of being used by Riverine Rabbits as they have been observed in similar habitat south of the Kappa substation. As a result, this habitat type is not considered suitable for PV development and should be avoided by the PV fields. Although there were initially some PV areas planned within these areas, the layout has been adapted to accommodate these areas which are now completely avoided.

Figure 4. There Tanqua Dune habitat consists of loose sands accumulated against hillsides and other places protected from the wind. This is considered to represent a relatively sensitive vegetation type and should be avoided by the PV fields.

Minor Drainage Lines

There are several minor drainage lines and washes across the site. These are not considered to represent optimal habitat for Riverine Rabbits as the extent of associated floodplains and riparian vegetation is limited and there is probably insufficient habitat along these minor drainage features to support a population of Riverine Rabbits. These areas are however important for landscape connectivity as it is likely that these features are used for movement and migration of Riverine Rabbits when moving about the landscape. In addition, such sub-optimal areas can be important during times of stress as they can provide a resource that can be used when the primary habitat has become degraded or over-utilised. The core drainage features are mapped as Very High sensitivity while the adjacent floodplains and riparian vegetation are mapped as High sensitivity. No PV areas should be located in these areas or the buffers, but it would be acceptable for roads to traverse these features if there no existing roads that can be upgraded or alternative suitable access possibilities.

Figure 5. Typical minor drainage line within the site with Galenia Africana in the river bed and species such as Salsola spp. and Pteronia spp. on the adjacent floodplains. The riparian vegetation is not considered to represent optimal habitat for Riverine Rabbits as the cover is too low and the abundance of known food plants is also low.

Figure 6. Another example of a minor drainage feature from the site, with localised areas of floodplain vegetation that appear suitable as habitat for Riverine Rabbits but are limited in extent and are probably not sufficient to support a local population of Riverine Rabbits.

Major Drainage Lines

The major drainage line which traverses the site is the Groot River. The floodplain of the river is usually at least 500m wide and consists of a confined or braided channel flanked by silty floodplains dominated by halophytic shrubs such as *Salsola aphylla* with occasional stands of *Acacia karroo*. Although there are some parts of the floodplain that are degraded, possibly as a result of historical overgrazing, there are also extensive areas with dense riparian vegetation that is considered to represent excellent Riverine Rabbit habitat. Although no rabbits were captured on the camera traps, they are confirmed present in the greater Groot/Doring system and most likely move through the area at least on occasion. The river and adjacent floodplain have been classified as Very High sensitivity and disturbance and transformation in these areas should be kept to the minimum. Buffers around the floodplain have also been included in the sensitivity mapping to ensure that noise and other disturbances are kept away from the core of the habitat. As such no additional buffers around any of the mapped features is required.

Figure 7. View of the Groot Rivier, which the main drainage feature which traverses the site. In the section pictured, the right-hand bank consists of steep slopes of weathered shale, while there are extensive floodplains on the other side dominated by *Salsola aphylla* and *Acacia karroo*.

Figure 8. Typical riparian vegetation along the Groot Rivier, dominated by *Salsola* species with *Acacia karroo* in the background along a channel. This habitat is considered highly favourable for Riverine Rabbits and it is likely that Rabbits are at least on occasion present in these areas.

3.1 CAMERA TRAPPING RESULTS

A total of 12 different mammal species were captured by the cameras (Figure 9, Figure 10). This represents a relatively low total and does not compare favourably to other areas near the Kappa substation where camera trapping captured more than 20 different species. This low diversity and capture rate can be explained by the relative homogeneity of the site and aridity of the area compared to the wetter and more diverse landscapes near Kappa substation where several sites have been camera trapped. No Riverine Rabbits of other species of conservation concern were captured or observed at the site. In terms of the faunal community as observed by the camera traps, this is somewhat different from the other sites in the area that have been sampled, in that the Common Duiker was the most common species observed at the current site. At the majority of sites sampled nearby and in the wider karoo more generally, the Steenbok is usually the most common species observed. Although Caracal are not very common in the area, they are conspicuously absent from the current site, which may reflect the lack of sufficient cover for this species.

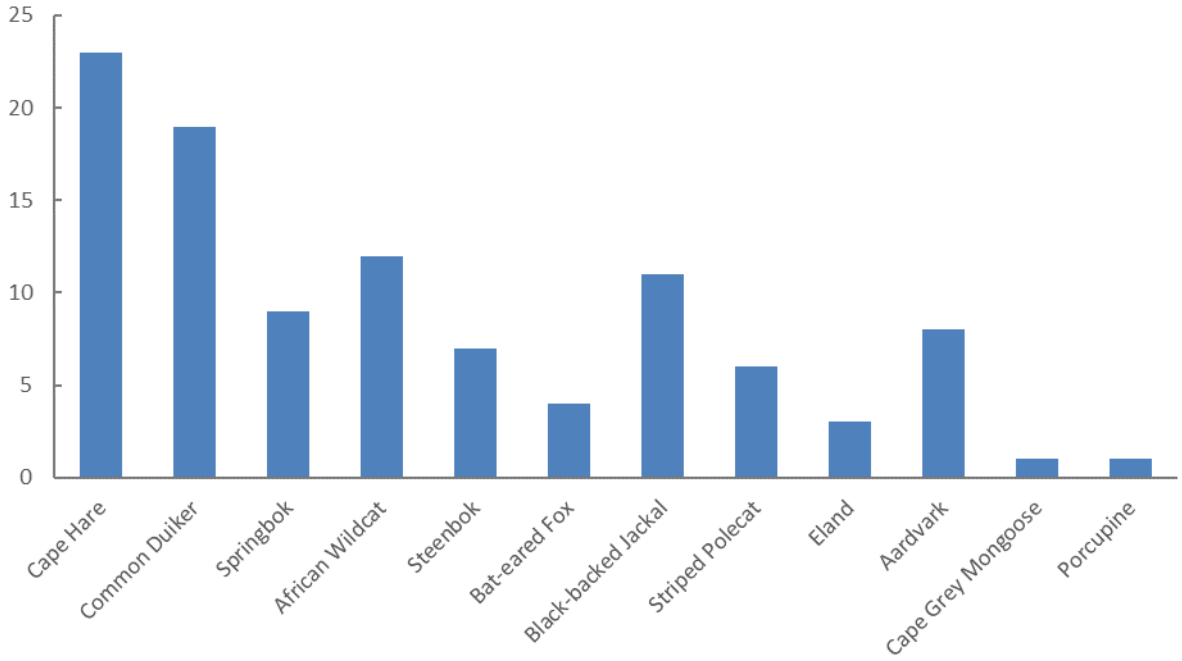

Figure 9. Frequency of different mammals captured by the camera traps. The y-axis represents the number of cameras each species was represented at (i.e. the "count" values in Annexure 1) (out of a total of 30 cameras).

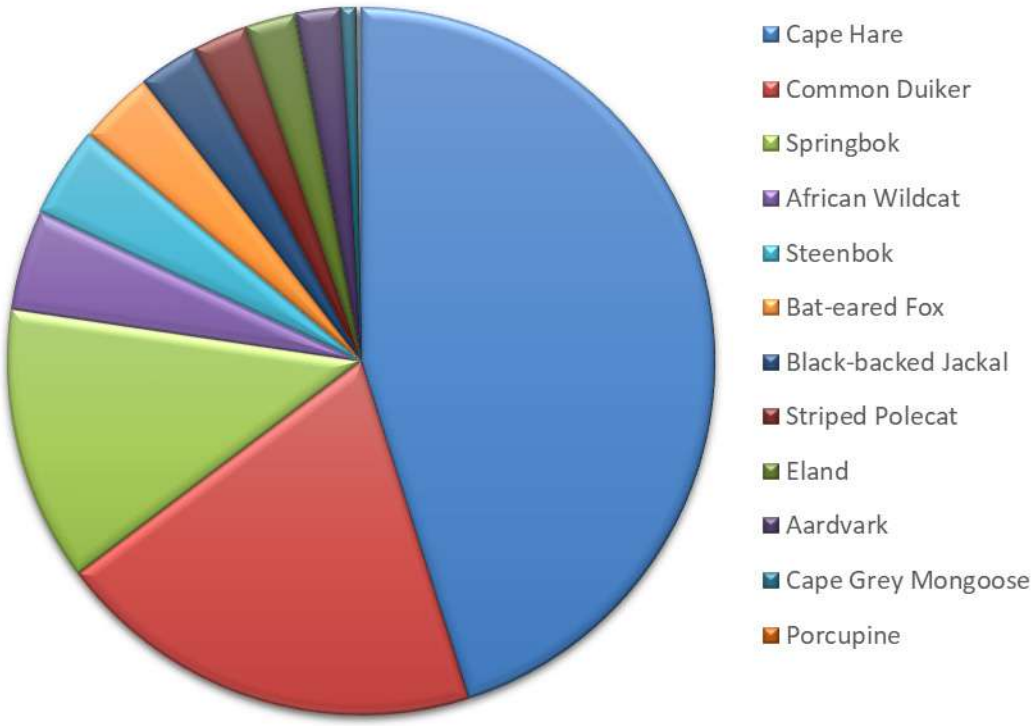

Figure 10. Pie chart showing the relative abundance of each species recorded. The species are sorted as per the legend from most abundant to least common.

Although no Riverine Rabbits were recorded on the site (Figure 12), the high conservation status of this species requires that a cautious and considered approach is required for this species. Furthermore, while it may not be present on the site itself, it does not directly follow that there would be no potential impacts on Riverine Rabbits. If present, impact on the Riverine Rabbit would predominantly be from habitat loss, disturbance during construction and the potential for deaths from vehicle collisions during construction. A breakdown and discussion of the potential impacts of the development on Riverine Rabbits is provided below in Table 1 and discussed in Sections 5 and 6. Although numerous camera traps were located in the areas considered to represent the best habitat for Riverine Rabbits, no Riverine Rabbits were recorded in these areas, but many Cape Hares were observed. There appears to be some competition between these species and Riverine Rabbits are usually absent in areas with high Cape Hare density. Consequently, the high abundance of Cape Hare in these areas is further support of the likely absence of the Riverine Rabbit from these areas. Despite, the absence of Riverine Rabbits from these areas, a cautious approach has been implemented with regards to buffering these areas from development. Given the fine-scale habitat mapping and buffering that has been conducted within the site and maintained in the layout, potential impacts on Riverine Rabbit habitat loss and disturbance will be reduced to acceptable levels. During operation, impacts are likely to be low and the main avenues of possible impact would be from vehicle collisions and human disturbance.

Table 1. Breakdown of potential impacts on Riverine Rabbits and the potential significance and mitigation and avoidance options that can be implemented to reduce potential impacts.

Potential Impact	Impact Source/Project Components	Potential Significance and Mitigation Options
Habitat Loss	The construction of access roads, PV fields etc. will result in the destruction of currently intact vegetation, possibly leading to habitat loss and fragmentation.	The primary area of potential conflict in terms of habitat loss would be the areas of potential Riverine Rabbit habitat along the drainage lines of the site. As the drainage lines and floodplains have been mapped as Very High sensitivity, no PV fields would be located in these areas and the total development footprint in these areas would be low. As a result, the total potential extent of habitat loss is likely to be very low and the resulting impact from habitat loss would also be low.
Collisions with vehicles	The large amount of traffic during construction will increase the probability of vehicle-related mortality. This would potentially be within the site as well as on the larger public roads to the site such as the R356. During operation, this potential impact would be significantly reduced.	Roadkill is a significant source of mortality for Riverine Rabbits. As the public roads to the site go through several areas of potential habitat, the increase in traffic associated with construction could increase the probability of roadkill. As Riverine Rabbit activity is highest between dusk and dawn, traffic during these hours can be curtailed. In addition, speed limits in areas of potential conflict can be implemented as this reduces collision risk.
Disturbance	Construction activity will result in noise and disturbance which may deter Riverine Rabbits from the affected areas.	Construction activity will generate much noise and disturbance which could impact Riverine Rabbits when this occurs in or near Riverine Rabbit habitat. As there are limited areas of potentially suitable Riverine Rabbit within the site, this would be a localised impact. If there are no Riverine Rabbits in the affected areas, then this impact would be of minimal intensity.

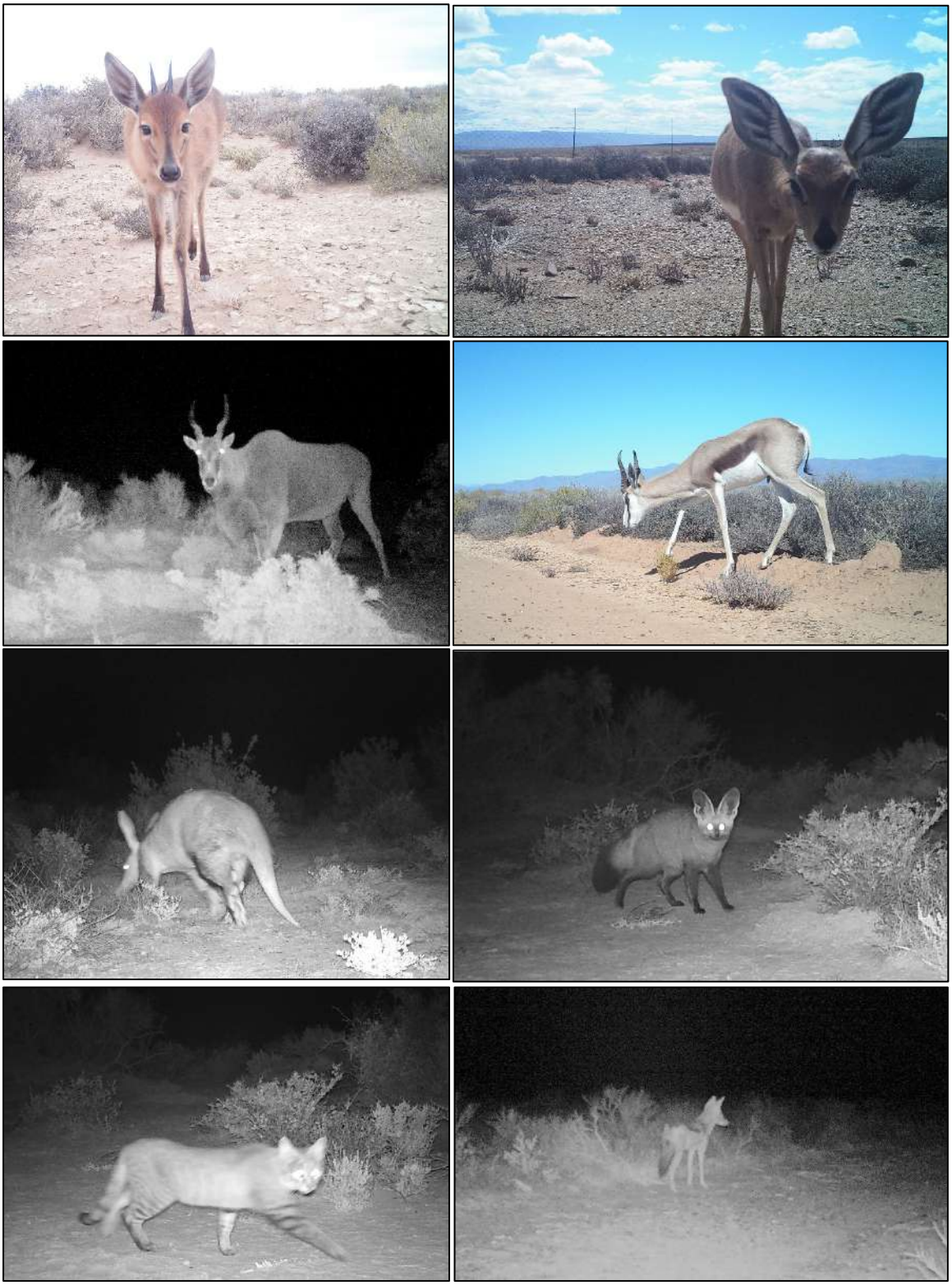

Figure 11. Examples of camera trap images obtained from the site. Clockwise from bottom-left, African Wildcat, Aardvark, Eland, Common Duiker, Steenbok, Springbok, Bat-eared Fox and Black-backed Jackal.

Figure 12. The only lagomorph observed at the site is the Cape Hare, here pictured from various camera locations and habitats across the site. No Riverine Rabbits were recorded by the camera traps. Characteristic and distinguishing features of the Cape Hare are the black and white tail, longer legs and different shaped head and ears of the Cape Hare compared to the Riverine Rabbit.

4 KAPPA PV RIVERINE RABBIT HABITAT SENSITIVITY ASSESSMENT

The Riverine Rabbit Habitat sensitivity map for the study area is depicted below in Figure 13. The major drainage features of the site classified as Very High sensitivity while the buffers around these features as well as areas of sub-optimal habitat are classified as High sensitivity. Under the assessed layout provided for this assessment, the PV footprint areas do not impinge into the High or Very High sensitivity areas and as such, the layout is considered acceptable and would likely generate low impact on the Riverine Rabbit and its associated habitats. Although Riverine Rabbits can be found outside of riparian habitats in the southern Cape, this does not appear to be case for the current population and as such, its presence outside of these areas is seen as extremely unlikely.

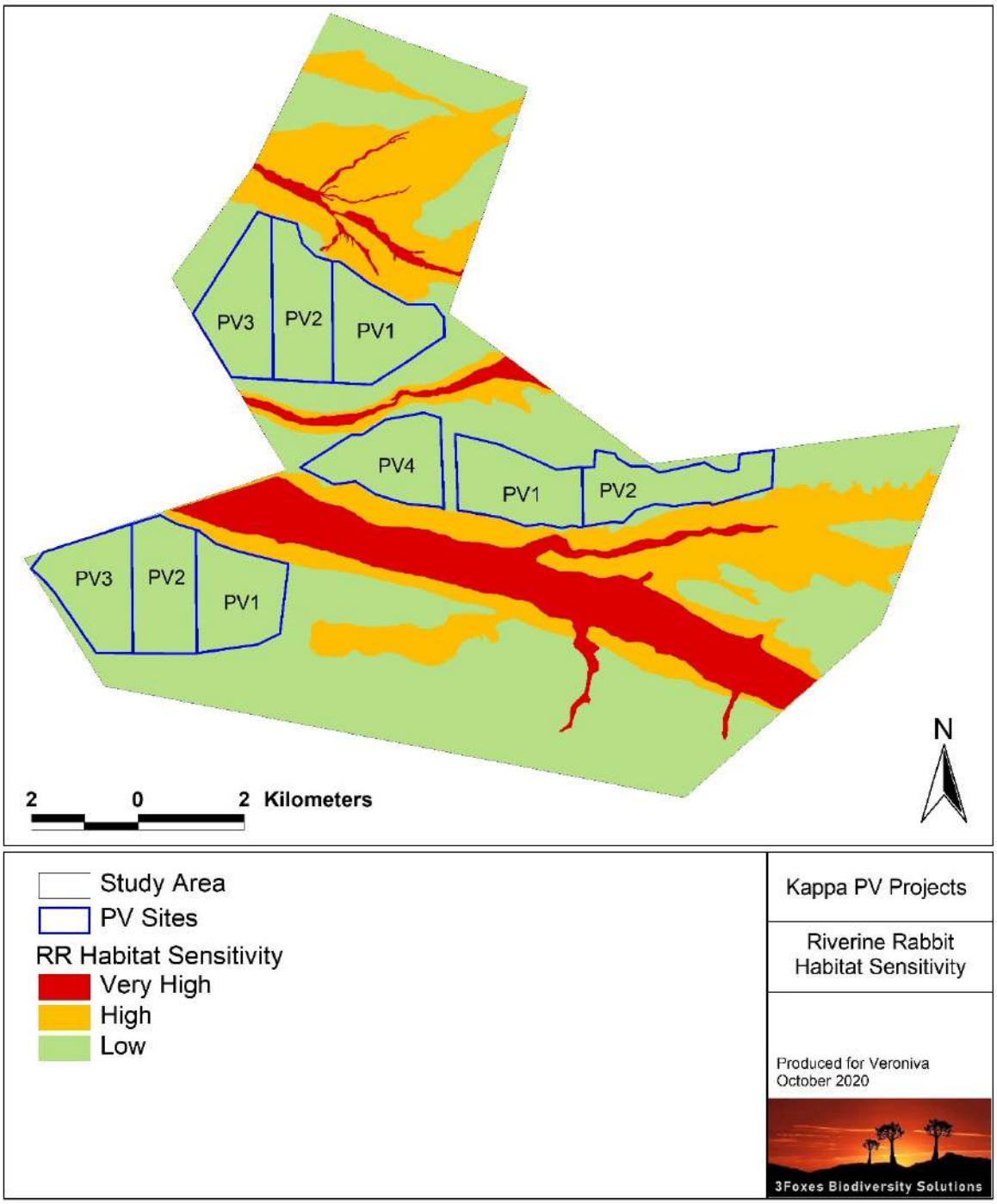

Figure 13. Riverine Rabbit habitat sensitivity map for the study area, showing the proposed footprint areas of the PV areas[1].

[1] Note that the area of Hoek Doornen PV 3 has been reduced slightly. Refer to the Final BA Report for the Hoek Doornen Project for maps.

5 IMPACTS AND ISSUES IDENTIFICATION

5.1 IDENTIFICATION OF POTENTIAL IMPACTS

The development of the Kappa PV projects would potentially result in a variety of impacts, associated largely with the disturbance, loss and transformation of intact vegetation and faunal habitat during construction. During operation, the impacts would be reduced and restricted largely to potential noise impacts and occasional disturbance from operational activities. These potential impacts are outlined below as they relate to the Riverine Rabbit.

Impact 1. Direct Impact on the Riverine Rabbit

Although the Riverine Rabbit is not expected to occur within the development area, it is known to occur in the area. During construction, the increased levels of traffic at the site would potentially increase collision risk with rabbits, which is a known major cause of mortality for this species. Furthermore, the noise and disturbance associated with construction may deter rabbits from the affected areas where these are in close proximity to areas where Rabbits are present. During operation, impacts would be reduced, but noise from operational activities would potentially impact this species, resulting in local habitat degradation within and adjacent to the PV sites.

Impact 2. Cumulative Impacts

The development of the Kappa PV projects would result in habitat loss and an increase in overall cumulative impacts on fauna and flora in the area. Current levels of transformation in the area resulting from solar PV and wind farm development is moderate and the current proposed development would add approximately 2270ha to the existing level of potential impact associated with approved projects. This is a locally significant contribution and rivals the entire footprint of all approved projects within 30km of the site. However, it is important to note that especially with regards to Riverine Rabbit habitat, the loss associated with the current proposed project would be very low and the proposed project would be unlikely to generate significant habitat fragmentation for the Riverine Rabbit given the avoidance of the preferred habitat areas.

6 ASSESSMENT OF IMPACTS – KAPPA PV FACILITIES

An assessment of the impact of the proposed Kappa PV project on the Riverine Rabbit is provided below. There are no significant differences between any of the individual PV projects in terms of their potential impacts and as such, the assessment is considered to apply to all of the associated projects.

6.1 CONSTRUCTION PHASE IMPACT 1. DIRECT AND INDIRECT IMPACTS ON RIVERINE RABBITS

The construction of access roads, PV fields etc. will result in the destruction of currently intact vegetation, possibly leading to habitat loss and fragmentation. The large amount of traffic during construction will increase the probability of vehicle-related mortality. This would potentially be within the site as well as on the larger public roads to the site such as the R356. Roadkill is a significant source of mortality for Riverine Rabbits. As the public roads to the site go through several areas of potential habitat, the increase in traffic associated with construction could increase the probability of roadkill. As Riverine Rabbit activity is highest between dusk and dawn, traffic during these hours can be curtailed. In addition, speed limits in areas of potential conflict can be implemented as this reduces collision risk. In addition, construction activity will result in noise and disturbance which may deter Riverine Rabbits from the affected areas. These impacts would however be transient and restricted to the construction phase, with significantly lower levels of traffic and disturbance during the operational phase. The primary area of potential conflict in terms of habitat loss would be the areas of potential Riverine Rabbit habitat along the drainage lines of the site. As the drainage lines and floodplains have been mapped as Very High sensitivity, no PV fields would be located in these areas and the total development footprint in these areas would be low. As a result, the total potential extent of habitat loss is likely to be very low and the resulting impact from habitat loss would also be low.

Without mitigation this impact is likely to be of **Moderate** significance.

Essential mitigation measures would include:

- Adhere to the development restrictions placed on areas of High and Very High sensitivity. No PV fields to be placed in these areas and any roads and power lines through these areas should use existing footprint areas where possible.
- All vehicles should adhere to a low speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h.
- Limiting access to the site and ensuring that construction staff and machinery remain within the demarcated construction areas during the construction phase.
- Environmental induction for all staff and contractors on-site must be undertaken.
- The design should ensure that there is no electrical fencing around the PV fields or substations (and associated battery facility) or other infrastructure that are within 20cm of the ground as some fauna can become stuck against such fences and are electrocuted to death.

With the implementation of the suggested mitigation the construction phase impact on Riverine Rabbits can likely be reduced to a **Low Significance**.

6.2 OPERATIONAL PHASE IMPACT 1. IMPACTS ON RIVERINE RABBITS DURING OPERATION

The operational phase would entail significantly lower levels of disturbance than the construction phase. However, there would still be increased traffic to and from the site each day leading to increased collision risk as well as some noise and disturbance associated with the operation and maintenance of the PV facilities which would have a negative influence on any resident Riverine Rabbits. The noise and disturbance would however be of a relatively low intensity and would have a largely local impact only.

Without mitigation this impact is likely to be of **Low** significance.

Essential mitigation measures would include:

- Human activity and disturbance outside of the fenced PV areas should be kept to a minimum and restricted to required maintenance activities only.
- All vehicles should adhere to a low speed limit on-site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h.

With the implementation of the suggested mitigation the operational phase impact on Riverine Rabbits would remain at a **Low Significance**.

6.3 CUMULATIVE IMPACT 1. CUMULATIVE IMPACTS ON BROAD-SCALE ECOLOGICAL PROCESSES AS RELATED TO THE RIVERINE RABBIT.

The development would result in cumulative impacts on broad-scale ecological processes such as movement and migration of Riverine Rabbits. The current proposed development would add approximately 2270ha to the existing level of potential impact associated with approved PV and wind energy projects. This is a locally significant contribution and rivals the entire footprint of all approved projects within 30km of the site. However, it is important to note that with regards to Riverine Rabbit habitat, the loss associated with the current proposed project would be very low and the proposed project would be unlikely to generate significant habitat fragmentation for the Riverine Rabbit given the avoidance of the preferred habitat areas.

Without mitigation this impact is likely to be of **Moderate** significance.

Essential mitigation measures would include:

- Adhere to the sensitivity maps provided within this assessment when determining the final layout of the PV facilities and associated infrastructure.
- Ensure that all the operational phase management plans are fully implemented and that the associated monitoring and feedback mechanisms to management are in place.

With the implementation of the suggested mitigation the cumulative impact on Riverine Rabbits can likely be reduced to a **Low Significance**.

6.4 IMPACT ASSESSMENT SUMMARY

CONSTRUCTION PHASE													
Direct impacts													
Impact on Riverine Rabbits due to construction phase activities													
Impact pathway	**Status**	**Extent**	**Duration**	**Consequence**	**Probability**	**Reversibility of impact**	**Irreplaceability of receiving environment/ resource**	**Significance of impact/risk (before mitigation)**	**Can impact be avoided?**	**Can impact be managed or mitigated?**	**Significance of residual risk/impact (after mitigation)**	**Ranking of impact/ risk**	**Confidence level**
Habitat Loss & Disturbance	**-**	**Local**	**Long-term**	**Substantial**	**Very Likely**	**Low**	**Moderate**	**Moderate Risk (3)**	**Partly**	**Partly**	**Low Risk (4)**	**4**	**High**

Suggested Mitigation:

- Adhere to the development restrictions placed on areas of High and Very High sensitivity. No PV fields to be placed in these areas and any roads and power lines through these areas should use existing footprint areas where possible.
- All vehicles should adhere to a low speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h.
- Limiting access to the site and ensuring that construction staff and machinery remain within the demarcated construction areas during the construction phase.
- Environmental induction for all staff and contractors on-site must be undertaken.
- The design should ensure that there is no electrical fencing around the PV fields or substations (and associated battery facility) or other infrastructure that are within 20cm of the ground as some fauna can become stuck against such fences and are electrocuted to death.

OPERATIONAL PHASE													
Direct impacts													
Impact on Riverine Rabbits due to operational phase activities													
Impact pathway	**Status**	**Extent**	**Duration**	**Consequence**	**Probability**	**Reversibility of impact**	**Irreplaceability of receiving environment/ resource**	**Significance of impact/risk (before mitigation)**	**Can impact be avoided?**	**Can impact be managed or mitigated?**	**Significance of residual risk/impact (after mitigation)**	**Ranking of impact/ risk**	**Confidence level**
Disturbance & vehicle collisions	**-**	**Local**	**Long-term**	**Moderate**	**Likely**	**Low**	**Moderate**	**Low Risk (4)**	**Partly**	**Partly**	**Low Risk (4)**	**4**	**High**

Suggested Mitigation:

- Human activity and disturbance outside of the fenced PV areas should be kept to a minimum and restricted to required maintenance activities only.
- All vehicles should adhere to a low speed limit on-site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h.

CUMULATIVE IMPACT													
Cumulative impact on Riverine Rabbits													
Impact pathway	**Status**	**Extent**	**Duration**	**Consequence**	**Probability**	**Reversibility of impact**	**Irreplaceability of receiving environment/ resource**	**Significance of impact/risk (before mitigation)**	**Can impact be avoided?**	**Can impact be managed or mitigated?**	**Significance of residual risk/impact (after mitigation)**	**Ranking of impact/ risk**	**Confidence level**
Disturbance & vehicle collisions	**-**	**Local**	**Long-term**	**Substantial**	**Very Likely**	**Low**	**Moderate**	**Moderate Risk (3)**	**Partly**	**Partly**	**Low Risk (4)**	**4**	**High**

Suggested Mitigation:

- Adhere to the sensitivity maps provided within this assessment when determining the final layout of the PV facilities and associated infrastructure.
- Ensure that all the operational phase management plans are fully implemented and that the associated monitoring and feedback mechanisms to management are in place.

7 CONCLUSION & RECOMMENDATIONS

The Kappa PV facilities are located in an area where Riverine Rabbits are known to occur and would potentially impact on this Critically Endangered species. The field assessment reveals that there is suitable habitat present on the site, especially along the Groot Rivier. The areas of habitat along this as well as the other smaller drainage features of the site have been mapped as Very High sensitivity and should be avoided as much as possible. In addition, the transitional areas between the drainage lines and the adjacent veld have been demarcated as buffer areas firstly to buffer the core areas of Riverine Rabbit habitat from impact and then secondly to provide additional space for Riverine Rabbits for foraging opportunity outside of the drainage lines and to ensure that landscape connectivity along the major water courses of the site is maintained. The buffer areas have been classified as High sensitivity and no PV fields should be located within these areas, as has been achieved under the assessed layout. The power line would not generate a significant extent of habitat loss within the riparian areas and a significant impact from the power line would not occur.

The camera trapping did not capture any images of Riverine Rabbits, suggesting at the very least that this species is not common in the area. The cameras did however pick up almost 600 images of Cape Hare, indicating that this is the dominant lagomorph of the area. Since these two species rarely co-occur at any individual camera trapping station, this suggests that Riverine Rabbits are not present at least within the areas sampled by the camera traps. It is possible that Riverine Rabbits are present along the major drainage lines of the site and were simply not picked by the camera traps. However, even if this is the case, there has been sufficient avoidance of this habitat that even if all 9 PV facilities were to be built that impact on Riverine Rabbit would likely remain low.

Based on the field assessment and assessed layout of the Kappa PV facilities, the development would not generate significant impact on the Riverine Rabbit and with the provided buffers around the important habitat features, the loss of habitat and impacts on landscape connectivity for Rabbits would be low.

<u>Riverine Rabbit Impact Statement</u>

The footprint of the Kappa PV facilities does not impinge on any areas that are considered to represent important habitat for the Riverine Rabbit. The areas assessed as being suitable habitat have been buffered to reduce potential impact on these features and to ensure that landscape connectivity is maintained. Under the layout of the Kappa PV facilities as assessed, there are no impacts on Riverine Rabbits that are moderate or high after mitigation and as a result, the development of the Kappa PV facilities is considered acceptable. The grid connection route to the Kappa substation wold generate a low impact on Riverine Rabbit habitat and no significant impacts on Riverine Rabbits are expected to occur as a result of the grid connection. Overall, there are no fatal flaws associated with any of the Kappa PV facilities or grid connection and it can be supported in terms of generating acceptably low Riverine Rabbit impacts.

8 ANNEX 1. LIST OF CAMERA TRAPPING OBSERVATIONS

List of cameras, their locations and counts of species observations.

Camera	Latitude	Longitude	Aardvark	African Wildcat	Bat-eared Fox	Black-backed Jackal	Cape Grey Mongoose	Cape Hare	Common Duiker	Eland	Porcupine	Springbok	Steenbok	Striped Polecat
C1	-32.94612400	19.95804900	0	0	0	0	0	9	3	0	0	0	0	0
C2	-32.93669200	19.94515600	0	0	0	0	0	39	6	0	0	0	0	0
C3	-32.96660500	19.94266200	0	0	0	0	0	0	0	0	0	3	0	3
C4	-32.96591900	19.92985000	3	0	3	0	0	45	12	0	0	0	3	0
C5	-32.97554200	19.94612900	0	3	0	0	0	3	15	0	0	0	0	0
C6	-32.97159600	19.95909100	0	12	0	0	0	3	42	0	0	3	0	0
C7	-32.96464700	19.96656200	0	0	0	0	0	75	24	0	0	0	9	0
C8	-32.95751200	19.95794300	0	3	0	3	0	3	0	0	0	3	0	0
C9	-33.00163100	19.90001300	3	0	0	0	0	24	9	0	0	0	0	6
C10	-32.99745800	19.91094400	0	3	0	0	0	54	18	0	3	0	0	15
C11	-33.00945600	19.92504000	0	0	0	3	0	78	0	0	0	0	6	0
C12	-33.00083000	19.96632400	0	0	9	3	0	3	0	0	0	0	0	0
C13	-32.99958100	19.96108400	0	0	0	0	0	0	9	0	0	0	0	0
C14	-32.99214100	19.93934200	3	3	30	3	0	3	15	0	0	0	0	0
C16	-33.01818600	19.92729400	3	3	0	3	0	12	36	3	0	0	9	3
C17	-33.01224800	19.94616800	0	3	0	3	0	75	3	0	0	0	0	0
C18	-33.01256600	19.96487400	0	0	0	0	0	42	15	0	0	0	0	0

Camera	Latitude	Longitude	Aardvark	African Wildcat	Bat-eared Fox	Black-backed Jackal	Cape Grey Mongoose	Cape Hare	Common Duiker	Eland	Porcupine	Springbok	Steenbok	Striped Polecat
C19	-33.00524700	19.98679200	0	3	3	3	0	0	12	0	0	0	0	0
C20	-32.99813900	19.99379600	0	0	0	0	0	0	0	0	0	0	0	0
C21	-32.99365500	20.01076200	3	0	0	3	0	6	6	24	0	45	0	0
C22	-32.96802200	19.97899700	0	12	0	3	0	0	0	0	0	0	0	0
C23	-32.96850200	19.97248600	0	3	0	0	0	0	9	3	0	0	0	0
C26	-33.00512400	19.98184500	3	0	0	0	9	6	12	0	0	0	0	0
C27	-32.94810500	19.94532500	0	9	0	0	0	27	0	0	0	63	21	0
C28	-32.97674800	19.98357000	3	0	0	3	0	18	0	0	0	24	0	0
C29	-32.98623900	19.99613100	0	0	0	0	0	3	0	0	0	9	0	0
C30	-32.98224300	20.00947200	0	0	0	0	0	18	9	0	0	12	0	0
C32	-32.98493700	19.96814500	0	3	0	6	0	39	3	0	0	3	3	3
C34	-32.95327700	19.92655100	0	0	0	0	0	0	0	0	0	0	3	3
C35	-32.97305400	19.93599600	6	0	0	0	0	6	0	0	0	0	0	0
Sum			27	60	45	36	9	591	258	30	3	165	54	33
Count			8	12	4	11	1	23	19	3	1	9	7	6