

## **APPENDIX F - ECOLOGICAL REPORT**

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# Final Ecological Specialist Report

## For the Proposed Construction of Adams Battery Energy Storage System (BESS) between Kathu and Hotazel Northern Cape Province

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OPS\_007\_v001

### PREPARED FOR:



Enel Green Power South Africa (Pty) Ltd

### DATED:

5 October 2022

### REPORT REVISION:

REV04


### PREPARED BY:

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## DECLARATION OF INDEPENDENCE

<b>Specialist Name</b>	Nico-Ronaldo Retief
<b>Declaration of Independence</b>	<p>I declare, as a specialist appointed in terms of the National Environmental Management Act (Act No 108 of 1998) and the associated 2014 Amended Environmental Impact Assessment (EIA) Regulations, that:</p> <ul style="list-style-type: none"> <li>• I act as the independent specialist in this application.</li> <li>• 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.</li> <li>• I declare that there are no circumstances that may compromise my objectivity in performing such work.</li> <li>• 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.</li> <li>• I will comply with the Act, Regulations, and all other applicable legislation.</li> <li>• I have no, and will not engage in, conflicting interests in the undertaking of the activity.</li> <li>• 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.</li> <li>• All the furnished by me in this form are true and correct; and</li> <li>• 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.</li> </ul>
<b>Signature</b>	
<b>Date</b>	<p style="text-align: center;">18 January 2022</p> <p style="text-align: center;">Revised 19 May 2022</p> <p style="text-align: center;">Revised 19 July 2022</p> <p style="text-align: center;">Finalised 27 October 2022</p>

## EXECUTIVE SUMMARY

In the case of this study site, the grasslands have been altered through anthropogenic activities. The grasslands, however, were green and dense.

- Two site alternatives, the Proposed/Preferred site and the No-Go Alternative (northern site) were being considered.
- Anthropogenic impacts identified within the study site included alien vegetation encroachment, gravel road construction, natural vegetation removal, hardening of surfaces to establish the Adams Solar Facility, fencing, grazing and power line construction.
- The site sensitivity in terms of vegetation cover is rated medium sensitivity. An Other Natural Area (ONA) at the proposed BESS was identified as the vegetation type based on the 2016 Northern Cape Critical Biodiversity Areas and still fulfils an ecological function.
- The study site still has a functional role to play in regional ecological functioning and biological functions at the site even though it has been influenced by human-related impacts.
- Ecological connectivity between the grasslands, thickets, woodland, and drainage located towards the northwest cannot be excluded in the overall study area.
- An alien invasive species plan must be developed for the BESS site, together with a termite management plan (maintenance management plan). Termite mitigation solutions should be aligned with the EGP requirements.
- Monitoring dust at the site should be encouraged.
- Monitor the reinfection of the current Adams PV facility's termites and BESS proposed every 5-years.
- A search-and-rescue plan needs to be developed for any medicinal plants onsite. To establish the BESS protected trees need to be tagged and a permit needs to be obtained from DAFF to either relocate or destroy these trees.
- Cumulative impacts in terms of ecological process and any projects within 30kms of the site have low-medium significance.

Concluded from the results presented in this document, the construction activities would impact on the medium sensitive terrestrial biota. Mitigation measures should be implemented to allow protection as far as possible the ecological nature of the site. Alien eradication and rehabilitation must be encouraged through the development of an alien and invasive species plan. Monitoring and prevention of termites should be

encouraged at the site and aligned with the EGP requirements. Based on the results and conclusions presented in this report, and the outcomes of the field survey, it is the opinion of the specialists that the proposed project can be favourably considered should all the mitigation measures be implemented and monitored against to ensure compliance and included in the Environmental Management Program. Even though the site has medium sensitivity, the mitigation measures provided may reduce the negative risks anticipated with the BESS construction. From an ecological perspective the proposal / preferred site, is supported by the specialist.

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## ABBREVIATIONS

DAFF:	Department of Agriculture, Forestry and Fisheries
DFFE:	Department of Forestry, Fisheries, and the Environment
DWS:	Department of Water and Sanitation
EA:	Environmental Authorisation
EAP:	Environmental Assessment Practitioner
EIA:	Environmental Impact Assessment
ER:	Employer's Representative
ECO:	Environmental Control Officer
EMPr:	Environmental Management Program
GA:	General Authorisation
NEMA	National Environmental Management Act
NCC:	NCC Environmental Services
ONA:	Other Natural Area

# 1 INTRODUCTION

## 1.1 DESCRIPTION OF PROJECT

**Enel Green Power South Africa (Pty) Ltd** intends to submit an Environmental Authorisation for the retrofitting of a Battery Energy Storage System (BESS) to the existing Adams Solar photovoltaic facility located in Joe Morolong Local Municipality in the Northern Cape province.

The general purpose and utilisation of a Battery Energy Storage System (BESS) is to save and store excess electrical output as it is generated, allowing for a timed release of electricity to the grid when the capacity is required. BESS systems therefore provide flexibility in the efficient operation of the electricity grid through decoupling of the energy supply and demand.

In recent years battery energy storage at utility scale has increasingly been recognised as an effective solution to several challenges within the current grid system such as inefficiency, network bottlenecks and overloads.

The BESS technology is modular, and the layout is customized depending on specific functional, technical, and commercial requirements at the time of system implementation.

The proposed Battery Energy Storage System (BESS) would be housed inside containers or similar structures with a total footprint of up to 4ha in extent. It would be located adjacent to the existing Adams Solar Facility. Both Lithium-ion and Redox-flow technology are being considered for the project, depending on which is most feasible at the time of implementation.

Associated infrastructure includes:

- A Substation with a maximum height of - HV busbar up to 10 m max and an HV Building up to 4 m max.
- Access road to the BESS (6 existing access road), and internal roads (up to 8m wide) within the footprint of the BESS, as needed.
- MV Cabling (underground or overhead) between the BESS and the HV/MV BESS substation.
- HV Cabling (underground or overhead) between the HV/MV BESS substation and the existing HV substation or for loop in and loop out to the existing HV connection line.
- Fencing around the BESS and the substation for increased security measures.
- Temporary laydown area within the 4ha footprint of the BESS.
- Possible firebreak around the BESS facility which is to be located within the 4ha BESS footprint.

Batteries may be classified as either solid state or flow batteries. Solid state batteries use solid electrodes and electrolytes. Flow batteries on the other hand use solid electrodes and liquid electrolytes.

Each type has its own particular advantages and disadvantages.

## 1.2 STUDY SITE

The study area is located to the south of the town of Hotazel. It covers a portion or portions of the original farm Goold 329. On a regional scale, the study area is located within quaternary catchment D41K. Quaternary catchment D41K has been evaluated to be intact, which imply that the quaternary catchment is in a pristine state.

### 1.2.1 Vegetation

The study area is located within the least threatened Kathu Bushveld regional vegetation unit within the Savanna Biome.

#### 1.2.1.1 Distribution:

Northern Cape Province: Plains from Kathu and Dibeng in the south, through Hotazel, vicinity of Frylinckspan to the Botswana border roughly between Van Zylsrus and McCarthysrus. Altitude 960–1 300 m. (Mucina & Rutherford, 2006).

#### 1.2.1.2 Vegetation & Landscape Features

Medium-tall tree layer with *Acacia erioloba* in places, but mostly open and including *Boscia albitrunca* as the prominent trees. Shrub layer generally most important with, for example, *A. mellifera*, *Diospyros lycioides* and *Lycium hirsutum*. Grass layer is variable in cover. (Mucina & Rutherford, 2006).

#### 1.2.1.3 Geology and Soils

Aeolian red sand and surface calcrete, deep (>1.2 m) sandy soils of Hutton and Clovelly soil forms. Land types of mainly Ah and Ae, with some Ag. (Mucina & Rutherford, 2006).

#### 1.2.1.4 Climate

Summer and autumn rainfall with very dry winters. MAP about 220–380 mm. Frost frequent in winter. Mean monthly maximum and minimum temperatures for Sishen 37.0°C and –2.2°C for December and July, respectively. (Mucina & Rutherford, 2006).

### 1.2.1.5 Important Taxa

**Table 1-1:** Taxa for the Kathu Bushveld

Growth form	Indicator species
<b>Tall Tree:</b>	<i>Acacia erioloba</i> (d).
<b>Small Trees:</b>	<i>Acacia mellifera</i> subsp. <i>detinens</i> (d), <i>Boscia albitrunca</i> (d), <i>Terminalia sericea</i> .
<b>Tall Shrubs:</b>	<i>Diospyros lycioides</i> subsp. <i>lycioides</i> (d), <i>Dichrostachys cinerea</i> , <i>Grewia flava</i> , <i>Gymnosporia buxifolia</i> , <i>Rhigozum brevispinosum</i> .
<b>Low Shrubs:</b>	<i>Aptosimum decumbens</i> , <i>Grewia retinervis</i> , <i>Nolletia arenosa</i> , <i>Sida cordifolia</i> , <i>Tragia dioica</i> .
<b>Herbs:</b>	<i>Acrotome inflata</i> , <i>Erlangea misera</i> , <i>Gisekia africana</i> , <i>Heliotropium ciliatum</i> , <i>Hermbsaedia fleckii</i> , <i>H. odorata</i> , <i>Limeum fenestratum</i> , <i>L. viscosum</i> , <i>Lotononis platycarpa</i> , <i>Senna italica</i> subsp. <i>arachoides</i> , <i>Tribulus terrestris</i> .
<b>Graminoids:</b>	<i>Aristida meridionalis</i> (d), <i>Brachiaria nigropedata</i> (d), <i>Centropodia glauca</i> (d), <i>Eragrostis lehmanniana</i> (d), <i>Schmidtia pappophoroides</i> (d), <i>Stipagrostis ciliata</i> (d), <i>Aristida congesta</i> , <i>Eragrostis biflora</i> , <i>E. chloromelas</i> , <i>E. heteromera</i> , <i>E. pallens</i> , <i>Melinis repens</i> , <i>Schmidtia kalahariensis</i> , <i>Stipagrostis uniplumis</i> , <i>Tragus berteronianus</i> .
<b>Biogeographically Important Taxa (Kalahari endemics) Small Tree:</b>	<i>Acacia luederitzii</i> var. <i>luederitzii</i> .
<b>Biogeographically Important Taxa (Kalahari endemics) Graminoids:</b>	<i>Antheophora argentea</i> , <i>Megaloprotachne albescens</i> , <i>Panicum kalaharens</i> .
<b>Biogeographically Important Taxa (Kalahari endemics) Herb:</b>	<i>Neuradopsis bechuanensis</i> .

### 1.3 Scope of work and objectives

NCC Environmental Services (Pty) Ltd was appointed by **Enel Green Power South Africa (Pty) Ltd** to undertake an ecological assessment as part of the Water Use License and Environmental Impact Assessment for the proposed Adams Solar PV Facility BESS, approximately 20km south of Hotazel.

### 1.3.1 Biodiversity Assessment

The proposed Scope of Work (SoW) aims to meet the minimum requirements of the Department of Forestry, Fisheries, and the Environment (DEFF) to conduct the relevant specialist assessments in support of a Biodiversity Baseline Assessment (BA). The following documents were considered:

- EIA and EMPr; and
- Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in Terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation.

#### 1.3.1.1 Specialist Studies

The selected baseline studies would aim to meet the requirements of DFFE to conduct a biodiversity assessment in the Northern Cape. The following studies would be included in the biodiversity assessment:

- Fauna – Mammals (including bats), birds, reptiles, amphibians & invertebrates.
- Plants and vegetation (including alien vegetation).
- Habitat features – Caves and/or ridges.

Specifically, the Terms of Reference (ToR) included the following:

- Desktop description of the baseline receiving environment specific to the field of expertise (general surrounding area as well as site specific environment).
- Identification and description of any sensitive receptors in terms of relevant specialist disciplines (biodiversity) that occur in the study area, and the manner in which these sensitive receptors may be affected by the activity.
- Identify 'significant' ecological, botanical, and faunal features within the proposed development areas
- Site visit to verify desktop information.
- Screening to identify any critical issues (potential fatal flaws) that may result in project delays or rejection of the application; and
- Provide a map to identifying sensitive receptors in the study area, based on available maps, database information & site visit verification.

## 1.4 Overview of the Specialist

Mr. Nico-Ronaldo Retief is a professional EAP, water, ecological biodiversity, and visual specialist with emphasis on biodiversity and zoology. He has undertaken numerous mining related, environmental, and ecological assessments, wetland studies and water quality specialist studies as well as visual impact assessments. He is registered with the South African Council for Natural Scientific Professions (SACNASP). For more information, please refer to Table 1-2.

**Table 1-2: Details of the Specialist**

Specialist	Nico-Ronaldo Retief
Qualifications:	M.Sc. Zoology (University of Johannesburg)
Experience:	Flora and Fauna Habitat Surveys Water Quality Assessments (Biomonitoring) Wetland Assessments Visual Impact Studies Aquatic Assessments and Biomonitoring Mining and water specialist 17 years' Experience
Affiliation/ Registration	SACNASP Professional Natural Scientist 005636
Address:	26 Bell Close   Westlake Business Park   Westlake   Cape Town
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## 1.5 Structure of the Report

Appendix 6 of GN 706 of 13 July 2018 provides the requirements for specialist reports undertaken as part of the environmental authorisation process. In line with this

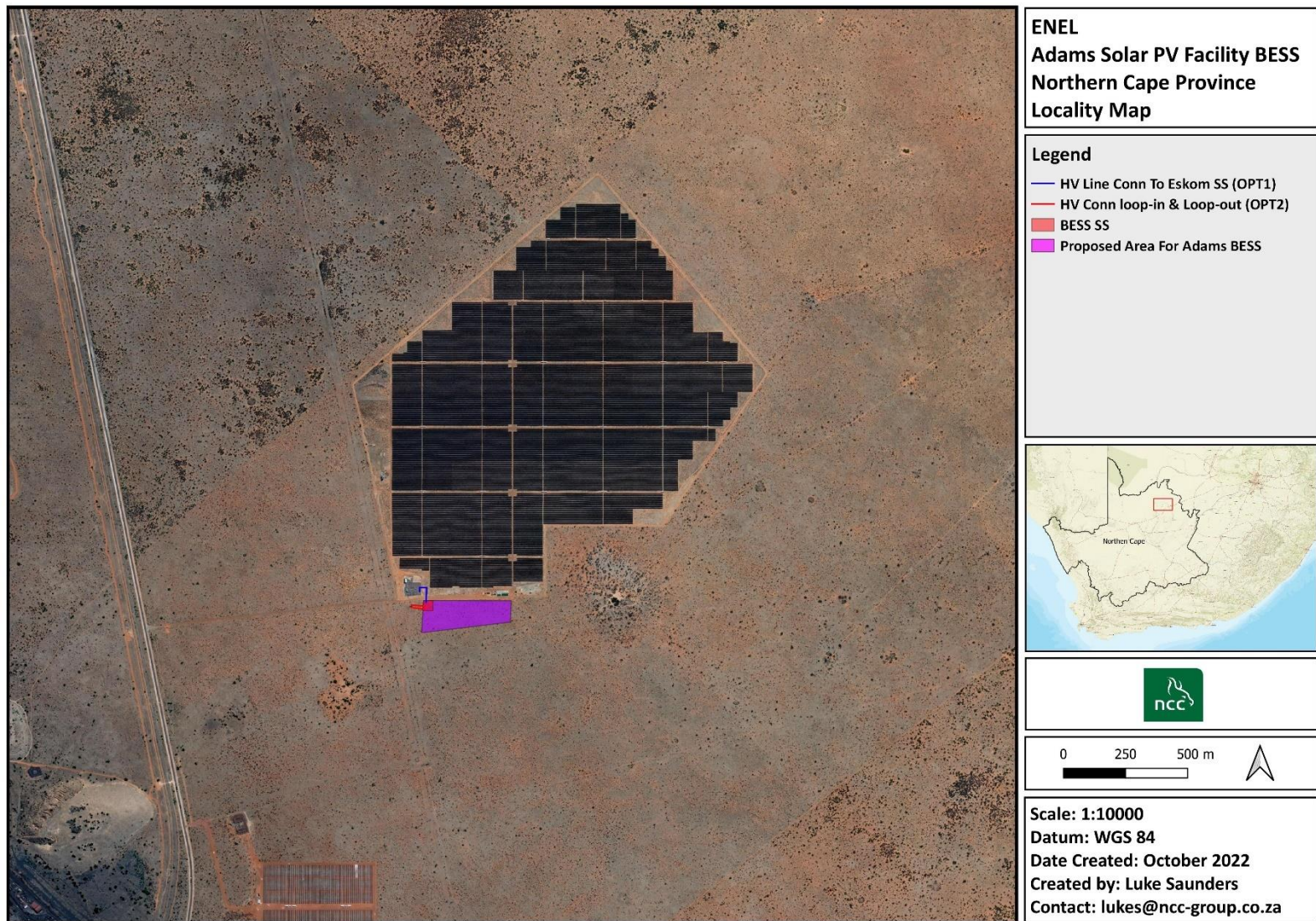
Table 1-3 provides an overview of Appendix 6 together with information on how these requirements have been met.

**Table 1-3: Specialist Report Requirements.**

Requirement from Appendix 6 of GN 326 of 7 April 2017	Chapter
(a) Details of- (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae	Chapter 1 Appendix A
(b) Declaration that the specialist is independent in a form as may be specified by the competent authority	<i>Declaration of Independence</i>
(c) Indication of the scope of, and the purpose for which, the report was prepared	Chapter 1
(cA) An indication of the quality and age of base data used for the specialist report	Chapter 2, 3, 4 & 5
(cB) A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change.	Chapter 5 & 7
(d) the Duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Chapter 4 & 5
(e) Description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used.	Chapter 5
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure inclusive of a site plan identifying site alternative	Chapter 5
(g) Identification of any areas to be avoided, including buffers	Chapter 5
(h) Map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	Chapter 5
(I) Description of any assumptions made and any uncertainties or gaps in knowledge	Chapter 6
(j) Description of the findings and potential implications of such findings on the impact of the proposed activity, or activities	Chapter 5 Chapter 6 Chapter 7
(k) Mitigation measures for inclusion in the EMPr	Chapter 7
(I) Conditions for inclusion in the environmental authorisation	Chapter 5 to 7
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Chapter 5 to 7

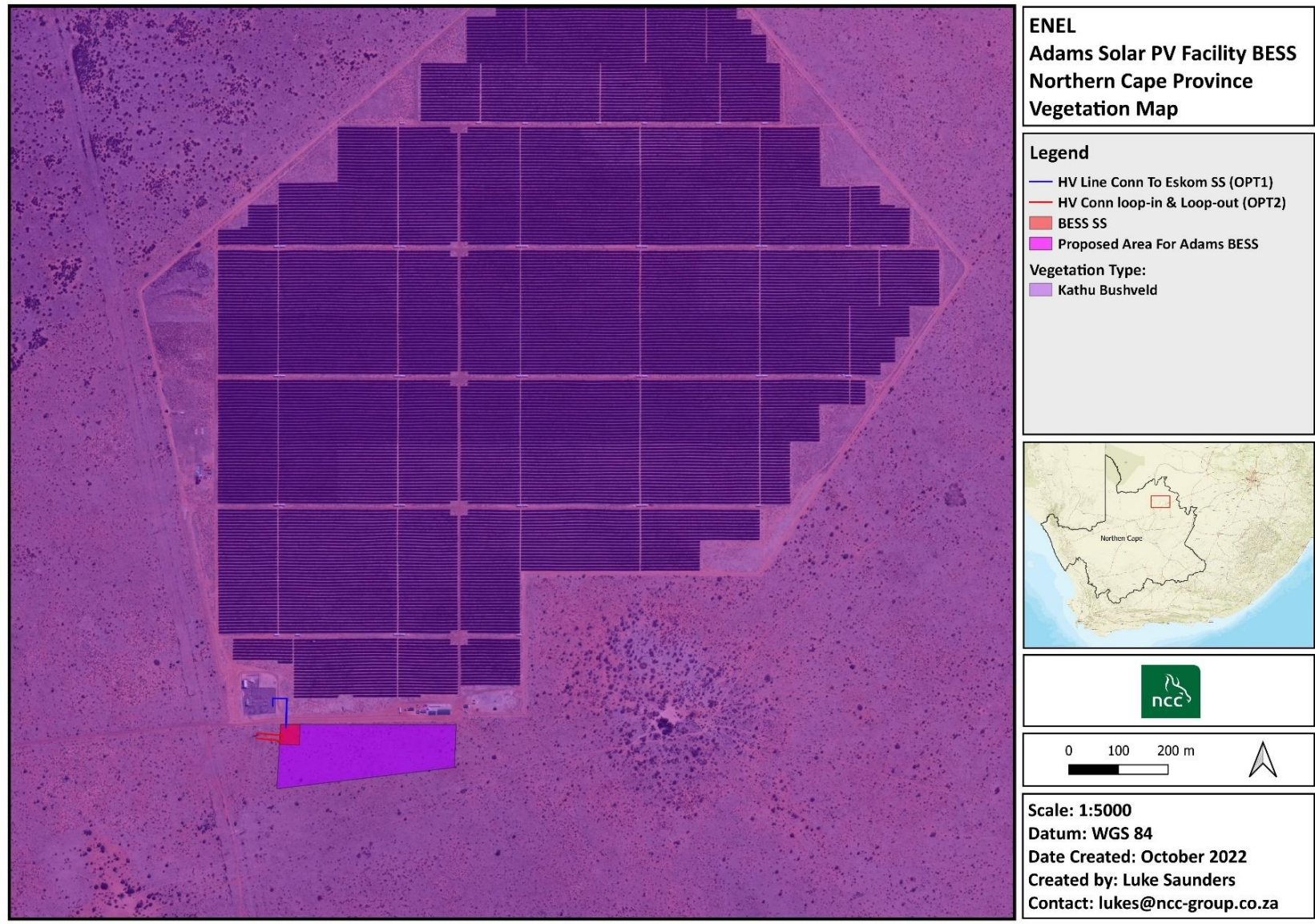


Requirement from Appendix 6 of GN 326 of 7 April 2017	Chapter
<p><b>(n) Reasoned opinion-</b></p> <p><b>(i) whether the proposed activity, activities or portions thereof should be authorised</b></p> <p><b>(iA) regarding the acceptability of the proposed activity or activities; and</b></p> <p><b>(ii) if the opinion is that the proposed activity, activities, or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMP, and where applicable, the closure plan</b></p>	<b>Chapter 7</b>
<b>(o) Description of any consultation process that was undertaken during the course of preparing the specialist report</b>	<b>Chapter 4</b>
<b>(p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto</b>	<b>Not Applicable</b>
<b>(q) Any other information requested by the competent authority</b>	<b>Not Applicable</b>



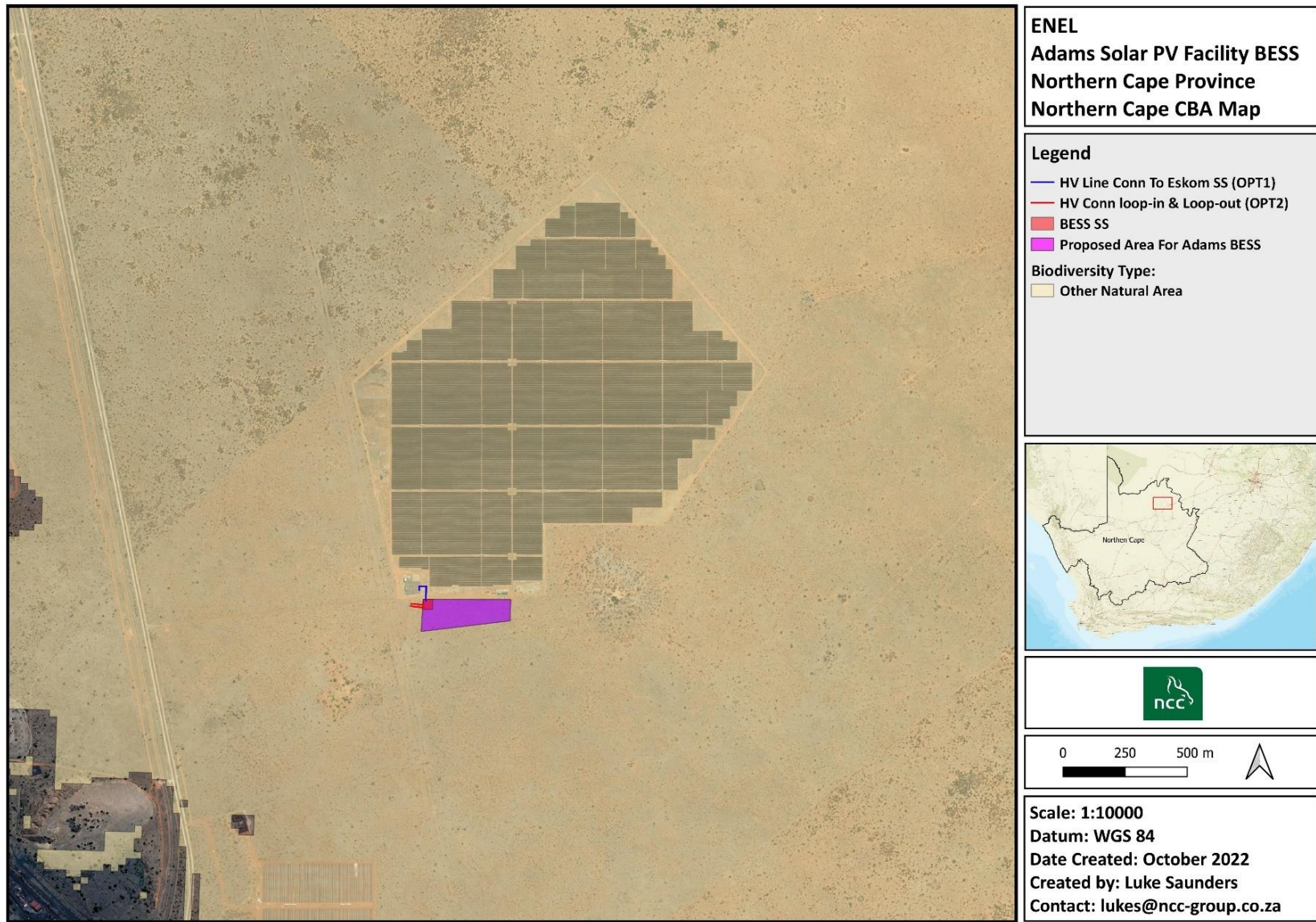
**Figure 1-1: Locality Map**





**Figure 1-2: Vegetation Map**





**Figure 1-3: Northern Cape CBA Map**



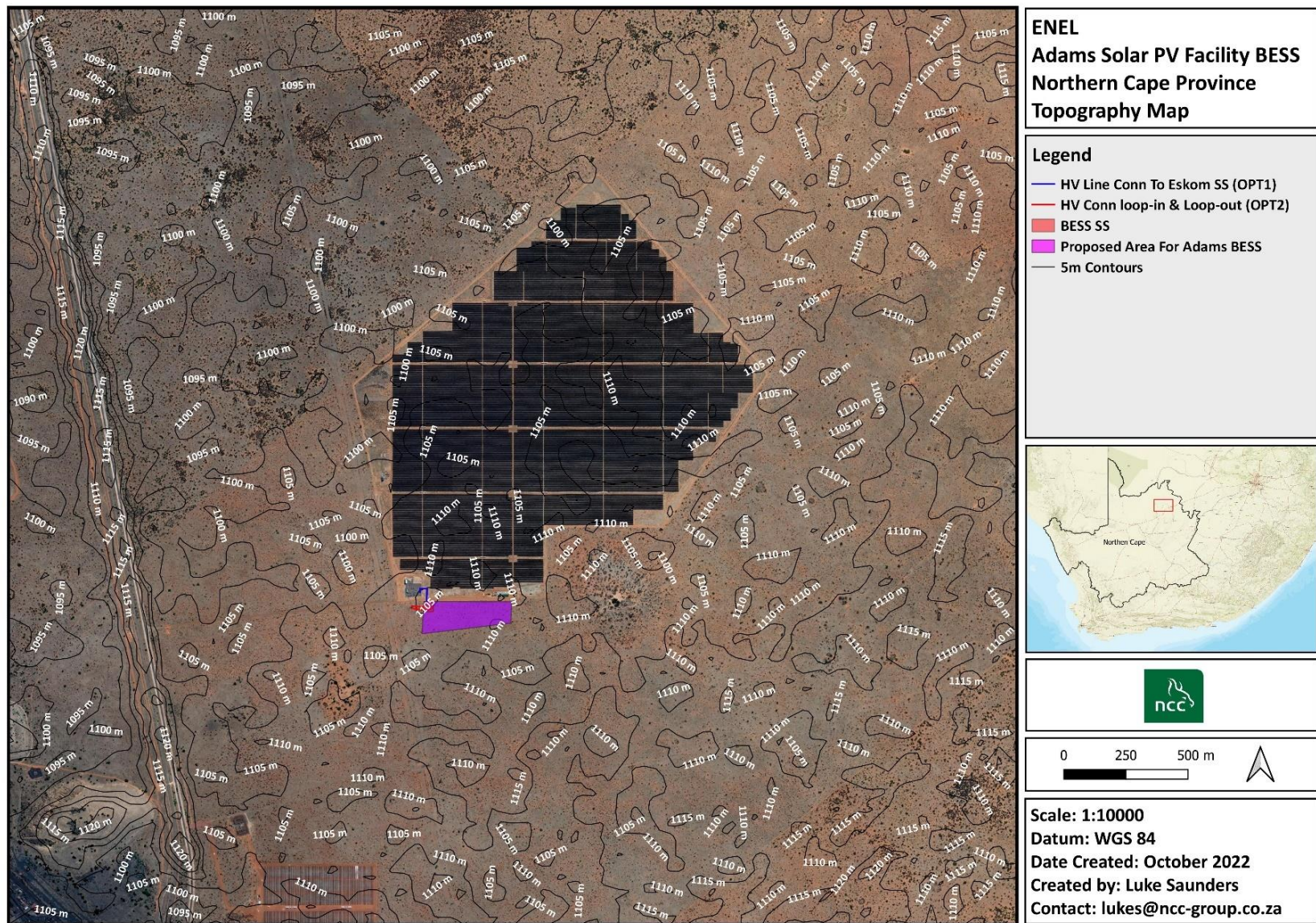


Figure 1-4: Topography Map

## 2 LEGISLATION AND GUIDELINES

The following policies and legislation are relevant to the Adams Solar PV Facility BESS:

The legislation, policies and guidelines listed below are applicable to the current project in terms of biodiversity and ecological support systems. The list below, although extensive, may not be exhaustive and other legislation, policies and guidelines may apply in addition to those listed below. Explanation of certain documents, organisations or legislation is provided (below in

Table 2-1) where these have a high degree of relevance to the project and/or are referred to in this assessment.

**Table 2-1:** A list of key legislative requirements relevant to biodiversity and conservation in the Northern Cape Province

INTERNATIONAL	Convention on Biological Diversity (CBD, 1993)
	The United Nations Framework Convention on Climate Change (UNFCCC, 1994)
	The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973)
	The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)
	Nomination file 914, 1999
	Advisory Body Evaluation (IUCN), 1999
	Component Areas of the Nominated Site, 1998
NATIONAL	Constitution of the Republic of South Africa (Act No. 108 of 2006)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
	The National Environmental Management Protected Areas Act (Act No. 57 of 2003)
	The National Environmental Management Biodiversity Act (Act No. 10 of 2004)
	The National Environmental Management: Waste Act, 2008 (Act 59 of 2008);
	The Environment Conservation Act (Act No. 73 of 1989)
	National Environmental Management Air Quality Act (No. 39 of 2004)
	National Protected Areas Expansion Strategy (NPAES)
	Natural Scientific Professions Act (Act No. 27 of 2003)
	National Biodiversity Framework (NBF, 2009)
	National Forest Act (Act No. 84 of 1998)
	National Veld and Forest Fire Act (101 of 1998)
	National Water Act, 1998 (Act 36 of 1998)
	National Freshwater Ecosystem Priority Areas (NFEPA's)
	National Spatial Biodiversity Assessment (NSBA)
	World Heritage Convention Act (Act No. 49 of 1999)
	National Heritage Resources Act, 1999 (Act 25 of 1999)



	Municipal Systems Act (Act No. 32 of 2000)
	Alien and Invasive Species Regulations, 2014
	South Africa's National Biodiversity Strategy and Action Plan (NBSAP)
	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)
	Sustainable Utilisation of Agricultural Resources (Draft Legislation).
	White Paper on Biodiversity

## 2.1 International Legislation and Policy

- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). CITES is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival; and
- The IUCN (World Conservation Union). The IUCN's mission is to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.

## 2.2 National Level

- Constitution of the Republic of South Africa (Act 108 of 1996). The Bill of Rights, in the Constitution of South Africa states that everyone has a right to a nonthreatening environment and requires that reasonable measures be applied to protect the environment. This protection encompasses preventing pollution and promoting conservation and environmentally sustainable development.
- The National Environmental Management: Biodiversity Act (NEM:BA) No. 10 of 2004: specifically, the management and conservation of biological diversity within the RSA and of the components of such biological diversity.
- National Forests Act, 1998 (Act 84 of 1998), specifically with reference to Protected Tree species.
- National Biodiversity Assessment (NBA): The National Biodiversity Assessment (NBA) was completed as a collaboration between the South African National Biodiversity Institute (SANBI), the Department of Environmental Affairs (DEA) and other stakeholders, including scientists and biodiversity management experts throughout the country over a three-year period (Driver et al., 2011). The purpose of the NBA is to assess the state of South Africa's biodiversity with a view to understanding trends over time and informing policy and decision-making across a range of sectors (Driver et al., 2011).
- National Water Act (NWA, 1998), The Department of Water & Sanitation (DWS) is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers. The National Water Act (NWA) (Act No. 36 of 1998) allows for the protection of water resources, which includes:

- The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way.
- The prevention of the degradation of the water resource; and
- The rehabilitation of the water resource.
- A watercourse means:
  - A river or spring.
  - A natural channel in which water flows regularly or intermittently.
  - A wetland, lake, or dam into which, or from which, water flows; and
  - Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.
- The NWA recognises that the entire ecosystem, and not just the water itself, and any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the DWS.
- For the purposes of this project, a wetland area is defined according to the NWA (Act No. 36 of 1998): “Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil”.
- Wetlands have one or more of the following attributes to meet the NWA wetland definition (DWAF, 2005):
  - A high-water table that results in the saturation at or near the surface, leading to anaerobic conditions developing in the top 50 cm of the soil.
  - Wetland or hydromorphic soils that display characteristics resulting from prolonged saturation, i.e., mottling, or grey soils; and
  - The presence of, at least occasionally, hydrophilic plants, i.e., hydrophytes (water loving plants).

### 2.3 Provincial and Municipal Level

The Provincial Department responsible for environmental matters in the **Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform**. Relevant provincial legislation includes, but is not limited to:

- Northern Cape Planning and Development Act No. 7 of 1998.
- Cape Nature and Environmental Conservation Ordinance 19 of 1974.



### 3 METHODOLOGY

A site visit was undertaken during the summer months on 13 December 2021 and revisited in February 2022. This complies with the Minimum requirements for biodiversity assessments.

#### 3.1 Desktop assessment

The following information sources were considered for the desktop assessment:

- Information as presented by the South African National Biodiversity Institutes (SANBI's) Biodiversity Geographic Information Systems (BGIS) website (<http://bgis.sanbi.org>).
- Aerial imagery (Google Earth Pro).
- Topographical watercourse data sets.
- Land Type Data (Land Type Survey Staff, 1972 - 2006).
- The National Freshwater Ecosystem Priority Areas (Nel, et al., 2011).
- Contour data (5 m).

#### 3.2 Biodiversity Assessment Methodology

##### 3.2.1 Geographic Information Systems (GIS) Mapping

Existing data layers were incorporated into GIS software. Emphasis was placed on the following spatial datasets:

- Vegetation Map of South Africa, Lesotho, and Swaziland (Mucina *et al.*, 2006).
- Important Bird Areas 2015 – BirdLife South Africa (vector geospatial dataset); and
- Department of Environmental Affairs (DEA) National Land cover 2015.

Field surveys were conducted to confirm (or refute) the presence of species identified in the desktop assessment. The specialist disciplines completed for this study included:

- Botanical.
- Fauna (mammals and avifauna); and
- Herpetology (reptiles and amphibians).

Brief descriptions of the standardised methodologies applied in each of the specialist disciplines are provided below.

### 3.2.2 Botanical Assessment

The botanical study encompassed an assessment of all the vegetation units and habitat types within the project area. The focus was on an ecological assessment of habitat types as well as identification of any Red Data species within the known distribution of the project area. The methodology included the following survey techniques:

- Sensitivity analysis based on structural and species diversity; and
- Identification of potential floral red-data species.

#### 3.2.2.1 Literature Study

A literature review was conducted as part of the desktop study to identify the potential habitats present within the project area. The South African National Biodiversity Institute (SANBI) provides an electronic database system, namely the Botanical Database of Southern Africa (BODATSA), to access distribution records on southern African plants. This is a new database which replaces the old Plants of Southern Africa (POSA) database. The POSA database provided distribution data of flora at the quarter degree square (QDS) resolution.

The Red List of South African Plants website (SANBI, 2021) was utilized to provide the most current account of the national status of flora. Relevant field guides and texts consulted for identification purposes in the field during the surveys included the following:

- Field Guide to the Wildflowers of the Highveld (Van Wyk & Malan, 1997).
- A Field Guide to Wildflowers (Pooley, 1998).
- Guide to Grasses of Southern Africa (Van Oudtshoorn, 1999).
- Orchids of South Africa (Johnson & Bytebier, 2015).
- Guide to the Aloes of South Africa (Van Wyk & Smith, 2014).
- Medicinal Plants of South Africa (Van Wyk et al., 2013).
- Freshwater Life: A field guide to the plants and animals of southern Africa (Griffiths & Day, 2016); and
- Identification Guide to Southern African Grasses. An identification manual with keys, descriptions, and distributions. (Fish *et al.*, 2015).
- Adams Photovoltaic Solar Energy Facility, Northern Cape: Fauna & Flora Specialist Report for Impact Assessment by EScience Associates, 2012.

Additional information regarding ecosystems, vegetation types, and species of conservation concern (SCC) included the following sources:

- The Vegetation of South Africa, Lesotho, and Swaziland (Mucina & Rutherford, 2012).
- Grassland Ecosystem Guidelines: landscape interpretation for planners and managers (SANBI, 2013); and
- Red List of South African Plants (Raimondo et al., 2009; SANBI, 2016).

### 3.2.3 Faunal Assessment (Mammals & Avifauna)

#### 3.2.3.1 The faunal desktop assessment included the following:

- Literature Review to familiarise the specialist with the information available.
- Compilation of expected species lists.
- Compilation of identified species lists.
- Identification of any Red Data or SCC present or potentially occurring in the area; and
- Emphasis was placed on the probability of occurrence of species of provincial, national, and international conservation importance.
- Mammal distribution data were obtained from the following information sources:
  - The Mammals of the Southern African Subregion (Skinner & Chimimba, 2005).
  - Bats of Southern and Central Africa (Monadjem *et al.*, 2010).
  - The 2016 Red List of Mammals of South Africa, Lesotho, and Swaziland ([www.ewt.org.za](http://www.ewt.org.za)) (EWT, 2016).
  - Animal Demography Unit (ADU) - MammalMap Category (MammalMap, 2022) ([mammalmap.adu.org.za](http://mammalmap.adu.org.za)); and
  - A Field Guide to the Tracks and Signs of Southern, Central and East African Wildlife (Stuart & Stuart, 2013).
  - Adams Photovoltaic Solar Energy Facility, Northern Cape: Fauna & Flora Specialist Report for Impact Assessment by EScience Associates, 2012.

#### 3.2.3.2 The faunal field survey component of the study utilised a variety of sampling techniques including, but not limited to, the following:

- Visual observations; and
- Identification of tracks and signs.
- Habitat types sampled included disturbed and semi-disturbed zones, drainage lines and wetlands.

### 3.2.4 Herpetology (Reptiles & Amphibians)

#### 3.2.4.1 The desktop assessment in terms of herpetology included

- Literature Review to familiarise the specialist with the information available. Herpetofauna distributional data was obtained from the following information sources:
  - South African Reptile Conservation Assessment (SARCA) ([sarca.adu.org](http://sarca.adu.org)).
  - A Guide to the Reptiles of Southern Africa (Alexander & Marais, 2007).
  - Field guide to Snakes and other Reptiles of Southern Africa (Branch, 1998).
  - Atlas and Red list of Reptiles of South Africa, Lesotho, and Swaziland (Bates *et al.*, 2014).
  - A Complete Guide to the Frogs of Southern Africa (du Preez & Carruthers, 2009).
  - Animal Demography Unit (ADU) - FrogMAP ([frogmap.adu.org.za](http://frogmap.adu.org.za)).
  - Atlas and Red Data Book of Frogs of South Africa, Lesotho, and Swaziland (Mintner *et al.*, 2004); and
  - Ensuring a Future for South Africa's frogs (Measey, 2011).
- Compilation of expected species lists.
- Compilation of identified species lists.
- Identification of any Red Data or SCC present or potentially occurring in the area; and
- Emphasis was placed on the probability of occurrence of species of provincial, national, and international conservation importance.

#### 3.2.4.2 The herpetological field survey comprised the following techniques:

- Diurnal hand searches are used for reptile species that shelter in or under particular microhabitats (typically rocks, exfoliating rock outcrops, fallen timber, leaf litter, bark etc.).
- Visual searches - typically undertaken for species whose behaviour involves surface activity or for species that are difficult to detect by hand-searches or pitfall trapping.
- May include walking transects or using binoculars to view the species from a distance without the animal being disturbed.
- Amphibians – many of the survey techniques listed above would be able to detect species of amphibians. Over and above these techniques, vocalisation sampling techniques are often the best to detect the presence of amphibians as each species has a distinct call.
- Opportunistic sampling - reptiles, especially snakes, are incredibly elusive and difficult to observe. Consequently, all possible opportunities to observe reptiles are taken in order to augment the standard sampling procedures described above.

### 3.3 Impact Assessment Methodology

#### 3.3.1 Overview

The impacts identified have been assessed using the methodology described below.

##### 3.3.1.1 Impact Assessment Criteria

The criteria used for the assessment of potential impacts are described in Table 3-1.

**Table 3-1:** Impact Assessment Criteria

Criteria	Description
Nature	Includes a description of what causes the effect, what would be affected and how it would be affected.
Extent	Physical and spatial scale of the impact.
Duration	Lifetime of the impact is measured in relation to the lifetime of the project.
Intensity	Examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment.
Probability	This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the lifecycle of the activity, and not at any given time.
Status	Description of the impact as positive, negative, or neutral, and direct or indirect.
Significance	Synthesis of the characteristics described above and assessed as low, medium, or high. Distinction would be made for the significance rating without the implementation of mitigation measures and with the implementation of mitigation measures.

##### 3.3.1.2 Extent

The physical and spatial scale of the impact is classified below.

**Table 3-2:** Description of Extent Criteria

Description	Explanation	Scoring
Footprint	Impacted area extends only as far as the activity, such as footprint occurring within the total site area.	1
Site	Impact could affect the whole, or a significant portion of the site.	2
Regional	Impact could affect the area around the site including neighbouring farms, Transport routes and adjoining towns.	3
National	Impact could have an effect that expands throughout the country (South Africa).	4
International	Impact has international ramifications that go beyond the boundaries of South Africa	5

### 3.3.1.3 Duration

The lifetime of the impact is measured in relation to the lifetime of the proposed operation of the existing project.

**Table 3-3:** Description of Duration Criteria

Description	Explanation	Scoring
Short term	Impact would either disappear with mitigation or would be mitigated through a natural process in a period shorter than any of the development phases.	1
Short to medium term	Impact would be relevant through to the end of the construction phase.	2
Medium term	Impact would last up to the end of the development phases, where after it would be entirely negated.	3
Long term	Impact would continue or last for the entire lifetime of the development but would be mitigated by direct human action or by natural processes thereafter.	4
Permanent	The only impact class that is non-transitory. Mitigation by man or natural process would not occur in such a way or time span that the impact can be considered transient.	5

### 3.3.1.4 Intensity

The assessment of the intensity of the impact would be measured using the criteria listed in the following table.

**Table 3-4:** Description of Intensity Criteria

Description	Explanation	Scoring
Low	Impact alters the affected environment in such a way that the natural processes or functions are not affected.	2
Low-Medium	Impact alters the affected environment in such a way that the natural processes or functions are slightly affected.	4
Medium	Affected environment is altered, but functions and processes continue, albeit in a modified way.	6
Medium-High	Affected environment is altered, and the functions and processes are modified immensely.	8
High	Function or process of the affected environment is disturbed to the extent where the function or process temporarily or permanently ceases.	10

### 3.3.1.5 Probability

Probability describes the likelihood of the impact(s) occurring for any length of time during the lifecycle of the activity, and not at any given time. The following table shows the classes.

**Table 3-5:** Description of Probability Criteria

Description	Explanation	Scoring
Improbable	Possibility of the either impact occurring is none, due to the circumstances, design, or experience. The chance of this impact occurring is thus zero (0%).	1
Possible	Possibility of the impact occurring is very low, either due to the circumstances, design, or experience. The chances of this impact occurring are defined as 25%.	2
Likely	There is a possibility that the impact would occur to the extent that provisions must therefore be made. The chances of this impact occurring are defined as 50%.	3
Highly likely	It is most likely that the impacts would occur at some stage of the Development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring are defined as 75%.	4
Definite	Impact would take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied upon. The chance of this impact occurring is defined as 100%.	5

### 3.3.1.6 Confidence

The level of knowledge or information that the specialist had in their judgement is rated as shown in the following table. Note that this criterion is not given a numerical value.

**Table 3-6:** Description of Confidence Criteria

Description	Explanation
Low	Judgement is based on intuition and not on knowledge or information.
Medium	Judgement is based on common sense and general knowledge.
High	Judgement is based on scientific and/or proven information.

### 3.3.1.7 Reversibility

Reversibility is the ability of the affected environment to recover from the impact, with or without mitigation. Note that this criterion is not given a numerical value.

**Table 3-7:** Description of Reversibility Criteria

Description	Explanation
Yes	The affected environment would be able to recover from the impact.
No	The affected environment, which is permanently modified, would be unable to recover from the impact.

### 3.3.1.8 Replicability

Replicability is an indication of the scarcity of the specific set of parameters that make up the affected environment. That is, if lost can the affected environment be (a) recreated, or (b) is it a common set of characteristics and thus if lost is not considered a significant loss. Note that this criterion is not given a numerical value.

**Table 3-8:** Description of Replicability Criteria

Description	Explanation
Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).
No	Affected environment is irreplaceable.

### 3.3.1.9 Level of Significance

Based on the above criteria, the significance of issues would be determined using the following formula:

$$\text{Significance} = (\text{Extent} + \text{Duration} + \text{Intensity}) \times \text{Probability}$$

This is the importance of the impact in terms of physical extent and time scale, and is rated as follows:

**Table 3-9:** Impact Assessment Significant Rating

Significance	Description	Scoring
No Impact	There is no impact	0 – 10
Low	Impacts are less important. Some mitigation is required to reduce the negative impacts.	11 – 30
Medium	Impacts are important and require attention. Mitigation is required to reduce the negative impacts.	31 – 60
High	Impacts are of high importance. Mitigation is essential to reduce the negative impacts.	61 – 89
Fatal Flaw	Impacts present a fatal flaw, and alternatives must be considered	90 – 100



### 3.3.2 Identification of Mitigation Measures

The purpose of mitigation measures is to reduce the significance level of the anticipated negative impact. Therefore, the reduction in the significance level after mitigation is directly related to the scores used in the impact assessment criteria. The effect of potential mitigation measures to reduce the overall significance level is also to be considered in each issues table (i.e., values with and without mitigation are presented).

### 3.3.3 Ascribing Significance to Cumulative Impacts

In ascribing significance to cumulative impacts, it should be noted that impacts cannot be assessed in isolation and an integrated approach requires that cumulative impacts would be included in the assessment of individual impacts. The nature of the impact would be described in such a way as to detail the potential cumulative impact of the activity if there is indeed a cumulative impact. For example, dust and air emissions cannot be assessed in isolation of the potential cumulative impact of increased emissions into the atmosphere. Similarly, if water quality is improved within the immediate surroundings of the proposed activities, this would most certainly have a ripple effect/ cumulative impact on the greater water quality in the area.

The impacts were assessed, and significance ratings allocated, after which the project was assessed on a holistic basis to determine the overall project impact on the receiving environment. This is a function of the individual impacts as well as the cumulative nature of combining all those impacts within a single context/ project.

## 3.4 Biodiversity and Conservation Importance

The 2016 Northern Cape CBA Map classified areas within the province on the basis of its contribution to reach the conservation targets within the province:

- Critical Biodiversity Areas 1 and 2 (CBA).
- Ecological Support Areas (ESA).
- Other Natural Areas; and
- Protected Areas.

Critical Biodiversity Areas (CBAs) are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. CBAs are areas of high biodiversity value and need to be kept in a natural state, with no further loss of habitat or species. Thus, if these areas are not maintained in a natural or

near natural state then biodiversity targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (SANBI- BGIS, 2022).

Ecological Support Areas (ESAs) are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services. Critical Biodiversity Areas and Ecological Support Areas may be terrestrial or aquatic (SANBI-BGIS, 2021).

Other Natural Area (ONA) are areas that have not been identified as a priority in the current biodiversity spatial plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. Although they have not been prioritised for meeting biodiversity targets, they are still an important part of the natural ecosystem.

The study site occurs within the Kathu Bushveld. The conservation status of the Kathu Bushveld is considered **Least Threatened**. Target 16%. None conserved in statutory conservation areas. More than 1% already transformed, including the iron ore mining locality at Sishen, one of the biggest open-cast mines in the world. Erosion is very low.

## 4 ASSUMPTIONS AND GAPS

Consultation as part of the overall environmental authorization process is being undertaken by NCC Environmental Services (Pty) Ltd.

The following limitations with respect to the assessment of the property are applicable to this report:

- Sampling, by nature, implies that not all species in a study site would be recorded due to factors such as plant phenology as affected by seasonality, seasonal climatic conditions, microhabitats and both historical and current management practices
- The site inspection was a single site visit and no specialist sampling techniques utilised.
- Sampling was undertaken during the summer period and the flowering period of the summer rainfall season.
- Field assessment notes are supplemented by making use of literature sources and existing data bases (SANBI, Reference books, Articles etc.); and
- The main ecological and floristic observations, forming the basis for recommendations, are, however, based on the field assessment observations.

## 5 FINDINGS AND RESULTS

### 5.1 Habitat and Vegetation Characteristics

An outline of the main landscape and habitat characteristics of the study site is provided in Table 5-1.

**Table 5-1:** Outline of main landscape and habitat characteristics of the site.

HABITAT FEATURE	DESCRIPTION
Topography	The study area is generally flat.
Rockiness	No rockiness was observed in the study area where the BESS is proposed.
Presence of wetlands	Only the NFEPA wetland clusters and river systems towards the northwest and northeast approximately 2km from the site was observed. Watering points are located towards the west.
Overview of vegetation	Refer to the vegetation description below.
Signs of disturbances	Limited impacts on the site includes a fence and road running underneath an existing Eskom powerline, while grazing by livestock was also observed. No termite mounds were observed on the site.
Connectivity of natural vegetation at the site and between the site and surrounding areas	Connectivity cannot be excluded. The vegetation and drainage may still fulfil an ecological function by sustaining biodiversity and ecological maintenance of downstream users as well as maintenance of ecological biodiversity drivers.

Within the site, there was little apparent variation in the vegetation composition. In some areas, such as near the watering points, the density of trees was somewhat higher, and the grass layer grazed out. However, there were no significant differences visible that warranted recognition as different plant communities within the site. It is possible that the dry conditions at the time of sampling as well as the burnt condition of a large proportion of the site may have hindered the recognition of the different communities within the site. However, this seems unlikely as the substrate was very homogenous and there was little significant variation in the woody layer. In addition, no drainage lines or other edaphic features occur within the site that might lead to differentiation of the vegetation.

Within the site, the vegetation consists of a tree layer, comprised mainly of *Acacia haematoxylon*, *Acacia mellifera*, *Acacia erioloba* and *Grewia flava*, with a grassy understorey consisting mainly of perennial grass species such as *Schmidtia pappophoroides*, *Aristida meridionalis*, *Eragrostis lehmanniana* and *Stipagrostis uniplumis*. There are some occasional shrubs present, such as *Gnidia polycephala*, *Hermannia tomentosa* and *Melolobium macrocalyx*. Other large woody species that occurred at the site as scattered individuals or localized clumps include *Searsia lancea*, *Acacia hebeclada*, *Lycium hirsutum* and *Tarchonanthus camphoratus*.

## 5.2 Assessment of Plant Species of Conservation Concern

No individuals of the endemic or biogeographically important plants were observed during the survey, although it may have previously been found in the larger area.

No red data species potentially occur in the QDS of the study area according to the SIBIS database. No other red data species was also found in the area, although the potential habitats were surveyed to the extent representative of the area.

None of these threatened species were identified during the site inspection.

In terms of protected trees, the National Forest Act (Act no.84 of 1998: National Forest Act, 1998) provides a list of tree species that are considered important in a South African perspective as a result of scarcity, high utilization, common value, etc. In terms of the National Forest Act of 1998, these tree species may not be cut, disturbed, damaged destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased, or sold – except under license granted by DWS (or a delegated authority). Obtaining relevant permits are therefore required prior to any impact on these individuals. Taking cognizance of the data obtained from the field surveys.

*Boscia albitrunca*, *Acacia haematoxylon*, and *Acacia erioloba* are located within the study area and need to be tagged as these are species of concern and protected under the National Forestry Act, 1998. No *Boscia albitrunca* was found on either site.

At the time of assessment (February 2022), following weeks of rainfall, alternative B (the “new” site) was covered in a swathe of dense green grass in keeping with the vegetation type of the area. This grass layer caused a limitation in terms of the ability to assess the geophytic, forb and shrub component which was mostly obscured. Likewise, tree counting, due to large numbers is estimated.

The site has two (2) protected tree species types of present: *Vachellia erioloba* (Camel Thorn) est 91 and *Vachellia haematoxylon* (Gray Camel Thorn) est 66 presents as well as many bird nests utilising these trees (refer Photograph 1).





**Photograph 1:** *Vachellia erioloba* (Camel Thorn) found on the site (Altern, February 2022).



**Photograph 2:** *Vachellia haematoxylon* (Gray camel thorn) found on the site (Altern, February 2022).

Medicinal species such as *Elephantorrhiza elephantina* (LC) are present on site and it is suspected that species such as *Hypoxis iridifolia* could be found if not for the dense grassy layer obscuring this ground layer during the season of assessment.





**Photograph 3:** Medicinal plant *Elephantorrhiza elephantina* (LC) ‘Least Concern’ found on the site (Altern, February 2022).

Protected species including *Boophone disticha* (century plant or gifbol) and *Harpagophytum procumbens* (Devils Claw) are highly likely to be found on the site due to their confirmed presence close by (<2km) in similar veld type and condition.





**Photograph 4:** *Boophone disticha* found nearby (**Altern, February 2022**).



**Photograph 5:** *Harpagophytum procumbens* (Devils Claw) found nearby (**Altern, February 2022**).



The development would cause loss of indigenous vegetation triggering NEMA EIA notices as well as the loss of protected tree species, the latter of which would require a permit from DFFE to remove and destroy and the former Environmental Authorisation (EA).

Even though the loss of the vegetation of the site would be high intensity (complete removal) permanent and irreversible, the species themselves, whilst some protected, as well as the vegetation type are mostly all LC (Least Concern). Therefore, the botanical loss (reduction) of the area of Kathu Bushveld, as well as the loss of individual trees and plant species, from the site would not have a significant negative effect on either the vegetation type unit nor on the individual trees or plants as species due to their least concern (abundant and widespread) status.

It is suggested that botanical search and rescue be undertaken for protected species including *Boophone disticha*, *Harpagophytum procumbens* as well as any other protected and realistically relocatable floral species (succulent or geophytic types) known from the quarter degree square in which the site is located.

A list of the Species of Concern is located in Appendix 2 – Species lists based on the SANBI POSA site

### 5.3 Assessment of Vertebrate Species of Conservation Concern

In terms of mammals occurring within the quarter degree square 2723AC, a total of 11 species were found and two species were found to be Near Threatened or Vulnerable. In terms of the migrating and nesting birds in the quarter degree square a total of 70 different species occur in the area. Of this one species of birds were recorded on the Red List for birds in the quarter degree square. In terms of the reptilian species occurring in the area and quarter degree square, a total of 2 species were recorded. None of these, however, are threatened or on the red list.

### 5.4 Assessment of Invertebrate Species of Conservation Concern

In terms of butterfly species of concern in the area, a total of 25 species of butterfly occurs in the area, and none are on the IUCN red list.

### **5.5 Beetles of conservation priority**

No beetles of conservation priority were recorded within the quarter degree square 2723AC. The likelihood of these species occurring within the quarter degree square cannot be excluded.

### **5.6 Mygalomorph spiders of conservation priority**

None of the baboon spiders were recorded within the QSD 2723AC, however suitable habitat for spiders exists in the hardy thicket and grassland areas.



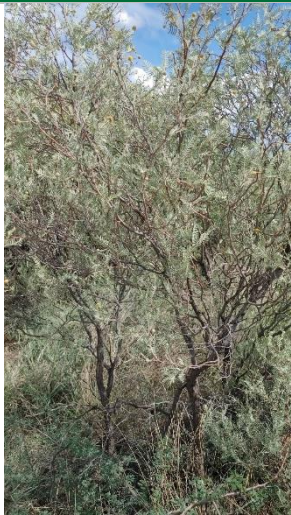



### **5.7 Scorpions of conservation priority**

None of the red listed scorpions were recorded within the QSD 2723AC. The chance-finding scorpions in the hardy thicket and grassland areas cannot be excluded. For more information on the species lists, please refer to Appendix 2 – Species Lists.

### **5.8 Termites and the management of them**

No visible signs of termite or termite mounts were observed on the site. The chance-finding of colonies in the hardy thicket and grasses cannot be excluded. The management of these is described and assessed in this report.

## 5.9 Photographic record

	
<p>General view of the study site looking westwards.</p>	<p>View of a <i>Senegalia nigrescens</i> found on the site.</p>
	
<p>View of a <i>Vachellia erioloba</i> on the site where the BESS is proposed.</p>	<p>View of a <i>Boscia albitrunca</i> located in the study area</p>
	
<p>General view from the site looking easterly. Note the scattered thorn trees</p>	<p>View of a <i>Carthamus lanatus</i> located in the study area</p>



View of *Cucumis myriocarpus* found in the study area



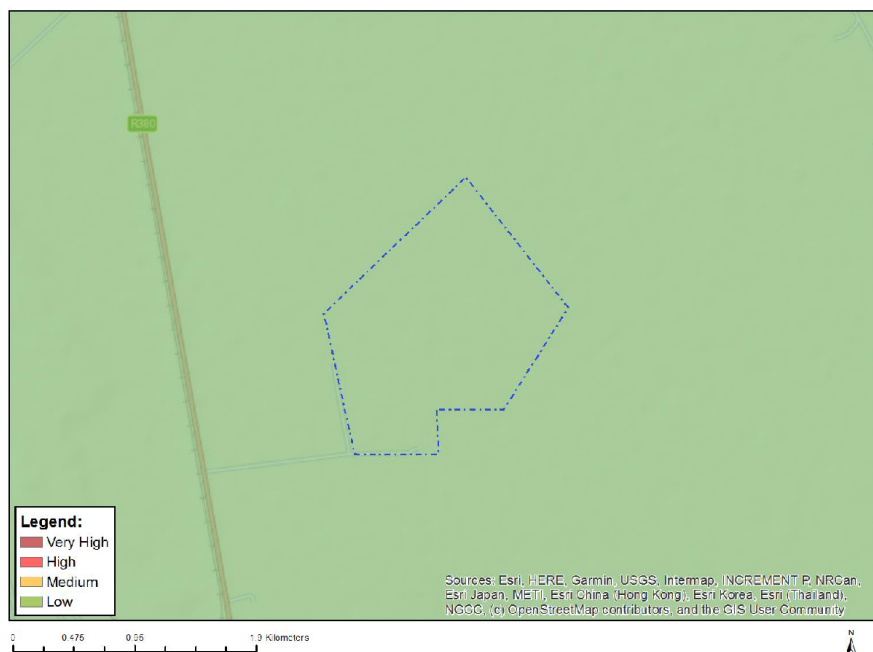
View of a *Vachellia haematoxylon* on the site where the BESS is proposed.

### 5.10 Site Sensitivity

Based on the findings above, the following maps depict the delineation of the study site and the overall ecological sensitivity on the study site for the BESS. Sensitive features identified at the site are indicated in Figure 5-3.

Anthropogenic impacts identified included grazing, infrastructure development (Adams Solar PV Facility), hardening of surfaces to install power lines and road, and few scattered alien invasive species occurring at the site.

## MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY



Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at [eiadatarequests@sanbi.org.za](mailto:eiadatarequests@sanbi.org.za) listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

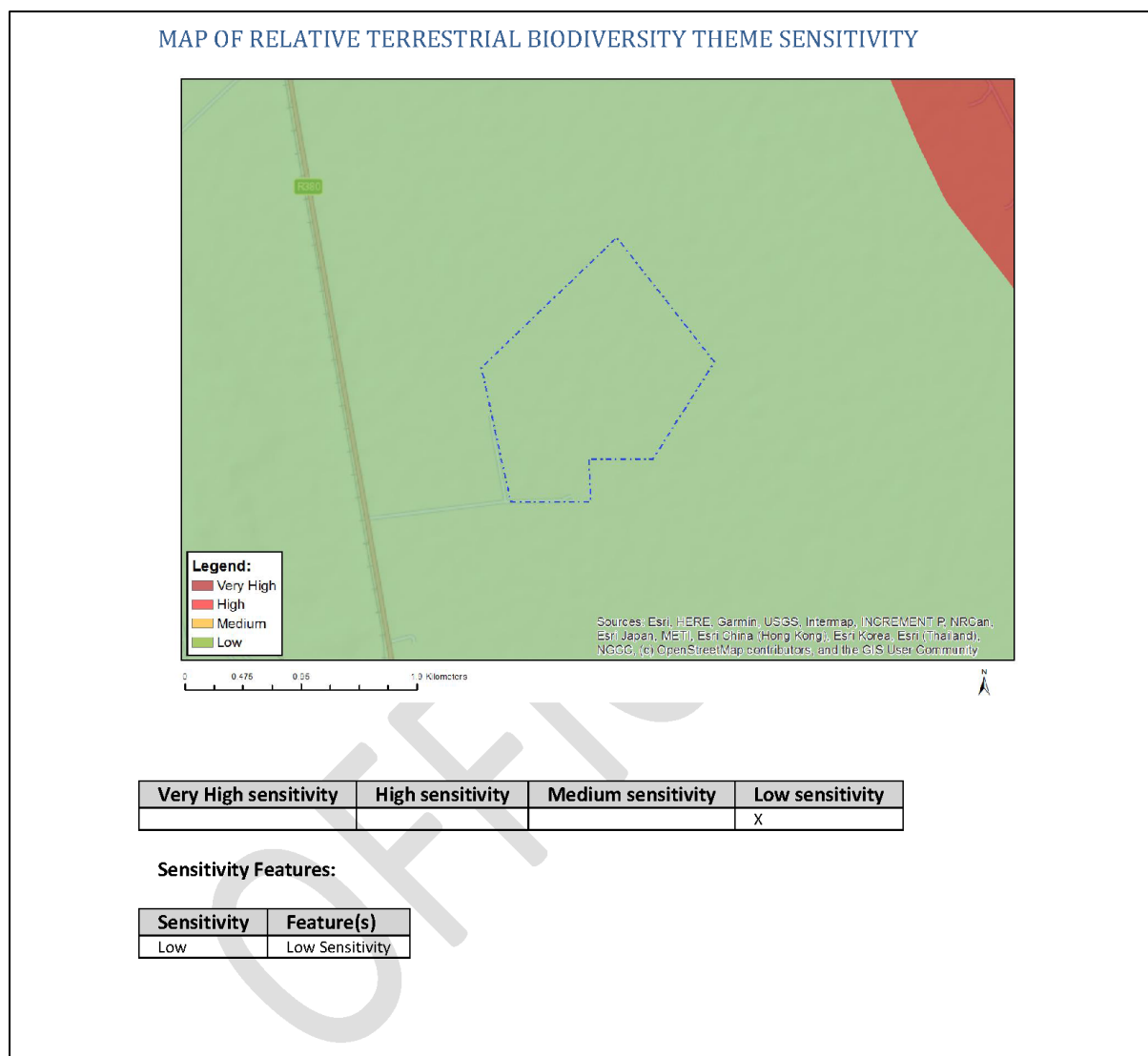
### Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity

**Figure 5-1: Plant species sensitivity as per the DEFF Screening Tool**

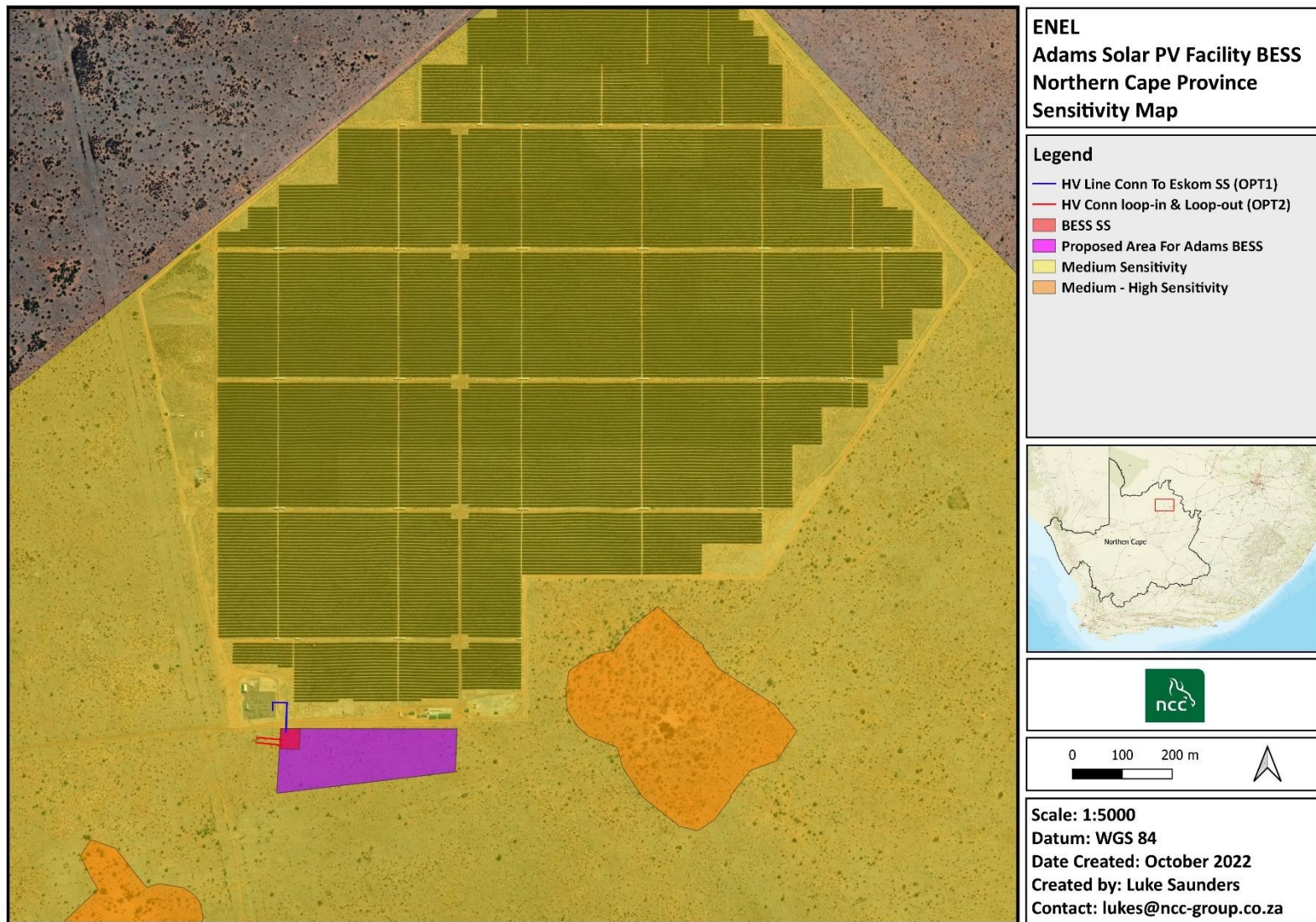
Based on the DEFF Screening Tool and the Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in Terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation the site falls within a Low Plant species sensitivity. From the site visit it can be confirmed that the sensitivity of the site is medium.





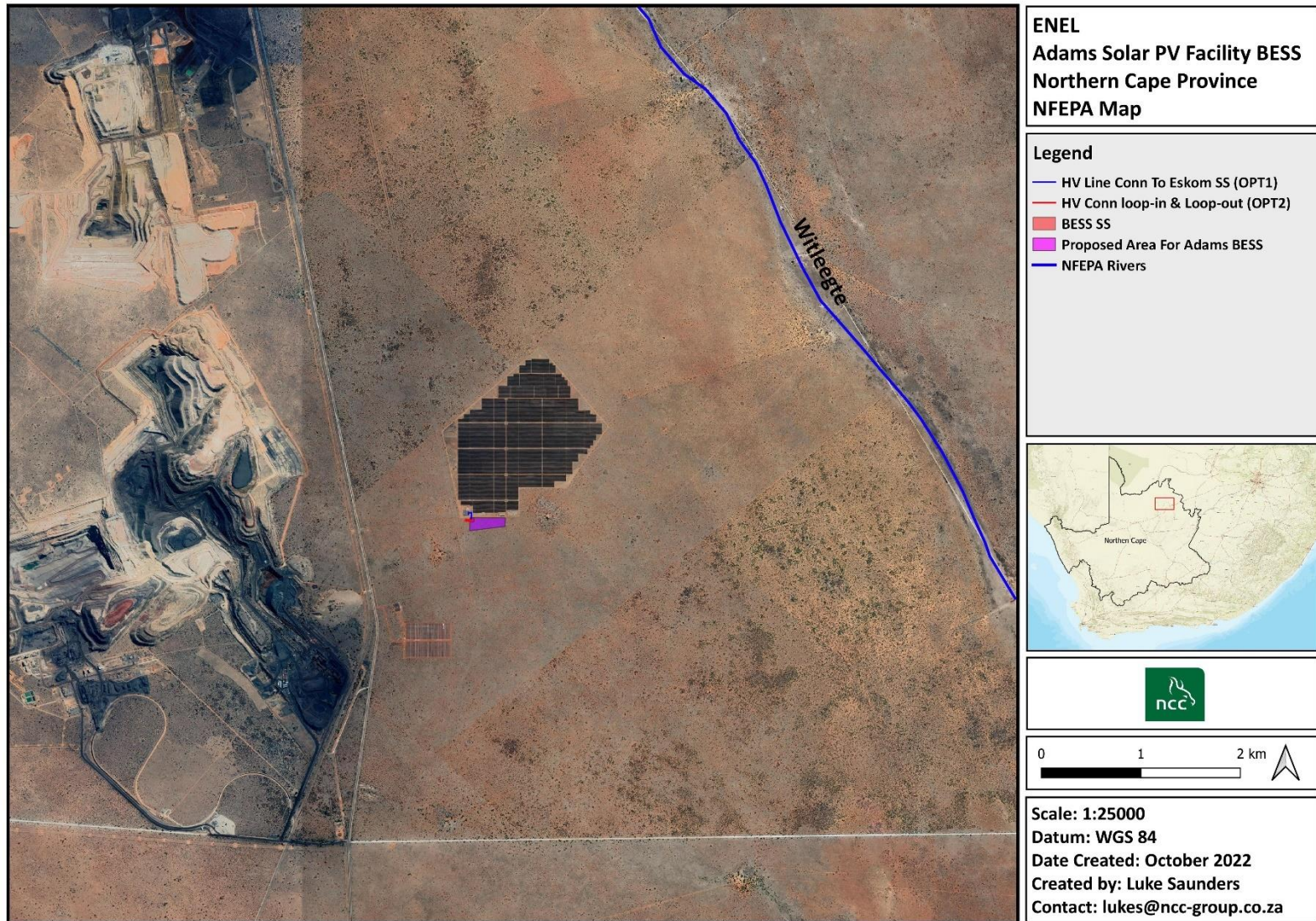
**Figure 5-2: Terrestrial Biodiversity sensitivity as per the DEFF Screening Tool**

Based on the DEFF Screening Tool and the Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in Terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation the site falls within a low Terrestrial Biodiversity Sensitivity. From the site visit it can be confirmed that the onsite sensitivity of the site is Medium (grasslands remain, however were impacted upon) The site still has a functional role to play for ecological connectivity.



**Figure 5-3: Terrestrial Sensitivities Map**





**Figure 5-4: NFEPA Wetlands**



## 6 IMPACT ASSESSMENT

The Northern Cape Critical Biodiversity Areas has been developed as a tool to assist in identifying the threatened habitats, including the threatened species often associated with these habitat types. The plan also considers other important ecological principles such as connectivity, functioning, corridors / linkages as tools for determining delineations of areas. The aforementioned factors were then used to delineate Critical (CBA) and Ecologically (ESA) sensitive areas, which warrant special attention during impact assessments.

The study site falls within other natural areas as indicated in Section 3.4. The study area has been influenced by anthropogenic activities ranging from transformation of grasslands and alien infestation, overgrazing, and hardening of surfaces. A high number medium sensitivity is expected as the area may provide nesting for birds, hiding spots for reptiles and observation points for mammalian species. Potential ecological impacts resulting from the development would stem from a variety of different activities and risk factors associated with the construction and operational phases of the project including the following:

### 6.1 CONSTRUCTION PHASE

The potential impacts associated with the various project stages are discussed below.

#### 6.1.1 Impacts on vegetation communities

The following potential impacts were considered on terrestrial vegetation communities:

- Destruction of, and fragmentation of, the remaining vegetation communities.

#### 6.1.2 Impacts on vegetation and protected tree species

Impacts on vegetation and protected tree species would occur due to the construction of the BESS facility.

##### 6.1.2.1 Mitigation measures:

- Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared.
- The final development area should be surveyed for species suitable for search and rescue, which should be translocated prior to the commencement of construction.
- Development would be likely to encourage alien plant invasion and measures to prevent and limit alien plant invasion should be implemented as part of the EMPr for the development.
- Protected trees should be tagged, and a permit obtained from the DAFF.

### 6.1.3 Increased Erosion risk

Increased erosion risk as a result of soil disturbance and loss of vegetation cover.

#### 6.1.3.1 Mitigation measures:

- Minimise the development footprint so that only areas where infrastructure would be located are cleared.
- Post-construction revegetation of all bare areas with local species.
- Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance.
- All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.
- An erosion management plan should be developed as part of the EMPr for the development.

### 6.1.4 Direct Fauna impacts Description of impact

Faunal habitat destruction, alteration, and physical disturbance.

#### 6.1.4.1 Mitigation measures:

- The site should not be fenced with electric fencing which is near to the ground.
- Any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person.
- The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the demarcated construction site.
- Fires should only be allowed within fire-safe demarcated areas.
- No fuelwood collection should be allowed on-site.
- No domestic animals should be allowed on site.
- If the site must be lit at night for security purposes, this should be done with low-UV type lights (such as most LEDs), which do not attract insects.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- Staff present during the operational phase should receive environmental education so as to ensure that that no hunting, killing, or harvesting of plants and animals occurs.

### 6.1.5 Disruption of broad-scale ecological processes

Disruption of the broad-scale ecological processes.

#### 6.1.5.1 Mitigation measures:

- Areas of natural vegetation within the site should be managed in a manner which promotes or is at least compatible with the maintenance of biodiversity at the site.

### 6.1.6 Soil and water pollution

Construction work of the magnitude contemplated for the proposed development would always carry a substantial risk of soil and water pollution, with large construction vehicles contributing substantially due to oil and fuel spillages.

#### 6.1.6.1 Mitigation measures:

- Water falling on areas polluted with oil/diesel or other hazardous substances must be contained.
- Any excess or waste material or chemicals should be removed from the site and discarded in an environmentally friendly way. The ECO should enforce this rule rigorously.
- Dry chemicals to be stored on an impervious surface protected from rainfall and stormwater run-off.
- Ensure that refuelling stations on site are constructed so as to prevent spillage of fuel or oil onto the soil and put in place measures to ensure that any accidental spillages can be contained and cleaned up promptly.
- Sewage should either be treated in a suitable plant or removed from the site for treatment elsewhere.
- Spill kits should be on-hand to deal with spills immediately
- Spillages or leakages must be treated according to an applicable procedure as determined by a plan of action for the specific type of disturbance for instance the maintenance management plan.
- All construction vehicles should be inspected for oil and fuel leaks regularly and frequently.

### 6.1.7 Air pollution

The environmental impacts of wind-borne dust, gases and particulates from the construction activities associated with the proposed development are primarily related to human health and ecosystem damage. The proposed development would typically comprise the following sources and associated air quality pollutants:

- Land clearing operations, building, and scraping
- Stockpiling (particulate matter)
- Materials handling operations (truck loading & unloading, tipping, stockpiling)
- Vehicle entrainment on paved and unpaved roads

- Windblown dust-fugitive emissions (stockpiles).

Dust pollution would impact the most severe during the construction phase. Construction vehicles and equipment are the major contributors to the impact on air quality. Dust is generated during site clearance for the construction of infrastructure.

#### **6.1.7.1 Mitigation measures:**

- Dust suppression must be undertaken in conjunction with a dust monitoring programme that places dust deposition gauges or receiving buckets, directional dust collection receptacles, high volume active air samplers or continuous particle monitors or even personal exposure samplers at generation sites, around the mine and in adjacent areas.
- Implement standard dust control measures, including periodic spraying (frequency would depend on many factors including weather conditions, soil composition and traffic intensity and must thus be adapted on an on-going basis) of construction areas and access roads, and ensure that these are continuously monitored to ensure effective implementation.
- A speed limit (preferably 60 km/hour) should not be exceeded on dirt roads.

#### **6.1.8 Spread and establishment of alien invasive species**

This is probably one of the most significant potential impacts from a terrestrial invertebrate perspective, and also may have very significant knock-on effects that could impact virtually every aspect of the surrounding ecosystem. Vehicles often transport many seeds, and some may be of invader species, which may become established along the road, especially where the area is disturbed. Continued movement of personnel and vehicles on and off the site, as well as occasional delivery of materials required for maintenance, would result in a risk of importation of alien species throughout the life of the project.

##### **6.1.8.1 Mitigation measures:**

- Rehabilitate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish.
- Institute a monitoring programme to detect alien invasive species early, before they become established and, in the case of weeds, before the release of seeds.
- Institute an eradication/control programme for early intervention if invasive species are detected, so that their spread to surrounding natural ecosystems can be prevented.

## 6.2 OPERATIONAL PHASE

### 6.2.1 Impacts on terrestrial vegetation

The following potential impacts were considered on terrestrial vegetation communities:

- Increase in illegal dumping in drainage channels
- Alien vegetation increase
- Leaks in stormwater infrastructure

#### 6.2.1.1 Mitigation Measures

The following mitigation were considered on terrestrial vegetation communities:

- Routine maintenance in case of emergency leaks from stormwater infrastructure
- No illegal dumping in drainages
- Waste should be managed as not to be aesthetically appealing or attract pests or rodents.
- Control of alien invasive plant with pesticides.
- Where active rehabilitation or restoration is mandatory for terrestrial systems, it should make use of indigenous plant species native to the study site but would otherwise be destroyed during clearing for development purposes. The species selected should strive to represent habitat types typical of the ecological landscape prior to construction.
- Rehabilitation of natural vegetation should proceed in accordance with a rehabilitation plan compiled by a specialist registered in terms of the Natural Scientific Professions Act (No. 27 of 2003) in the field of Ecological Science.
- Only plant species that are indigenous to the natural vegetation of the study area should be used for landscaping. As far as possible, plants naturally growing on the development site, should be incorporated into landscaped areas.

### 6.2.2 Impact on termites and termite colonies

Termite colonies settling below the BESS infrastructure and damaging the infrastructure once established.

#### 6.2.2.1 Mitigation measures:

- A maintenance management plan should accompany the EIA to DFFE on how to prevent and contain the termites in future.
- An alien invasive species plan must be developed for the BESS site, together with a termite management plan (maintenance management plan). Termite mitigation solutions should be aligned with the EGP requirements.
- Monitor the reinfection of the current Adams PV facility's termites and BESS proposed every 5-years.

### 6.3 IMPACT ASSESSMENT MATRIX

Table 6-1 indicate the impacts described above and specific ratings of significance the impact would potentially have on the ecological components of the study area during construction, while Table 6-2 indicates the operational impacts.

<sup>1</sup>**Table 6-1:** Impact assessment Matrix for Alternative 1 (Preferred) and Alternative 2 during construction.

Aspect	Status	Mitigation	Intensity (I)	Extent (E)	Duration (D)	Probability (P)	Significance (I+E+D) xP
Impacts on vegetation and protected tree species	-	Without	4	1	5	5	50 Medium
	-	With	4	1	4	5	45 Medium
Increased erosion risk	-	Without	4	1	3	4	32 Medium
	-	With	2	1	1	3	12 Low
Faunal impact and disturbance	-	Without	6	2	4	4	48 Medium
	-	With	2	2	2	4	24 Low
Disruption of broad scale processes	-	Without	2	2	2	4	24 Low
	-	With	2	2	3	3	21 Low
Soil and water pollution	-	Without	8	2	3	4	52 Medium
	-	With	6	3	3	3	36 Medium
Spread and establishment of alien invasives	-	Without	4	2	3	4	36 Medium
	-	With	2	2	2	4	24 Low
Air pollution	-	Without	8	2	5	5	75 High
	-	With	4	2	5	4	44 Medium
Loss of Biodiversity	-	Without	8	3	4	4	60 Medium
	-	With	6	3	4	3	39 Medium

<sup>1</sup> Both the alternatives assessed have similar vegetation properties except for the number of protected tree species found onsite. Thus the construction impacts and operational impacts were similar.

Aspect	Status	Mitigation	Intensity (I)	Extent (E)	Duration (D)	Probability (P)	Significance (I+E+D) xP
Impacts of Noise and Lighting on surrounding Faunal Populations	-	Without	6	3	4	4	52 Medium
	-	With	4	3	4	3	33 Medium
Inadequate Rehabilitation and Maintenance of Disturbed Areas	-	Without	8	3	5	5	80 High
	-	With	4	3	5	4	48 Medium
Impact on termites and termite colonies	-	Without	6	2	4	3	36 Medium
	-	With	4	2	4	3	30 Medium

**Table 6-2:** Impact assessment Matrix for Alternative 1 (Preferred) and Alternative 2 during operation.

Aspect	Status	Mitigation	Intensity (I)	Extent (E)	Duration (D)	Probability (P)	Significance (I+E+D) xP
Obstruction of Ecological Corridors	-	Without	8	3	5	4	64 High
	-	With	6	3	5	3	42 Medium
Impacts of Noise and Lighting on Faunal Populations	-	Without	8	2	5	5	75 High
	-	With	4	2	5	3	33 Medium
Impact on termites and termite colonies	-	Without	6	2	4	3	36 Medium
	-	With	4	2	4	3	30 Medium

## 6.4 CUMULATIVE IMPACTS

Cumulative impacts of developments on population viability of species can be reduced significantly if new developments are kept as close as possible to existing developed and/or transformed areas or, where such is not possible, different sections of a development be kept as close together as possible. Renewable energy facilities, like solar PVs should be constructed as close as possible to existing infrastructure or substations, and if several developments are planned within close proximity, these developments should be situated as close together as possible, not scattered throughout the landscape. In addition, new power lines should follow routes of existing servitudes if these exist.

Cumulative ecological impacts have been identified for Adams Solar Facility BESS. One other PV Solar project is located within the 30 km radius and as such the cumulative impacts in the area was determined to be low-medium. In terms of the cumulative impact on the vegetation is expected to be minimal and would not impact the conservation status and targets of this vegetation type.

The following cumulative ecological impacts were determined:

### 6.4.1 Impact Nature: Reduced ability to meet conservation obligations and targets (Cumulative Impact)

The loss of unprotected vegetation types on a cumulative basis from the broader area impacts the country's ability to meet its conservation targets

	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects within the area
Extent	Local (1)	Local (1)
Duration	Long Term (4)	Long-Term (4)
Magnitude	Small (1)	Low (1)
Probability	Improbable (2)	Improbable (2)
Significance	Low (12)	Low (12)
Status	Slightly Negative	Slightly Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

#### 6.4.1.1 Mitigation

- The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.
- Reduce the footprint of the facility within sensitive habitat types as much as possible.
- Protected Tree species if to be removed, must be subjected to a tree removal permit from DAFF.



#### 6.4.2 Impact Nature: Impacts on Critical Biodiversity Areas and Broad-Scale Ecological Processes (Cumulative Impact)

Transformation of intact habitat could potentially compromise ecological processes of any natural areas, CBAs or ESA as well as ecological functioning of important habitats and would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects within the area
Extent	Local (1)	Local (1)
Duration	Long Term (4)	Long Term (4)
Magnitude	Small (1)	Small (1)
Probability	Improbable (2)	Improbable (2)
Significance	Low (12)	Low (12)
Status	Neutral – Slightly Negative	Neutral – Slightly Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

##### 6.4.2.1 Mitigation

- The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.
- Reduce the footprint of the facility within sensitive habitat types as much as possible.
- Small to medium sized mammals can be allowed to move between the development area and surrounding areas by creating artificial passageways underneath boundary fences (this is optional and may be implemented by developer if deemed necessary).

### 6.4.3 Impact Nature: Avifauna

The cumulative impact of the BESS facility on priority avifauna within a 30km radius around the proposed development is assessed to be low-medium, mainly due to the small size of the proposed BESS development, and the Adams Solar Array towards the south of the site. Mortality and displacement of priority avifauna due to the construction of the PV facility and associated infrastructure is likely to be low-medium.

	Overall impact of the proposed project considered in isolation (post mitigation)	Cumulative impact of the project and other projects in the area (post mitigation)
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Moderate (6)	Moderate (6)
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Significance</b>	<b>Moderate (44)</b>	<b>Moderate (44)</b>
<b>Status (positive/negative)</b>	Negative	Negative
<b>Reversibility</b>	High	High
<b>Loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	Yes, but only to some extent	Yes, but only to some extent

#### 6.4.3.1 Mitigation:

- Construction activity should be restricted to the immediate footprint of the infrastructure.
- Access to the remainder of the site should be strictly controlled to prevent unnecessary degradation of habitat.
- Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.
- It is recommended that a single perimeter fence is used.
- A bird-friendly pole design must be implemented for the BESS connection with the Adams solar facility.

Based on the specialist cumulative assessment and findings, the development, and its contribution to the overall impact of all existing and proposed Adams solar energy facilities within a 30km radius, it can be concluded that cumulative impacts would be of a low-medium significance. Therefore, the development would not result in unacceptable, high cumulative impacts and would not result in a whole-scale change of the environment (ecological) and is therefore considered acceptable from a cumulative impact perspective.

## 6.5 NO-GO IMPACTS

The no-go alternative considers impacts that would occur to the ecological environment in the absence of the proposed development. There is no ecological impact of the no-go option. Therefore, the negative ecological impact of the development is more significant than that of the no-go alternative, and so, purely from an ecological impact perspective, the no-go alternative is the preferred alternative between the development and the no-go, however, the site has already been developed (Adams PV Facility) and the need for sustainable energy supply a requirement and therefore the preferred alternative by ENEL is supported.

## 7 CONCLUSIONS AND RECOMMENDATIONS

Based on the ecological assessment for the Adams Solar PV Facility BESS, the following is noted:

### 7.1 Mitigations Measures for Design and Construction Phase for biodiversity:

The following mitigation and management measures should be implemented during the construction phase to minimise potential environmental impacts:

#### 7.1.1 Recommended mitigation and rehabilitation measures for biodiversity:

- To preserve these footprints, need to be demarcated and then adhered to.
- Construction activities should be limited as agreed with the ECO and according to the approved EMPr.
- Adopt responsible construction practices aimed at containing the construction activities to specifically demarcated areas.
- Any soil must be exposed for the minimum time possible once cleared of vegetation to avoid prolonged exposure to wind and water erosion and to minimise dust generation.
- Use existing ablutions or provide to a max of 10 per ablution.
- Induction awareness training should be undertaken.
- Onsite waste management and removal, waste not to sit longer than 7 days. Bins to have lids.
- Separation of waste should be encouraged.
- Erosion control measures should be in place.
- Any buffers identified should be maintained by the contractor.

The following mitigation and management measures should be implemented during the operation phase to minimise potential environmental impacts:

- Waste should be managed as not to be aesthetically appealing or attract pests or rodents.
- Control of alien invasive plants is encouraged.
- Rehabilitation and landscaping with indigenous vegetation within the development should be encouraged and made a condition within the Environmental Authorisation.
- Mitigation Measure Objectives for biodiversity impacts on flora and fauna should be encouraged. The EMPr has made further provision for this.
- Prevent the destruction of, and fragmentation, of the vegetation community.
- Prevent the loss of the faunal community associated with this vegetation community.

## 7.2 Mitigation Measures for Impacts on Vegetation Communities & CBAs

From an ecological perspective, the development is situated within an area, which has been disturbed. It is recommended that any alien plant species found during construction, be removed according to best practice guidelines and all efforts should be made to prevent further growth of other alien or invasive plant species. It is further recommended that an alien invasive species plan be prepared for the Adams site and the Competent Authority make this a condition in the Environmental Authorisation together with the tree relocation permits required for the Adams BESS site.

### 7.2.1 Recommended mitigation and rehabilitation measures for biodiversity:

- As far as possible, the proposed development should be restricted to areas that have already been disturbed, and limited further loss of secondary vegetation, wetland areas, drainage lines should be permitted
- It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon and preventing movement of workers into sensitive surrounding environments
- Where possible, existing access routes and walking paths must be made use of, and new routes limited
- All laydown, storage areas etc should be restricted to within the project area, not beyond the sensitive areas
- All building materials should be mixed off site and no mixing should take place in sensitive areas
- Prefabricated material must be used (or prioritised) to limit the fabrication and mixing on site; and
- Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This would also reduce the likelihood of encroachment by alien invasive plant species.

## 7.3 Mitigation Measures for Impacts on Faunal Communities

Recommended mitigation and rehabilitation measures for faunal community's hinge largely on protecting their habitats and ensuring it remains intact.

### 7.3.1 Specific mitigation measures for birds, mammals, and amphibians

- Fauna species such as frogs and reptiles that have not moved away should be carefully and safely removed to a suitable location beyond the extent of the development footprint by a suitably qualified ECO trained in the handling and relocation of animals
- No trapping, killing, or poisoning of any wildlife is to be allowed on site, including snakes, birds, lizards, frogs, insects, or mammals



- All building materials should be mixed off site and no mixing should take place near the sensitive areas
- Have action plans onsite, and training for contactors and employees in the event of spills, leaks, and other impacts to the surrounding environment.
- It is worth noting that by applying relevant mitigation measures the functionality of watercourses in the greater area not be lost and would directly ensure that the surrounding system's functionality be retained while impacts to the water resources be limited.
- The footprint area associated with the construction must be minimised, avoiding the drainage areas where possible (marked medium-high sensitivity on the sensitivity map located in section 5.10). Areas earmarked for development must be marked to ensure a controlled disturbance footprint area to minimise negative impacts.
- Erosion prevention and sediment control measures are imperative and need to be implemented throughout the entire project footprint area, access roads and temporary laydown / storage sites. Temporary and permanent erosion control methods may include silt fences, interceptor ditches, seeding and sodding, riprap of exposed embankments, erosion mats, and mulching.
- Further, unstable, and exposed soil embankments should be protected from erosion with a combination of retainer wall bricks / blocks and vegetation.
- The contractors used for the construction should have spill kits available prior to construction to ensure that any fuel, oil, or hazardous substance spills are cleaned-up and discarded correctly
- It is preferable that construction takes place during the dry season (as much as possible) to reduce the erosion potential of the exposed surfaces.
- An alien invasive plant management plan needs to be compiled and implemented post construction to control current invaded areas and prevent the growth of invasive species on cleared areas.
- A maintenance management plan should accompany the EIA to DFFE on how to prevent and contain the termites in future.

## 7.4 Overall Conclusion

In the case of this study site, the grasslands have been altered through anthropogenic activities. The grasslands, however, were green and dense.

- Two site alternatives, the Proposed/Preferred site and the No-Go Alternative (northern site) were being considered.
- Anthropogenic impacts identified within the study site included alien vegetation encroachment, gravel road construction, natural vegetation removal, hardening of surfaces to establish the Adams Solar Facility, fencing, grazing and power line construction.
- The site sensitivity in terms of vegetation cover is rated medium sensitivity. An Other Natural Area (ONA) at the proposed BESS was identified as the vegetation type based on the 2016 Northern Cape Critical Biodiversity Areas and still fulfils an ecological function.
- The study site still has a functional role to play in regional ecological functioning and biological functions at the site even though it has been influenced by human-related impacts.
- Ecological connectivity between the grasslands, thickets, woodland, and drainage located towards the northwest cannot be excluded in the overall study area.
- An alien invasive species plan must be developed for the BESS site, together with a termite management plan (maintenance management plan). Termite mitigation solutions should be aligned with the EGP requirements.
- Monitoring dust at the site should be encouraged.
- Monitor the reinfection of the current Adams PV facility's termites and BESS proposed every 5-years.
- A search-and-rescue plan needs to be developed for any medicinal plants onsite. To establish the BESS protected trees need to be tagged and a permit needs to be obtained from DAFF to either relocate or destroy these trees.
- Cumulative impacts in terms of ecological process and any projects within 30kms of the site have low-medium significance.

Concluded from the results presented in this document, the construction activities would impact on the medium sensitive terrestrial biota. Mitigation measures should be implemented to allow protection as far as possible the ecological nature of the site. Alien eradication and rehabilitation must be encouraged through the development of an alien and invasive species plan. Monitoring and prevention of termites should be encouraged at the site and aligned with the EGP requirements. Based on the results and conclusions presented in this report, and the outcomes of the field survey, it is the opinion of the specialists that the proposed project can be favourably considered should all the mitigation measures be implemented and monitored against to ensure compliance and included in the Environmental Management Program. Even though the site has

medium sensitivity, the mitigation measures provided may reduce the negative risks anticipated with the BESS construction. From an ecological perspective the proposal / preferred site, is supported by the specialist.

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## 9 APPENDICES



## APPENDIX A - CURRICULUM VITAE

NAME	Nico-Ronaldo Retief
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<b>DATE OF BIRTH</b>	07 February 1982
<b>PROFESSION/SPECIALISATION</b>	Ecologist, Wetland Specialist, Aquatic Specialist. Mining Specialist; Visual Impact Specialist; Environmental Assessment Practitioner
<b>NATIONALITY</b>	South African
<b>YEARS' EXPERIENCE</b>	19-years
<b>CIVIL STATUS</b>	Single

**KEY QUALIFICATIONS:** I have 19 years' experience in the environmental consulting industry. My key interest falls within the water and mining industry. I completed my Masters in Zoology in February 2007 and since August 2010 I have been registered as a Professional Natural Scientist. I have considerable experience in the writing of EIA reports and have managed a variety of small- to large-scale EIA projects ranging from electrical power lines to housing developments. I have completed over 80 EIA projects, more than 50 Water Use License Applications, more than 15 mining related applications and more than 100 specialist input assessments.

I have vast experience as an Environmental Assessment Practitioner with expertise in: Water Quality Management, GIS mapping (in particular, PlanetGIS and ArcGIS software packages) and Surface Water Management.

I have valuable practical experience in the following EIA fields: bulk service infrastructure, water pipelines, sewage pipelines, road projects and upgrades; residential developments; renewable energy, mining applications and water use license applications. I am also proficient in conducting aquatic, wetland and ecological assessments. I have undertaken a variety of Visual Impact Assessments and utilise GIS and onsite first-hand experience when compiling the reports.

I believe that I am a valuable asset in any environmental industry owing to my experience, knowledge and expertise. I have the ability to lead, train and inspire staff to be enthusiastic and goal orientated. I am self-motivated and maintain an organised efficient work habitat.

My Career Specialist skills include:

- Biomonitoring.
- EIA guidance.
- Environmental Compliance Monitoring (ECO)
- Ecological Assessments and environmental identification and mapping.
- Drafting and Preparing Environmental Management Plans (EMPs).
- Undertaking Public Participation.
- Preparing Strategic guideline documents and training material.
- Compiling EIA reports.
- EIA guidance and recommendations.
- Mentoring junior staff.
- Project Procurement.
- Project Invoicing and Billing; and
- Water Quality Management.
- Wetland Delineations.
- GIS mapping and map production.
- Environmental Impact Assessments.
- Water Use License Applications.
- Mining applications and Guidance.
- Water Quality Management.
- Petroleum (Filling Stations) Groundwater Monitoring.
- Filling Stations Gas Monitoring.
- Aquatic Impact Assessments.
- Visual Impact Assessments.
- SASS5 & Biomonitoring;

#### **EMPLOYMENT RECORD:**

March 2020 - Present	NCC Group – Professional EAP and Ecologist
June 2018 to March 2020	Delta Built Environment Consultants – Senior Environmental Analyst
December 2017 – June 2018	Bokamoso Landscape Architects and Environmental Consultants
May 2015 – November 2017	PRISM Environmental Management Services, Position
September 2014 – April 2015	DMT-Kai Batla
June 2014 – August 2014	Kantey and Templer
September 2013 – May 2014	GladAfrica Environmental Management

August 2012 – April 2013	African Innovative Solutions and Projects
May 2011 – July 2012	Lidwala Consulting Engineers
March 2010 – April 2011	Strategic Environmental Focus
May 2009 – February 2010	Savannah Environmental
April 2007 – April 2009	Nemai Consulting
<b><u>PROFESSIONAL EXPERIENCE:</u></b>	
<b><u>Environmental Impact Assessments: Electricity</u></b>	
<ul style="list-style-type: none"> <li>• Eskom – Dunnottar 88kV substation and power lines – 2011.</li> <li>• Eskom – Koeberg Integration Project – 2009.</li> <li>• Eskom – Tshwane Strengthening Project. Report – 2009.</li> <li>• Mulilo – Wind Monitoring Masts – 2009.</li> <li>• Mulilo – Siting exercise for a solar energy facility – 2009.</li> <li>• Exxaro – Wind Monitoring Mast near Brand-se-Baai – 2009.</li> <li>• Biotherm – Wind monitoring masts on farms within the Overberg – 2009.</li> <li>• Eskom – Majuba Power Station Ash Dump Expansion project 2012.</li> <li>• Eskom – Tabor-Nzhelele 400kV power line between Polokwane and Musina – 2012; and</li> <li>• Zimbabwe Power Company – expansion of the power station, Hwange – 2014.</li> </ul>	
<b><u>Environmental Impact Assessments: Mining</u></b>	
<ul style="list-style-type: none"> <li>• Lonmin – Karee 4 Mine EMPR amendment – 2010.</li> <li>• Frankfort Mineral Resources – Priority East Prospecting Right Application – 2010.</li> <li>• BHP Billiton – Klipspruit Mining Colliery – 2010.</li> <li>• Sound Mining Solutions – Proposed Prospecting in the Northern Cape near Kuruman – 2011.</li> <li>• Exarro Resources – Inyanda Coal Mine – 2012.</li> <li>• Sebilong – Sebilong Chrome Retreatment Works – 2013; and</li> <li>• Kumba Iron Ore – Sishen mine borehole monitoring for the DMR – 2012.</li> <li>• Northam Platinum Limited Production Works Expansion Zondereinde division for Northam Platinum – 2015.</li> <li>• Section 24G Rectification Application for the BP Wiggill Engineering Foundry in Boksburg North – 2016.</li> <li>• Maroeloesfontein AEL monitoring and audit report in Thabazimbi, Limpopo Province 2016.</li> </ul>	
<b><u>Environmental Impact Assessments: Residential / Commercial Infrastructure</u></b>	
<ul style="list-style-type: none"> <li>• Highlands Estate – Mixed-Use Development – 2010.</li> <li>• Limpopo Department of Health – Limpopo Academic Hospital in Polokwane – 2010.</li> <li>• Mogale City Local Municipality – Munsieville Extension 6 Township Development – 2011.</li> <li>• Olivier Construction – Kuruman Development – 2012.</li> <li>• Thaba Ya Batswana – Stone River’s Arch Mixed-Use Development Klipriver Drive – 2014; and</li> <li>• World Bank – ASIDI Schools Development in Mthatha (Development of EMPs and ECO monitoring) – 2014.</li> <li>• Village Green Township Development – 2016</li> <li>• Roodekrans Ext 26 Township Development – 2015</li> <li>• Nederburg Mixed-use Development – 2016</li> <li>• Greengate Ext 70 – 2016, 2017</li> <li>• Greengate Ext 69 – 2016, 2017</li> <li>• Greengate Ext 68 Curro School – 2016, 2017</li> <li>• Olievenpoort Ext 47 Development - 2017</li> <li>• Portion 96 Lindley Township Development – 2017</li> <li>• Ptn 71 of Knopjeslaagte housing development, 2017</li> <li>• Dr. Yusuf Dadoo Hospital Expansion, EIA, Ecological Reporting, 2017</li> </ul>	
<b><u>Environmental Impact Assessments: Infrastructure</u></b>	

- Heartland Properties – Marlboro Road Extension (M60) – 2010.
- Sanral – Road Upgrades – Hendrina along the N11 to Ermelo (Work Package 2); Amersfoort to Majuba Power Station (Work Package 3) & Bethal to D622 (Work Package 4) – 2012.
- Sanral – Notwane River Bridge upgrade between South Africa & Botswana – 2009.
- City of Tshwane Metropolitan Municipality – Upgrade of Charles Street – 2008.
- Gautrans – Upgrade of the R103 between van Dyk & Diana Roads – 2009.
- Gautrans – Upgrade of Moore Street – 2009.
- Passenger Rail Agency of Southern Africa – Doornfontein Railway Station – 2008.
- Sanral – N11 Section 10 Road Rehabilitation and Upgrade between Middelburg and Loskop Dam – 2012.
- City of Tshwane Metropolitan Municipality – Rehabilitation of the Apies River between Wonderboom junction and Rosslyn Road – 2014; and
- Onderstepoort Biological Products – DEC- Development of a vaccination plant at the existing Onderstepoort Veterinary plant – 2015.
- Gautrans – Rose Interchange – 2016
- Boukorp (Pty) Ltd – Greengate Electrical Powerline – 2016

#### **Environmental Impact Assessments: Bulk Services Infrastructure**

- Mogale City Local Municipality – Munsieville Bulk Sewer Pipeline – 2011.
- Johannesburg Property Company – Pimville Golf Course – 2007.
- Johannesburg City Parks and Zoo – Upgrade of Regional Parks within Soweto – 2008-09.
- Rand Water – Zuikerbosch Central Sludge Pipeline – 2007.
- Ekurhuleni Metropolitan Municipality – Kempton Park Eastern Outfall Sewer – 2008.
- Ekurhuleni Metropolitan Municipality – Signal Hill Reservoir – 2008.
- City of Johannesburg Metropolitan Municipality – Bruma Lake Desiltation – 2009.
- Moses Kotane Local Municipality – Ledig Water Supply Project – 2008.
- Sun International – Sun City Recreational Dam – 2008; and
- Dr Ruth Segomotsi Mompati District Municipality – Pomfret and Bray Wastewater Treatment Works, Waste licenses, environmental licences and Water Use Licenses – 2013.

#### **Environmental Impact Assessments: Water Quality Guidelines**

- National Department of Health – Water Quality Monitoring Training and Training Manual Development for Domestic Use – 2012.
- Strategic Environmental Focus – Environmental Opinion for the Mine Waste Solutions Reclamation Project – 2012.
- Heartland Properties – Modderfontein Conservation Park – 2012.
- Department of Water and Sanitation – Wise use of Wetlands. Compilation of a Wise Use of Wetlands and Best Practise Guideline for the Department of Water Affairs (DWA) – 2008.
- Department of Water and Sanitation – Agricultural Research Project for Wineries. Preparation of posters, pamphlets and a T-Shirt for the research project. The topics for the project consisted of wineries, eutrophication, agricultural strategies and a communication framework in agriculture – 2008.
- Department of Water and Sanitation – Resource Directed Measures. Preparation of user-friendly material for Resource Directed Measures including the Spatial and Time Series Information Modelling Software (SPATSIM), Groundwater Resources Directed Measures (GRDM) and Teacha (Tool for Ecological Aquatic Chemical Habitat Assessment) software packages. A layman's pocket guide and a poster were also prepared. This material was work-shopped throughout South Africa – 2007-08; and
- Department of Water and Sanitation – Resource Directed Management of Water Quality: Attended a workshop at the CSIR International Conference Centre where the training material, posters etc. were discussed. Amending the posters and pamphlets with Corel Draw Graphics suite – 2008.
- Steyn City Water Quality Monitoring reports for in-situ and monthly water quality reporting, 2017.

#### **Environmental Impact Assessments: Ecological Assessments**

- Umgeni Water – Mhlabatshane Dam: Preparing a specialist study report as well as conducting a site visit on the feasibility of the site for the construction of the Mhlabatshane Dam. The report consisted of the feasibility and general characteristics of the area while also discussing the water quality of the site – 2008.

- City of Tshwane – Capital Park Feasibility study. Compiled a feasibility report for the proposed housing development in Capital Park. This was accomplished with the aid of PlanetGIS map overlays – 2008; and
- Kumba Iron Ore – Sishen mine development of a Biodiversity Action plan, Ecological Baseline study and Monitoring protocol for the expansion of the mine towards the west from the current site 2012.
- Honeydew Grove Ext 15 development, Ecological Scan report to identify the sensitivity and importance of the proposed site's development, ongoing.
- Steyn City Water Quality Monitoring reports for in-situ and monthly water quality reporting, 2017
- Randpark Ridge Water Quality monitoring reporting and assessment of the water quality onsite, 2017
- Maroeloesfontein Mine, Air Quality monthly reporting and report development 2017.
- Dr Yusuf Dadoo Hospital Ecological Assessment, Phase 1, 2017.
- Olievenpoort Ext 47. Ecological Impact Assessment, 2017.
- Greengate Ext 70, 68 and 69 Ecological Assessments, 2017.
- Temple development along Malibongwe Road in Northgate area, Ecological Assessment, 2017.
- Erand Gardens Ext 15, Ecological Assessment and site inspection, 2017.
- Olympus AH 72 site inspection with search-and-rescue for orange listed and red listed plant species, Bronberg, Tshwane, 2017.
- Glenvista Fauna and Flora amendment assessment, 2017.
- Jukskei View Mixed-Use Development in Midrand Ecological Assessment and Scan (Waterfall Ridge), 2017.
- La Montagne Ecological Assessment, 2018
- Kameeldrift Voere (Pty) Ltd, Alien Eradication Plan and Plant Species Map, 2018.
- Chamdor X4 Mixed Use Development Ecological Assessment, 2018
- PWV18 Ecological Assessment, 2018.
- TUT Ga-Rankuwa Sports Precinct Ecological Assessment, 2018.
- Berea Park, City of Tshwane marking and tagging of oak trees, 2018.
- Knopjeslaagte x19 Ecological Assessment, 2018.
- Equestria residential development, ecological scan and wetland delineation, 2018.
- Carnival City Dalpark Ecological Assessment, 2018.
- Cayman Academy ecological assessment, 2018.
- Hazeldean Road ecological assessment, 2018.
- Faerie Glen Ecological Scan, 2018.
- Secunda filling station ecological opinion, 2018.
- Mooibosch development ecological opinion, 2018.
- Peach Tree x25 residential development ecological assessment, 2018.
- SA Defence Force ecological opinion, 2018.
- Kudube rising main and pump station ecological assessment, 2018.
- Kudube pump station ecological assessment, 2018.
- Tonga Retail ecological weed eradication plan, 2018.
- Welgedacht filling station ecological assessment, 2018.

#### **Environmental Impact Assessments: Wetland Assessments**

- Eskom – Majuba Power Station Ash Dump Expansion Project – Wetland Delineation and Functional Assessment 2012.
- Lekwa-Teemane Municipality – Mamusa Bulk Pipeline Project between Bloemhof and Schweizer-Reneke – Wetland Delineation and Functional Assessment and Water Use License – 2012.

#### **Environmental Impact Assessments: Air Quality Assessments**

- Maroeloesfontein Mine, development of a Monitoring Programme based on the Approved Air Emissions License issued by LEDET, 2016, 2017 with dust monitoring reports.

#### **Environmental Impact Assessments: Waste / landfill site**

- Kgatelopele Municipality – Danielskuil Domestic Waste Site EIA – 2011.

#### **Environmental Impact Assessments: Filling Stations, Gas monitoring & Groundwater Monitoring**



- Engen Petroleum – 72 groundwater monitoring boreholes around Gauteng, Free State, Northwest and Mpumalanga – 2014;
- Engen Petroleum – Removal of storage tanks at the Bellavista Service Station – 2014.
- Engen Petroleum – Upgrade / removal of the fuel storage tanks at the Rustenburg Depot – 2014.
- Engen Petroleum – Proposed installation of 1 x 5 000m<sup>3</sup> aboveground fuel storage tank and associated handling infrastructure at Engen Rustenburg Depot – 2014.
- Volkswagen SA – Borehole assessment report for Volkswagen SA, Port Elizabeth plant, Eastern Cape for Volkswagen SA, Port Elizabeth plant, Eastern Cape – 2014.
- Volkswagen SA – Borehole assessment report for Volkswagen SA, Uitenhage plant, Eastern Cape for Volkswagen SA, Uitenhage plant, Eastern Cape – 2014; and
- Engen Petroleum – Tank removal, groundwater monitoring, gas testing, level 1 and 2 assessment and Permit to Work for 72 Engen Filling Stations around Gauteng, Mpumalanga, Free State and Northwest 2014.
- Groblersdal filling station EIA and establishment, 2018.
- Greenstone filling station EIA, 2018.
- Dennehof filling station EIA, 2018.
- Selby ext. 19 filling station EIA, 2018.

#### **Environmental Impact Assessments: Visual Impact Assessments:**

- Nkosi City Integrated Human Settlement, Mpumalanga province visual impact assessment, 2018.
- Dalpark Ext 32 Mixed-Use Development visual impact assessment, 2018.
- La Montage Reservoir and access road visual impact assessment, 2018.
- Glenvista Residential Development visual impact assessment, 2018.

#### **Environmental Impact Assessments: Water Use License Applications & General Authorisations**

- Heartland Properties – Westlake View WULA. Compilation of this Integrated Water Use License Application for the proposed project – 2009.
- Heartland Properties – Marlboro Road Extension (M60). Compilation of this Integrated Water Use License Application for the proposed project – 2009.
- Heartland Properties – Highlands Estate Ext 5, 6 & 7: Compilation of the Integrated Water Use License Application for this project – 2009.
- Mooiooi Chrome Processing Plant – Compilation of this Integrated Water Use License Application – 2011.
- Sanral – N14 WULA. Compilation of this Integrated Water Use License Application – 2009.
- Minco Mineral Holdings - Compilation of the Integrated Water Use License Application – 2009.
- Sebilong – Sebilong Chrome Retreatment Plant – 2012.
- Dr Ruth Municipality – Bray and Pomfret Waste Water Treatment Works – 2013;
- Franskraal Bowling Club – Water Use License – 2013; and
- Transvaal Gold Mining – Tailings Water Use License – 2013.
- Tamboekiesfontein – Compilation of an Integrated Water Use License Application – 2015
- Vista Park Extension 10 – Compilation of an Integrated Water Use License Application – 2015
- SAFDEV SSDC (Pty) Ltd – K6 Road Upgrade – Compilation of an Integrated Water Use License Application – 2015
- Summerset Ext. 25 – Compilation of an Integrated Water Use License Application – 2015
- Rose Interchange – Compilation of an Integrated Water Use License Application – 2016
- Randpark Ridge Extensions – Compilation of an Integrated Water Use License Application – 2015
- Greengate Electrical line – Compilation of General Authorisation – 2016
- Willowbrook Integrated Water Use License Application – 2016
- Wilgeheuwel Ext 60 Water Use License Application – 2016
- Nederburg Mixed-Use Development Water Use License Application – 2016, 2017
- The Village X10 Residential Development – Water Use License Application – 2016, 2017
- P39-1 (N14) Diepsloot Interchange – General Authorisation – 2017.
- Rietvlei Farm Village Sewage Treatment Works – Water Use License Application – 2018.

#### **Environmental Impact Assessments: Aquatic Assessments**

- Johannesburg Water – Biomonitoring on numerous urban rivers (including the Jukskei River, Harrington Spruit and Klip River) to obtain baseline data to detect disturbance and non-compliance of various construction activities on aquatic ecosystems. This includes the Northern Wastewater Treatment Works, Goudkoppies Wastewater Treatment Works, Bushkoppie Wastewater Treatment Works and Olifantsvlei Wastewater Treatment Works – 2008.
- Johannesburg Water – Zandspruit Sewage Spill: Investigation for the Northern Wastewater Treatment Works on foot from its effluent discharge point to the City of Johannesburg sampling point (J5). This was done to identify possible causes of higher dissolved oxygen levels at J5 compared to the control site DWJ27 in the Jukskei River – 2008.
- Johannesburg Water – Zandspruit Pump Station Sewage Spill. Biomonitoring in the Klein Jukskei River above the pump station and below the pump station. Physical water quality variables were also taken while onsite – 2008.
- City of Johannesburg – Upper Klipspruit Catchment Framework: Determine any sources of pollution and to identify impacts or anthropogenic stresses on the upper Klipspruit system. This was done for improving both river systems for the 2010 Soccer World Cup. A comprehensive report was compiled called the “Sustainable Urban River Management Plan for the Upper Klipspruit Catchment”. Co-author for the report and also compiled the water quality data – 2008.
- City of Johannesburg – Bruma Lake Rehabilitation: Undertaking the biomonitoring of the Jukskei River at the inlet to the Bruma Lake at UJ5 (DWA water sampling point) and below Bruma Lake at the DWA sampling site UJ6. The results were included as a specialist study for an environmental Impact assessment for the Rehabilitation of Bruma Lake – 2009.

#### **Environmental Impact Assessments: Amendment Applications**

- Wilgeheuwel Ext 60 Amendment Application Phase 1 and Phase 2, GDARD, 2017
- Strubensvallei x10 Amendment Application Phase 1, GDARD, 2017.

#### **Environmental Impact Assessments: International Projects**

- Upgrade of the Notwane river bridge crossing at the Swartkopfontein Border Post between South Africa and Botswana, EIA, 2009.
- Zimbabwe Power Company, Mining and EIA for the supply of coal to the Hwange Coal fired power station, 2014

#### **EDUCATION:**

Rand Afrikaans University (2001-2003)	B.Sc.
Rand Afrikaans University (2004)	B.Sc. Honours
University of Johannesburg (2005-2007)	M.Sc.

#### **CAREER ENHANCING COURSES:**

GDARD - 14, 15 April 2008	Basic Wetlands
Lexis Nexis Sandton - 12 October 2009	Lexis Nexis
FET Water - Dept. Water Affairs 08 March 2010	Risk Management of Aquifers
Strategic Environmental Focus- 13 August 2010	NEMA Legislation 2010
Dept. Water Affairs - 08, 09 September 2010	Section 21 c & i
ProjectLink - 20 & 21 June 2011	Microsoft Project Professional
Prowalco 6-8 June 2014	Engen Permit to Work
2014:	Health and Safety (Level 1 & 2 First Aid)
2014:	Firefighting

2004:	Advanced 4 x 4 driving course		
<b><u>PROFESSIONAL AFFILIATIONS:</u></b>			
Registration No: 005636	Professional Environmental, Ecological and Zoological Scientist: South African Council for Natural Scientific Professions		
2019/181	EAPASA professional environmental assessment practitioner		
N/A	Member of the Zoological Society of Southern Africa		
N/A	Member of the International Association for Impact Assessment South Africa		
N/A	Member of the Water Institute for Southern Africa (MWISA)		
<b><u>LANGUAGE:</u></b>			
<b>LANGUAGE</b>	<b>SPEAKING</b>	<b>READING</b>	<b>WRITING</b>
English	Fluent	Fluent	Fluent
Afrikaans	Fluent	Fluent	Fluent
<b><u>PUBLICATIONS:</u></b>			
<ul style="list-style-type: none"><li>• Retief, N.-R., Avenant-Oldewage, A., du Preez, H.H. 2006. The use of cestode parasites from the largemouth yellowfish, <i>Labeobarbus kimberleyensis</i> (Gilchrist and Thompson, 1913) in the Vaal Dam, South Africa as indicators of heavy metal bioaccumulation. <i>Physics and Chemistry of the Earth</i> 31, 840-847.</li><li>• Retief, N.-R., Avenant-Oldewage, A., du Preez, H.H. 2007. Ecological aspects of the occurrence of Asian tapeworm, <i>Bothriocephalus acheilognathi</i> Yamaguti, 1934 infection in the Largemouth yellowfish, <i>Labeobarbus kimberleyensis</i> Gilchrist and Thompson, 1913 in the Vaal Dam, South Africa. <i>Physics and Chemistry of the Earth</i> 32(15-18), 1384-1390.</li><li>• Retief, N.-R., Avenant-Oldewage, A., du Preez, H.H. 2009. Seasonal study on <i>Bothriocephalus</i> as indicator of metal pollution in yellowfish, South Africa. <i>Water SA</i> 35 (3) 315-322.</li></ul>			

## **APPENDIX B - SPECIES EXPECTED WITHIN QUARTER DEGREE SQUARE**

## Plant species found in quarter degree square

**Table 0-1:** Plant species of concern within quarter degree square

Family	Taxon	IUCN
Fabaceae	<i>Indigofera alternans</i> DC. var. <i>alternans</i>	LC
Poaceae	<i>Bromus diandrus</i> Roth	NE
Fabaceae	<i>Melolobium candicans</i> (E. Mey.) Eckl. & Zeyh.	LC
Malvaceae	<i>Grewia flava</i> DC.	LC
Acanthaceae	<i>Justicia incana</i> (Nees) T. Anderson	
Scrophulariaceae	<i>Diclis petiolaris</i> Benth.	LC
Limeaceae	<i>Limeum aethiopicum</i> Burm.f. var. <i>aethiopicum</i>	NE
Solanaceae	<i>Nicotiana glauca</i> Graham	
Asteraceae	<i>Galinsoga parviflora</i> Cav.	
Fabaceae	<i>Senegalia mellifera</i> (Vahl) Seigler & Ebinger subsp. <i>detinens</i> (Burch.) Kyal. & Boatwr.	LC
Hyacinthaceae	<i>Dipcadi viride</i> (L.) Moench	LC
Poaceae	<i>Aristida vestita</i> Thunb.	LC
Cleomaceae	<i>Cleome angustifolia</i> Forssk. subsp. <i>diandra</i> (Burch.) Kers	LC
Apocynaceae	<i>Gomphocarpus tomentosus</i> Burch. subsp. <i>tomentosus</i>	LC
Apocynaceae	<i>Piранthus decipiens</i> (N.E.Br.) Bruyns	LC
Poaceae	<i>Bromus diandrus</i> Roth	NE
Iridaceae	<i>Moraea pallida</i> (Baker) Goldblatt	LC
Poaceae	<i>Enneapogon cenchroides</i> (Licht. ex Roem. & Schult.) C.E. Hubb.	LC
Boraginaceae	<i>Heliotropium lineare</i> (A.DC.) Gurke	LC
Malvaceae	<i>Hermannia comosa</i> Burch. ex DC.	LC
Lamiaceae	<i>Leonotis pentadentata</i> J.C. Manning & Goldblatt	LC
Apocynaceae	<i>Piранthus decipiens</i> (N.E.Br.) Bruyns	LC
Poaceae	<i>Fingerhuthia africana</i> Lehm.	LC
Zygophyllaceae	<i>Roepera lichtensteiniana</i> (Cham.) Beier & Thulin	
Poaceae	<i>Polypogon monspeliensis</i> (L.) Desf.	NE
Scrophulariaceae	<i>Selago</i> sp.	
Scrophulariaceae	<i>Jamesbrittenia albiflora</i> (I. Verd.) Hilliard	LC
Poaceae	<i>Sporobolus coromandelianus</i> (Retz.) Kunth	LC
Convolvulaceae	<i>Convolvulus arvensis</i> L.	
Nyctaginaceae	<i>Commicarpus pentandrus</i> (Burch.) Heimerl	LC
Aizoaceae	<i>Galenia exigua</i> Adamson	LC
Fabaceae	<i>Dichilus gracilis</i> Eckl. & Zeyh.	LC
Asteraceae	<i>Pentzia quinquefida</i> (Thunb.) Less.	LC
Zygophyllaceae	<i>Roepera lichtensteiniana</i> (Cham.) Beier & Thulin	
Amaranthaceae	<i>Dysphania ambrosioides</i> (L.) Mosyakin & Clemants	
Poaceae	<i>Melinis</i> sp.	
Solanaceae	<i>Lycium pilifolium</i> C.H. Wright	LC
Poaceae	<i>Eragrostis curvula</i> (Schrad.) Nees	LC



## Mammals of high conservation priority

In Table 0-2 threatened mammal species within the quarter degree square is shown. None of these species indicated in the table below, were observed onsite during the site inspection. The likelihood of the any of the listed near threatened and vulnerable mammal species can't be excluded as suitable habitat exists near the salt pan for these species to occur.

**Table 0-2:** Threatened mammal species of the quarter degree square<sup>2</sup>.

Family	Scientific name	Common name	Red list category
Bathyergidae	<i>Cryptomys hottentotus</i>	Southern African Mole-rat	Least Concern (2016)
Erinaceidae	<i>Atelerix frontalis</i>	Southern African Hedgehog	Near Threatened (2016)
Felidae	<i>Felis nigripes</i>	Black-footed Cat	Vulnerable (2016)
Felidae	<i>Felis silvestris</i>	Wildcat	Least Concern (2016)
Herpestidae	<i>Herpestes sanguineus</i>	Slender Mongoose	Least Concern (2016)
Leporidae	<i>Lepus capensis</i>	Cape Hare	Least Concern
Muridae	<i>Mastomys natalensis</i>	Natal Mastomys	Least Concern (2016)
Muridae	<i>Mus (Nannomys) minutoides</i>	Southern African Pygmy Mouse	Least Concern
Nesomyidae	<i>Dendromus melanotis</i>	Gray African Climbing Mouse	Least Concern (2016)
Nycteridae	<i>Nycteris thebaica</i>	Egyptian Slit-faced Bat	Least Concern (2016)
Pedetidae	<i>Pedetes capensis</i>	South African Spring Hare	Least Concern (2016)

Literature sources: Friedman & Daly, (2004), Skinner & Chimimba (2005), Wilson & Reeder (2005). Animal Demography Unit – Virtual Museum – MammalMAP for 2723AC.

<sup>2</sup> Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. 2016. The Red List of Mammals of South Africa, Swaziland, and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

## 9.1 Birds of high conservation priority

Ref	Common_group	Common_species	Genus	Species	IUCN Status
536	Babbler	Southern Pied	<i>Turdoides</i>	<i>bicolor</i>	
432	Barbet	Acacia Pied	<i>Tricholaema</i>	<i>leucomelas</i>	
439	Barbet	Crested	<i>Trachyphonus</i>	<i>vaillantii</i>	
674	Batis	Pirit	<i>Batis</i>	<i>pririt</i>	
404	Bee-eater	European	<i>Merops</i>	<i>apiaster</i>	
411	Bee-eater	Swallow-tailed	<i>Merops</i>	<i>hirundineus</i>	
544	Bulbul	African Red-eyed	<i>Pycnonotus</i>	<i>nigricans</i>	
874	Bunting	Golden-breasted	<i>Emberiza</i>	<i>flaviventris</i>	
217	Bustard	Kori	<i>Ardeotis</i>	<i>kori</i>	NT, NT
860	Canary	Black-throated	<i>Crithagra</i>	<i>atroregularis</i>	
866	Canary	Yellow	<i>Crithagra</i>	<i>flaviventris</i>	
575	Chat	Ant-eating	<i>Myrmecocichla</i>	<i>formicivora</i>	
570	Chat	Familiar	<i>Oenanthe</i>	<i>familiaris</i>	
50	Cormorant	Reed	<i>Microcarbo</i>	<i>africanus</i>	
341	Cuckoo	African	<i>Cuculus</i>	<i>gularis</i>	
348	Cuckoo	Jacobin	<i>Clamator</i>	<i>jacobinus</i>	
316	Dove	Cape Turtle	<i>Streptopelia</i>	<i>capicola</i>	
317	Dove	Laughing	<i>Spilopelia</i>	<i>senegalensis</i>	
314	Dove	Red-eyed	<i>Streptopelia</i>	<i>semitorquata</i>	
517	Drongo	Fork-tailed	<i>Dicrurus</i>	<i>adsimilis</i>	
663	Flycatcher	Chat	<i>Melaenornis</i>	<i>infuscatus</i>	
665	Flycatcher	Fiscal	<i>Melaenornis</i>	<i>silens</i>	
661	Flycatcher	Marico	<i>Melaenornis</i>	<i>mariquensis</i>	
89	Goose	Egyptian	<i>Alopochen</i>	<i>aegyptiaca</i>	
165	Goshawk	Pale Chanting	<i>Melierax</i>	<i>canorus</i>	
192	Guineafowl	Helmeted	<i>Numida</i>	<i>meleagris</i>	
440	Honeyguide	Greater	<i>Indicator</i>	<i>indicator</i>	
418	Hoopoe	African	<i>Upupa</i>	<i>africana</i>	
424	Hornbill	African Grey	<i>Lophoceros</i>	<i>nasutus</i>	
426	Hornbill	Southern Yellow-billed	<i>Tockus</i>	<i>leucomelas</i>	
84	Ibis	Hadada	<i>Bostrychia</i>	<i>hagedash</i>	
245	Lapwing	Blacksmith	<i>Vanellus</i>	<i>armatus</i>	
242	Lapwing	Crowned	<i>Vanellus</i>	<i>coronatus</i>	
488	Lark	Red-capped	<i>Calandrella</i>	<i>cinerea</i>	
506	Martin	Rock	<i>Ptyonoprogne</i>	<i>fuligula</i>	
392	Mousebird	Red-faced	<i>Urocolius</i>	<i>indicus</i>	
391	Mousebird	White-backed	<i>Colius</i>	<i>colius</i>	
365	Owlet	Pearl-spotted	<i>Glaucidium</i>	<i>perlatum</i>	
692	Pipit	African	<i>Anthus</i>	<i>cinnamomeus</i>	
650	Prinia	Black-chested	<i>Prinia</i>	<i>flavicans</i>	
581	Robin-Chat	Cape	<i>Cossypha</i>	<i>caffra</i>	
586	Scrub Robin	Kalahari	<i>Cercotrichas</i>	<i>paena</i>	

Ref	Common_group	Common_species	Genus	Species	IUCN Status
711	Shrike	Crimson-breasted	<i>Laniarius</i>	<i>atrococcineus</i>	
784	Sparrow	House	<i>Passer</i>	<i>domesticus</i>	
4142	Sparrow	Southern Grey-headed	<i>Passer</i>	<i>diffusus</i>	
780	Sparrow-Weaver	White-browed	<i>Plocepasser</i>	<i>mahali</i>	
182	Spurfowl	Red-billed	<i>Pternistis</i>	<i>adspersus</i>	
737	Starling	Cape	<i>Lamprotornis</i>	<i>nitens</i>	
735	Starling	Wattled	<i>Creatophora</i>	<i>cinerea</i>	
755	Sunbird	Marico	<i>Cinnyris</i>	<i>mariquensis</i>	
763	Sunbird	White-bellied	<i>Cinnyris</i>	<i>talatala</i>	
502	Swallow	Greater Striped	<i>Cecropis</i>	<i>cucullata</i>	
387	Swift	African Palm	<i>Cypsiurus</i>	<i>parvus</i>	
378	Swift	Common	<i>Apus</i>	<i>apus</i>	
385	Swift	Little	<i>Apus</i>	<i>affinis</i>	
557	Thrush	Groundscraper	<i>Turdus</i>	<i>litsitsirupa</i>	
1104	Thrush	Karoo	<i>Turdus</i>	<i>smithi</i>	
514	Tit	Ashy	<i>Melaniparus</i>	<i>cinerascens</i>	
531	Tit	Cape Penduline	<i>Anthoscopus</i>	<i>minutus</i>	
686	Wagtail	Cape	<i>Motacilla</i>	<i>capensis</i>	
658	Warbler	Chestnut-vented	<i>Curruca</i>	<i>subcoerulea</i>	
841	Waxbill	Black-faced	<i>Brunhilda</i>	<i>erythronotos</i>	
840	Waxbill	Violet-eared	<i>Granatina</i>	<i>granatina</i>	
779	Weaver	Red-billed Buffalo	<i>Bubalornis</i>	<i>niger</i>	
789	Weaver	Scaly feathered	<i>Sporopipes</i>	<i>squamifrons</i>	
803	Weaver	Southern Masked	<i>Ploceus</i>	<i>velatus</i>	
1171	White-eye	Orange River	<i>Zosterops</i>	<i>pallidus</i>	
419	Wood Hoopoe	Green	<i>Phoeniculus</i>	<i>purpureus</i>	
450	Woodpecker	Cardinal	<i>Dendropicos</i>	<i>fuscescens</i>	
731		Brubru	<i>Nilaus</i>	<i>afer</i>	

Literature sources Barnes (2000), Hockey, Dean & Ryan, P.G. (2005) and Chittenden (2007). Southern African Bird Atlas Project for LOCHIEL (2924BB) Table 0-3 list the bird species within quarter degree square 2723AC bird species of high conservation priority. The likelihood of these bird species occurring at the site can't be excluded. One of these species are expected to occur in the quarter degree square.

**Table 0-3:** Threatened bird species of the quarter degree square.

Ref	Common_group	Common_species	Genus	Species	IUCN Status
536	Babbler	Southern Pied	<i>Turdoides</i>	<i>bicolor</i>	
432	Barbet	Acacia Pied	<i>Tricholaema</i>	<i>leucomelas</i>	
439	Barbet	Crested	<i>Trachyphonus</i>	<i>vaillantii</i>	
674	Batis	Pirit	<i>Batis</i>	<i>pririt</i>	
404	Bee-eater	European	<i>Merops</i>	<i>apiaster</i>	

Ref	Common_group	Common_species	Genus	Species	IUCN Status
411	Bee-eater	Swallow-tailed	<i>Merops</i>	<i>hirundineus</i>	
544	Bulbul	African Red-eyed	<i>Pycnonotus</i>	<i>nigricans</i>	
874	Bunting	Golden-breasted	<i>Emberiza</i>	<i>flaviventris</i>	
217	Bustard	Kori	<i>Ardeotis</i>	<i>kori</i>	NT, NT
860	Canary	Black-throated	<i>Crithagra</i>	<i>atroregularis</i>	
866	Canary	Yellow	<i>Crithagra</i>	<i>flaviventris</i>	
575	Chat	Ant-eating	<i>Myrmecocichla</i>	<i>formicivora</i>	
570	Chat	Familiar	<i>Oenanthe</i>	<i>familiaris</i>	
50	Cormorant	Reed	<i>Microcarbo</i>	<i>africanus</i>	
341	Cuckoo	African	<i>Cuculus</i>	<i>gularis</i>	
348	Cuckoo	Jacobin	<i>Clamator</i>	<i>jacobinus</i>	
316	Dove	Cape Turtle	<i>Streptopelia</i>	<i>capicola</i>	
317	Dove	Laughing	<i>Spilopelia</i>	<i>senegalensis</i>	
314	Dove	Red-eyed	<i>Streptopelia</i>	<i>semitorquata</i>	
517	Drongo	Fork-tailed	<i>Dicrurus</i>	<i>adsimilis</i>	
663	Flycatcher	Chat	<i>Melaenornis</i>	<i>infuscatus</i>	
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661	Flycatcher	Marico	<i>Melaenornis</i>	<i>mariquensis</i>	
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165	Goshawk	Pale Chanting	<i>Melierax</i>	<i>canorus</i>	
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84	Ibis	Hadada	<i>Bostrychia</i>	<i>hagedash</i>	
245	Lapwing	Blacksmith	<i>Vanellus</i>	<i>armatus</i>	
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506	Martin	Rock	<i>Ptyonoprogne</i>	<i>fuligula</i>	
392	Mousebird	Red-faced	<i>Urocolius</i>	<i>indicus</i>	
391	Mousebird	White-backed	<i>Colius</i>	<i>colius</i>	
365	Owlet	Pearl-spotted	<i>Glaucidium</i>	<i>perlatum</i>	
692	Pipit	African	<i>Anthus</i>	<i>cinnamomeus</i>	
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581	Robin-Chat	Cape	<i>Cossypha</i>	<i>caffra</i>	
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711	Shrike	Crimson-breasted	<i>Laniarius</i>	<i>atrococcineus</i>	
784	Sparrow	House	<i>Passer</i>	<i>domesticus</i>	
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780	Sparrow-Weaver	White-browed	<i>Plocepasser</i>	<i>mahali</i>	
182	Spurfowl	Red-billed	<i>Pternistis</i>	<i>adspersus</i>	
737	Starling	Cape	<i>Lamprotornis</i>	<i>nitens</i>	
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Ref	Common_group	Common_species	Genus	Species	IUCN Status
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387	Swift	African Palm	<i>Cypsiurus</i>	<i>parvus</i>	
378	Swift	Common	<i>Apus</i>	<i>apus</i>	
385	Swift	Little	<i>Apus</i>	<i>affinis</i>	
557	Thrush	Groundscraper	<i>Turdus</i>	<i>litsitsirupa</i>	
1104	Thrush	Karoo	<i>Turdus</i>	<i>smithi</i>	
514	Tit	Ashy	<i>Melaniparus</i>	<i>cinerascens</i>	
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686	Wagtail	Cape	<i>Motacilla</i>	<i>capensis</i>	
658	Warbler	Chestnut-vented	<i>Curruca</i>	<i>subcoerulea</i>	
841	Waxbill	Black-faced	<i>Brunhilda</i>	<i>erythronotos</i>	
840	Waxbill	Violet-eared	<i>Granatina</i>	<i>granatina</i>	
779	Weaver	Red-billed Buffalo	<i>Bubalornis</i>	<i>niger</i>	
789	Weaver	Scaly feathered	<i>Sporopipes</i>	<i>squamifrons</i>	
803	Weaver	Southern Masked	<i>Ploceus</i>	<i>velatus</i>	
1171	White-eye	Orange River	<i>Zosterops</i>	<i>pallidus</i>	
419	Wood Hoopoe	Green	<i>Phoeniculus</i>	<i>purpureus</i>	
450	Woodpecker	Cardinal	<i>Dendropicos</i>	<i>fuscescens</i>	
731		Brubru	<i>Nilaus</i>	<i>afer</i>	

Literature sources Barnes (2000), Hockey, Dean & Ryan, P.G. (2005) and Chittenden (2007). Southern African Bird Atlas Project for LOCHIEL (2924BB)



## Reptiles of high conservation priority

Table 0-4 list the possible presence or absence of near threatened reptile species on the site. The likelihood of the reptile species of conservation concern occurring at the site can't be excluded. Even though the species recorded are of least concern, suitable habitat occurs onsite.

**Table 0-4:** Threatened reptile species within quarter degree square<sup>3</sup>.

#	Species code	Family	Scientific name	Common name	Red list category
1	1450	Agamidae	<i>Agama aculeata aculeata</i>	Common Ground Agama	Least Concern (SARCA 2014)
2	1220	Varanidae	<i>Varanus albigularis albigularis</i>	Rock Monitor	Least Concern (SARCA 2014)

Source: FitzPatrick Institute of African Ornithology (2022). ReptileMAP Virtual Museum. Accessed at <http://vmus.adu.org.za/?vm=ReptileMAP> on 2022-01-14 Animal Demography Unit – Virtual Museum – ReptileMAP for 2723AC.

## 9.2 Amphibians of importance

Table 0-5 lists the possible presence or absence of near threatened frog species on the site. The likelihood of the frog species of conservation concern occurring at the site can't be excluded. Drainage is located towards the east of the BESS and may in all likelihood house some amphibian species.

**Table 0-5:** Amphibian species within quarter degree square having threatened importance<sup>4</sup>.

Scientific Name	Common Name	Status
<i>Breviceps adspersus</i>	Bushveld Rain Frog	Not Threatened
<i>Amietophrynus gutturalis</i>	Guttural Toad	Not Threatened
<i>Amietophrynus poweri</i>	Western Olive Toad	Not Threatened
<i>Vandijkophrynus gariensis</i>	Karoo Toad	Not Threatened
<i>Kassinia senegalensis</i>	Bubbling Kassinia	Not Threatened
<i>Pyxicephalus adspersus</i>	Giant Bullfrog	Near Threatened
<i>Xenopus laevis</i>	Common Platanna	Not Threatened
<i>Cacosternum boettgeri</i>	Common Caco	Not Threatened
<i>Amietia angolensis</i>	Common River Frog	Not Threatened

<sup>3</sup> Atlas and Red List of the Reptiles of South Africa, Lesotho, and Swaziland. 2014. Edited by Michael F. Bates, William R. Branch, Aaron M. Bauer, Marius Burger, Johan Marais, Graham J. Alexander & Marienne S. de Villiers. SANBI, Pretoria.

<sup>4</sup> Minter LR, Burger M, Harrison JA, Braack HH, Bishop PJ & Kloepfer D (eds). 2004. Atlas and Red Data book of the frogs of South Africa, Lesotho, and Swaziland. SI/MAB Series no. 9. Smithsonian Institution, Washington, D.C.

## Butterflies of conservation priority

In Table 0-6 the threatened butterfly species within the quarter degree square are shown. The likely occurrence of the butterfly species on the site cannot be excluded due to habitat conditions favourable for species to exist at the site around grassland and hardy thicket.

**Table 0-6:** Threatened: Endangered butterfly species of quarter degree square 2723AC.

#	Species code	Family	Scientific name	Common name	Red list category
1	471110	HESPERIIDAE	<i>Spialia delagoae</i>	Delagoa sandman	Least Concern (SABCA 2013)
2	471170	HESPERIIDAE	<i>Spialia ferax</i>	Striped sandman	Least Concern (SABCA 2013)
3	471240	HESPERIIDAE	<i>Spialia mafa mafa</i>	Mafa sandman	Least Concern (SABCA 2013)
4	471340	HESPERIIDAE	<i>Spialia spio</i>	Mountain sandman	Least Concern (SABCA 2013)
5	459060	LYCAENIDAE	<i>Aloeides damarensis damarensis</i>	Damara russet	Least Concern (SABCA 2013)
6	459310	LYCAENIDAE	<i>Aloeides molomo krooni</i>	Mottled russet	Least Concern (SABCA 2013)
7	459530	LYCAENIDAE	<i>Aloeides simplex</i>	Dune russet	Least Concern (SABCA 2013)
8	457920	LYCAENIDAE	<i>Argyraspodes argyraspis</i>	Warrior silver-spotted copper	Least Concern (SABCA 2013)
9	458270	LYCAENIDAE	<i>Cigaritis natalensis</i>	Natal silverline	Least Concern (SABCA 2013)
10	458320	LYCAENIDAE	<i>Cigaritis phanes</i>	Silvery silverline	Least Concern (SABCA 2013)
11	463120	LYCAENIDAE	<i>Cupidopsis jobates jobates</i>	Tailed meadow blue	Least Concern (SABCA 2013)
12	453690	LYCAENIDAE	<i>Stugeta subinfusata reynoldsi</i>	Dusky marbled sapphire	Least Concern (SABCA 2013)
13	464500	LYCAENIDAE	<i>Tarucus sybaris linearis</i>	Dotted pierrot	Least Concern (SABCA 2013)
14	460080	LYCAENIDAE	<i>Tylopaedia sardonyx sardonyx</i>	King copper	Least Concern (SABCA 2013)
15	410760	NYMPHALIDAE	<i>Acraea neobule neobule</i>	Wandering donkey acraea	Least Concern (SABCA 2013)
16	409280	NYMPHALIDAE	<i>Danaus chrysippus orientis</i>	African plain tiger	Least Concern (SABCA 2013)
17	439300	NYMPHALIDAE	<i>Hypolimnys misippus</i>	Common diadem	Least Concern (SABCA 2013)
18	438340	NYMPHALIDAE	<i>Junonia oenone oenone</i>	Dark blue pansy	Least Concern (SABCA 2013)
19	438050	NYMPHALIDAE	<i>Vanessa cardui</i>	Painted lady	Least Concern (SABCA 2013)
20	418500	NYMPHALIDAE	<i>Ypthima asterope hereroica</i>	African three-ring	Least Concern (SABCA 2013)

21	407450	PIERIDAE	<i>Belenois aurota</i>	Pioneer caper white	Least Concern (SABCA 2013)
22	403120	PIERIDAE	<i>Catopsilia florella</i>	African migrant	Least Concern (SABCA 2013)
23	405610	PIERIDAE	<i>Pontia helice helice</i>	Southern meadow white	Least Concern (SABCA 2013)
24	403650	PIERIDAE	<i>Teracolus agoye bowkeri</i>	Speckled sulphur tip	Least Concern (SABCA 2013)
25	403710	PIERIDAE	<i>Teracolus subfasciatus</i>	Lemon traveller	Least Concern (SABCA 2013)

Sources: Mecenero, S., J.B. Ball, D.A. Edge, M.L. Hamer, G.A. Hening, M. Krüger, E.L. Pringle, R.F. Terblanche & M.C. Williams (eds). 2013. Conservation assessment of butterflies of South Africa, Lesotho, and Swaziland: Red List and atlas. Safronics (Pty) Ltd., Johannesburg and Animal Demography Unit, Cape Town.



# environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

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

File Reference Number:  
NEAS Reference Number:  
Date Received:

(For official use only)

DEA/EIA/

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

**ADAMS BATTERY ENERGY STORAGE SYSTEM (BESS) AND ASSOCIATED INFRASTRUCTURE LOCATED IN THE NORTHERN CAPE PROVINCE**

### 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](mailto:EIAAdmin@environment.gov.za)

## 1. SPECIALIST INFORMATION

<b>Specialist Company Name:</b>	NCC Environmental Services (Pty) Ltd		
<b>B-BBEE</b>	<b>Contribution level (indicate 1 to 8 or non-compliant)</b>	2	<b>Percentage Procurement recognition</b>
<b>Specialist name:</b>	Nico-Ronaldo Retief		
<b>Specialist Qualifications:</b>	M.Sc. Zoology		
<b>Professional affiliation/registration:</b>	SACNASP 005636; EAPASA Reg. EAP		
<b>Physical address:</b>	26 Bell Close, Westlake Business Park, Westlake, Cape Town, 7945		
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<b>Telephone:</b>		<b>Fax:</b>	
<b>E-mail:</b>	ronaldor@ncc-group.co.za		

## 2. DECLARATION BY THE SPECIALIST

I, Nico-Ronaldo Retief, 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

NCC Environmental Services (PTY) LTD

Name of Company:

31 October 2022

Date



3.

### UNDERTAKING UNDER OATH/ AFFIRMATION

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

[Signature]  
Signature of the Specialist

NCC Environmental Services (PTY) LTD  
Name of Company

31 October 2022  
Date

[Signature]  
Signature of the Commissioner of Oaths

09/11/2022  
Date

**SAREL FRANCOIS MALAN**  
**MALAN & HITGE ATTORNEYS**  
745 Park St Clydesdale Pretoria 0002  
Commissioner of Oaths - Ex Officio  
Practising Attorney of South Africa