ENERTRAG SOUTH AFRICA (PTY) LTD

# CAMDEN I SOLAR UP TO 132 KV GRID CONNECTION AND ASSOCIATED INFRASTRUCTURE NEAR ERMELO MPUMALANGA (REFERENCE: 14/12/16/3/3/1/2768)

## FINAL BASIC ASSESSMENT REPORT

03 AUGUST 2023 FINAL

# CAMDEN I SOLAR UP TO 132 KV GRID CONNECTION AND ASSOCIATED INFRASTRUCTURE NEAR ERMELO MPUMALANGA (REFERENCE: 14/12/16/3/3/1/2768)

## FINAL BASIC ASSESSMENT REPORT

ENERTRAG SOUTH AFRICA (PTY) LTD

TYPE OF DOCUMENT (VERSION)
CONFIDENTIAL

PROJECT NO.: 41103247
DATE: AUGUST 2023

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# QUALITY MANAGEMENT

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This Final Basic Assessment Report (Report) for the proposed Camden I Solar Energy Facility 132 kV Grid Connection Project has been prepared by WSP Group Africa Proprietary Limited (WSP) on behalf and at the request of Enertrag South Africa (Pty) Ltd (Client), as part of the application process for Environmental Authorisation.

Unless otherwise agreed by us in writing, we do not accept responsibility or legal liability to any person other than the Client for the contents of, or any omissions from, this Report.

To prepare this Report, we have reviewed only the documents and information provided to us by the Client or any third parties directed to provide information and documents to us by the Client. We have not reviewed any other documents in relation to this Report, except where otherwise indicated in the Report.

# DOCUMENT DESCRIPTION

CLIENT

Enertrag South Africa (Pty) Ltd

PROJECT NAME

Camden I Solar Grid Connection Up To 132 kV Powerline and associated infrastructure Near Ermelo Mpumalanga

REPORT TYPE

Final Basic Assessment Report: (REFERENCE: 14/12/16/3/3/1/2768)

WSP PROJECT NUMBER

41103247

# PRODUCTION TEAM

## ENERTRAG SOUTH AFRICA (PTY) LTD

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# ABBREVIATIONS

| ABBREVIATION | DEFINITION |
|---|---|
| AEL | Atmospheric Emission Licence |
| AIS | Alien and Invasive Species |
| BA | Basic Assessment |
| BAR | Basic Assessment Report |
| BBBEE | Broad Based Black Economic Empowerment |
| BPEO | Best Practicable Environmental Option |
| BSP | Biodiversity Spatial Plan |
| CA | Competent Authority |
| CARA | Conservation of Agricultural Resources Act (Act 43 of 1983) |
| CBA | Critical Biodiversity Area |
| CH | Critical Habitat |
| CIA | Cumulative Impact Assessment |
| CR | Critically Endangered |
| CRR | Comments and Responses Report |
| CSP | concentrated solar power |
| CV | Curriculum vitae |
| DEA | Department of Environmental Affairs |
| DFFE | Department of Forestry, Fisheries and the Environment |
| DMRE | Department of Mineral Resources and Energy |
| DoA | Department of Agriculture |
| DoT | Department of Transport |
| DWS | Department of Water and Sanitation |
| EA | Environmental Authorisation |
| EAP | Environmental Assessment Practitioner |
| ECO | Environmental Control Officer |
| EDL | episodic drainage line |
| EGI | Electricity Grid Infrastructure |

| ABBREVIATION | DEFINITION |
|---|---|
| EHS | Environmental, Health and Safety |
| EIA | Environmental Impact Assessment |
| EMF | Environmental Management Framework |
| EMPr | Environmental Management Programme |
| EN | Endangered |
| EP | Equator Principles |
| EPL | Ecosystem Protection Level |
| EPFI | Equator Principles Financial Institution |
| ERA | Electricity Regulation Act (Act 4 of 2006) |
| ESA | Ecological Support Area |
| ESA | Early Stone Age |
| ESMS | Environmental and Social Management System |
| ETS | Ecosystem Threat Status |
| EWT | Endangered Wildlife Trust |
| FI | Financial Institution |
| FPIC | Free, Prior, and Informed Consent |
| GA | General Authorisation |
| GBIF | Global Biodiversity Information Facility |
| GM | Grievance Mechanism |
| GG | Government Gazette |
| GHG | Greenhouse Gases |
| GIIP | Good International Industry Practice |
| GN | Government Notice |
| GNR | Government Notice Regulation |
| GPS | Global Positioning System |
| IBA | Important Bird Area |
| ICAO | International Civil Aviation Organisation |
| ICP | Informed Consultation and Participation |
| IDP | Integrated Development Plan |
| IEP | Integrated Energy Plan |
| IFC | International Finance Corporation |

| ABBREVIATION | DEFINITION |
|---|---|
| IPPPP | Independent Power Producer Procurement Programme |
| IRP | Integrated Resource Plan |
| IUCN | International Union for Conservation of Nature |
| LC | Least Concern |
| LSA | Later Stone Age |
| MF | Monitoring Forum |
| MP | Moderately Protected |
| MSA | Middle Stone Age |
| MSDS | Material Safety Data Sheets |
| NDP | National Development Plan |
| NEMA | National Environmental Management Act (Act 107 of 1998) |
| NEMAQA | National Environment Management Air Quality Act (No. 39 of 2004) |
| NEMBA | National Environmental Management Biodiversity Act (Act 10 of 2004) |
| NEMPAA | National Environmental Management Protected Areas Act (Act 57 of 2003) |
| NEMWA | National Environmental Management Waste Act (Act 59 of 2008) |
| NERSA | National Energy Regulator of South Africa |
| NFEPA | National Freshwater Ecosystem Priority Areas |
| NHRA | National Heritage Resource Act (Act 25 of 1999) |
| NID | Notice of Intent to Develop |
| NIP | National Infrastructure Plan |
| NP | Not Protected |
| NT | Near Threatened |
| NWA | National Water Act (Act 36 of 1998) |
| OEC | Obstacle Evaluation Committee |
| OHPL | Overhead Powerline |
| OHSA | Occupational Health and Safety Act (Act 85 of 1993) |
| ONA | Other Natural Areas |
| PA | Protected Area |
| PES | Present Ecological State |
| PICC | Presidential Infrastructure Coordinating Commission |
| POSA | Plants of South Africa |

| ABBREVIATION | DEFINITION |
|---|---|
| PP | Poorly Protected |
| PPE | Personal Protective Equipment |
| PPP | Public Participation Process |
| PS | Performance Standard |
| PSDF | Provincial Spatial Development Framework |
| PVSEF | Photovoltaic Solar Energy Facility |
| REDZ | Renewable Energy Development Zones |
| REIPPPP | Renewable Energy Independent Power Producer Procurement Programme |
| SAAF | South African Air Force |
| SA CATS | South African Civil Aviation Technical Standards |
| SACAA | South African Civil Aviation Authority |
| SAHRA | South African Heritage Resources Agency |
| SAIIAE | South African Inventory of Inland Aquatic Ecosystems |
| SANBI | South African National Biodiversity Institute |
| SAPAD | South Africa Protected Areas Database |
| SARPs | Standards and Recommended Practices |
| SCC | Species of Conservation Concern |
| SDF | Spatial Development Framework |
| SEA | Strategic Environmental Assessment |
| SER | Stakeholder Engagement Report |
| SIA | Social Impact Assessment |
| SIP | Strategic Integrated Projects |
| SKEP | Succulent Karoo Ecosystem Programme |
| SO | Spatial objective |
| SPLUMA | Spatial Planning and Land Use Management Act (Act 16 of 2013) |
| STD | sexually transmitted disease |
| UN | United Nations |
| VEC | Valued Environmental and Social Components |
| VU | Vulnerable |
| WBG | World Bank Group |
| WMA | Water Management Area |

| ABBREVIATION | DEFINITION |
|---|---|
| WML | Waste Management Licence |
| WP | Well Protected |
| WSP | WSP Group Africa (Pty) Ltd |
| WUL | Water Use Licence |

# CONTENTS OF THIS REPORT

As per the Environmental Impact Assessment (EIA) Regulations 2014, as amended, Appendix 1 of Government Notice Regulation (GNR) 326 identifies the legislated requirements that must be contained within a Basic Assessment Report (BAR) for the Competent Authority (CA) to consider and come to a decision on the application. **Table A** below details where the required information is located within the Final BAR (this report).

**Table A: Legal Requirements as detailed in Appendix 1 of GNR 326 of the 2014 EIA Regulations, as amended**

| APPENDIX 1 OF GNR 326 | DESCRIPTION | RELEVANT REPORT SECTION |
|---|---|---|
| **3(1) (a)** | Details of the EAP who prepared the report and the expertise of the EAP, including a curriculum vitae | **Section 1.3.1 Appendix A** |
| **3(1) (b)** | The location of the activity | **Section 2.1** |
| **3(1) (c)** | A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale | **Section 2.1** |
| **3(1) (d)** | A description of the scope of the proposed activity | **Section 4.1 and 4.2** |
| **3(1) (e)** | A description of the policy and legislative context within which the development is proposed | **Section 3.1** |
| **3(1) (f)** | A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location | **Section 2.5** |
| **3(1) (g)** | A motivation for the preferred site, activity and technology alternative | **Section 5** |
| **3(1) (h)** | A full description of the process followed to reach the proposed alternative within the site | **Section 5** |
| **3(1) (i)** | A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity | **Section 4.5** |
| **3(1) (j)** | An assessment of each identified potentially significant impact and risk | **Section 7** |
| **3(1) (k)** | Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report | **Section 7** |
| **3(1) (l)** | An environmental impact statement | **Section 9** |
| **3(1) (m)** | Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the Environmental Management Programme (EMPr). | **Section 7** |
| **3(1) (n)** | Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation. | **Section 9.6** |

| APPENDIX 1 OF GNR 326 | DESCRIPTION | RELEVANT REPORT SECTION |
|---|---|---|
| **3(1) (o)** | A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed | **Section 1.7** |
| **3(1) (p)** | A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation | **Section 9.6** |
| **3(1) (q)** | Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be conducted, and the post construction monitoring requirements finalised | **N/A** |
| **3(1) (r)** | An undertaking under oath or affirmation by the EAP | **Appendix B** |
| **3(1) (s)** | Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts | **N/A** |
| **3(1) (t)** | Any specific information that may be required by the competent authority | **N/A** |
| **3(1) (u)** | Any other matters required in terms of section 24(4)(a) and (b) of the Act | **N/A** |

# GENERAL SITE INFORMATION

**TECHNICAL DETAILS OF THE PROPOSED CAMDEN I SEF UP TO 132KV GRID CONNECTION PROJECT**

| | |
|---|---|
| Location of Site | The proposed project is situated in Msukaligwa Local Municipality under the Gert Sibande District Municipality in Mpumalanga Province. |
| Farm Names | Portion 1 and 2 of the farm WELGELEGEN 322 IT |
| SG Codes | T0IT00000000032200001<br>T0IT00000000032200002 |
| Size of Buildable Area i.e., project infrastructure footprint (only preferred layout, inclusive of all associated infrastructure) | **Alternative 1**<br>Approximate length of transmission line = 1.8 km<br>Servitude width = up to 40m<br>Assessment corridor width = 500m (250m on either side of the centreline<br>**Alternative 2 (Preferred corridor route)**<br>Approximate length of transmission line = 2.1 km<br>Servitude width = up to 40m<br>Assessment corridor width = 500m (250m on either side of the centreline<br>**Alternative 3**<br>Approximate length of transmission line = 3.93 km<br>Servitude width = up to 40m<br>Assessment corridor width = 500m (250m on either side of the centreline<br>**Alternative 4**<br>Approximate length of transmission line = 3.087 km<br>Servitude width = up to 40m<br>Assessment corridor width = 500m (250m on either side of the centreline) |
| Substation assessment corridor width | Substation assessment corridor = 250m from the outer extent of the initiation/commencement substation, and the terminating substation works (i.e. both start and end substation components associated with the powerline) |
| Co-ordinates: | **Alternative 1**<br>Start: 26°39'43.40"S; 30° 4'21.95"E<br>Middle: 26°39'15.93"S; 30° 4'7.31"E<br>End: 26°38'51.28"S; 30° 4'1.89"E<br>**Alternative 2 (Preferred)**<br>Start: 26°39'35.84"S; 30° 4'26.32"E<br>Middle: 26°39'15.93"S; 30° 4'7.31"E<br>End - 26°38'51.28"S; 30° 4'1.89"E<br>**Alternative 3**<br>Start: 26°39'35.84"S; 30° 4'26.31"E<br>Middle: 26°39'56.03"S; 30° 3'25.22"E<br>End: 26°40'29.37"S; 30° 2'27.51"E<br>**Alternative 4** |

| | |
|---|---|
| | Start: 26°39'43.42"S; 30° 4'21.90"E<br>Middle: 26°39'56.03"S; 30° 3'25.22"E<br>End: 26°40'29.51"S; 30° 2'27.03"E<br>**Alternative 1: Grid operator and Switching Substation**<br>S1-1: 26°40'36.82"S 30° 2'26.07"E<br>S1-2: 26°40'39.57"S 30° 2'19.87"E<br>S1-3: 26°40'27.62"S 30° 2'23.60"E<br>S1-4: 26°40'29.07"S 30° 2'29.60"E<br>**Alternative 2: Preferred: Grid operator & Switching Substation**<br>S2-1: 26°38'47.65"S 30° 4'14.23"E<br>S2-2: 26°38'57.66"S 30° 4'3.07"E<br>S2-3: 26°38'54.03"S 30° 3'59.66"E<br>S2-4: 26°38'44.10"S 30° 4'10.51"E<br>**Alternative 1: Grid Substation & BESS:**<br>S3-1: 26°39'39.20"S 30° 4'23.08"E<br>S3-2: 26°39'41.33"S 30° 4'28.76"E<br>S3-3: 26°39'50.91"S 30° 4'23.44"E<br>S3-4: 26°39'48.61"S 30° 4'17.98"E<br>**Alternative 2- Preferred: Grid Substation & BESS:**<br>S4-1: 26°39'35.64"S 30° 4'31.79"E<br>S4-2: 26°39'40.82"S 30° 4'28.93"E<br>S4-3: 26°39'36.55"S 30° 4'18.57"E<br>S4-4: 26°39'31.19"S 30° 4'21.27"E |

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**H** SCREENING TOOL REPORT

**I** PRE-APPLICATION MEETING MINUTES

# 1 INTRODUCTION

Changes made from the Draft Basic Assessment Report (BAR) have been underlined in this final BAR for ease of reference to the updates made in the report.

## 1.1 BACKGROUND AND TERMS OF REFERENCE

ENERTRAG South Africa (Pty) Ltd (ESA) (the Developer) is proposing the development of a Camden Renewable Energy Complex comprising various projects within the vicinity of the Camden Power Station in Mpumalanga. The Complex consists of eight distinct projects referred to as:

- Camden I Wind Energy Facility (WEF) (up to 200MW): Subject to a Scoping and Environmental Impact Reporting (S&EIR) process (DFFE Ref: 14/12/16/3/3/2/2137);
- Camden I Wind Grid Connection (up to 132kV): Subject to a Basic Assessment (BA) process;
- Camden Grid Connection and Collector substation (up to 400kV): Subject to a S&EIR process (DFFE Ref: 14/12/16/3/3/2/2134);
- Camden I Solar Energy Facility (SEF) (up to 100MW): Subject to a S&EIR process (DFFE Ref: 14/12/16/3/3/2/2136);
- **Camden I Solar Grid Connection (up to 132kV): Subject to a BA process; (this report & application)**
- Camden II WEF (up to 200MW): Subject to a S&EIR process (DFFE Ref: 14/12/16/3/3/2/2135);
- Camden II WEF up to 132kV Grid Connection: Subject to a BA process; and
- Camden Green Hydrogen and Ammonia Facility and associated infrastructure: Subject to a S&EIR process (MDARDLEA Ref: 1/3/1/16/1G-242).

**The focus of this Application is the proposed Camden up to 132kV Grid Connection powerline and associated infrastructure.**

The proposed project entails the construction of an up to 132kV Grid connection overhead powerline including associated infrastructure, from the Camden I Solar PV Facility to the nearby Camden Collector substation (which in turn will connect to the Camden Power Station). The powerline will be approximately 5km in length, depending on the authorized location of the collector substation.

The onsite grid connection substation will consist of high voltage substation yard to allow for multiple (up to) 132kV feeder bays and transformers, control building, telecommunication infrastructure, access roads, etc. The area for the onsite substation will be up to 1.5ha, as well as an additional up to 1.5ha for termination work upgrades required for connection into the common collector and Main Transmission Substation. The up to 132kV powerline and substation will have a 500m corridor (250m either side of the centre line, and 250m around the entire perimeter of the proposed substation sites), to allow for micro-siting and avoidance of sensitive features where possible. This corridor, as opposed to the line routing, is proposed for authorisation. This application additionally includes the necessary up to 132kV voltage electrical components required for connection at the Collector Substation (i.e. the termination works).

The proposed project will comprise the following key components, detailed further in Table 1-1 below:

- The grid connection substation (adjacent the IPP substation), consisting of a high voltage substation yard to allow for multiple (up to) 132kV feeder bays and transformers, control building, telecommunication infrastructure, access roads, lighting and fencing;
- Construction of an up to 132kV power line (either single or double circuit) between the grid connection substation portion and that of the Camden Collector substation; and
- Termination works (up to 1.5ha), comprising the necessary up to 132kV voltage electrical components required for connection at and into the Collector Substation.
- Existing or new access and service roads (utilising existing roads where possible, with new roads developed where there are no existing roads to be utilised).

**Table 1-1: Key components of the proposed project**

**OVERHEAD POWERLINE**

| | |
|---|---|
| Powerline capacity | Up to 132kV (note this includes 132kV exactly for the avoidance of doubt) |
| Powerline corridors width | A grid connection corridor has been identified for the assessment and placement of the grid connection infrastructure, comprising 500 m (i.e. 250 m on either side of centre line). The entire corridor is proposed for development provided the infrastructure remains within the assessed corridor. |
| Powerline servitude width | 40m |
| Powerline pylons: | Monopole or Lattice pylons, or a combination of both where required and as informed by detailed design |
| Construction clearance required (per pylon) | To allow for crane and large component access and installation, clearing required for each tower depends on local terrain, but up to 1500m$^2$, or where existing OHL crossings are made or powerlines are constructed adjacent each other, up to 2500m$^2$. |
| Powerline pylon height: | Up to a maximum of 40 m |
| Minimum conductor clearance | 8.1 m |
| Pylon spacing | Up to 250m apart, depending on complexity and slope of terrain |
| Pylon designs | Various pylon design types are considered (and will be determined during the detailed design engineering phase), and may include any of the following:<br>– Up to 132kV (single or double circuit)<br>– Intermediate self-supporting monopole<br>– Inline or angle-strain self-supporting monopole<br>– Suspension self-supporting monopole<br>– Triple pole structure<br>– Cross rope suspension;<br>– Guyed “V” Structure<br>– Steel lattice structure; or<br>– Similar pylon design at 132kV specification<br>The above designs may require anchors with guy-wires or be anchorless. For up to 132kV structures, concrete foundation sizes may vary depending on design type up to 140m$^2$ (12m by 12m), with depths reaching up to 4m typically in a rectangular ‘pad’ shape. |
| **Substation (and Collector Substation connection components)** | |
| Substation Footprint | 1.5ha each, for both onsite substation and terminating works upgrade |
| Substation Capacity | 33/132kV |

**OVERHEAD POWERLINE**

| | |
|---|---|
| Corridor width | A grid connection corridor has been identified for the assessment and placement of the grid connection infrastructure, comprising 250m around the entire perimeter of the proposed substation sites. The entire corridor is proposed for development provided the infrastructure remains within the assessed corridor. |
| Associated infrastructure | The substation will consist of high voltage substation yard to allow for multiple (up to) 132kV feeder bays and transformers, control building, telecommunication infrastructure, access roads, etc, including the following:<br><br>Standard substation electrical equipment, including but not limited to transformers, busbars, office area, operation and control room, workshop, and storage area, feeder bays, transformers, stringer strain beams, insulators, isolators, conductors, circuit breakers, lightning arrestors, relays, capacitor banks, batteries, wave trappers, switchyard, metering and indication instruments, equipment for carrier current, surge protection and outgoing feeders, as may be needed.<br><br>The control building, telecommunication infrastructure, oil dam(s)<br><br>Workshop and office area within the substation footprint<br><br>Fencing around the substation<br><br>Lighting and security infrastructure<br><br>All the access road infrastructure to and within the substation<br><br>Further ancillary infrastructure including but not limited to lighting, lightning protection, fencing, buildings required for operation (ablutions, office, workshop and control room, security fencing and gating, parking area, concrete batching plant (if required), waste storage/disposal and storerooms). |
| Termination works | All works and components required for connection at and into the Collector Substation comprising up to 1.5ha including the necessary up to 132kV voltage electrical components, including amongst others standard substation electrical equipment as may be needed (feeder bays, transformers, busbars, stringer strain beams, insulators, isolators, conductors, circuit breakers, lightning arrestors, relays, capacitor banks, batteries, wave trappers, switchyard, metering and indication instruments, equipment for carrier current, surge protection and outgoing feeders. |
| **Roads Infrastructure** | |
| Road servitude and access roads | Approximately 6 meters wide, however where required for turning circle/bypass areas, access or internal roads will be up to 20m wide to allow for larger component transport. During operation, vegetation maintenance by partial clearing/maintenance in grid servitude for operation, safety and maintenance reasons. |

WSP Group Africa (Pty) Ltd (WSP) has been appointed by ESA as the independent Environmental Assessment Practitioner (EAP) to facilitate the Basic Assessment (BA) process in accordance with the Environmental Impact Assessment (EIA) Regulations (2014, as amended).

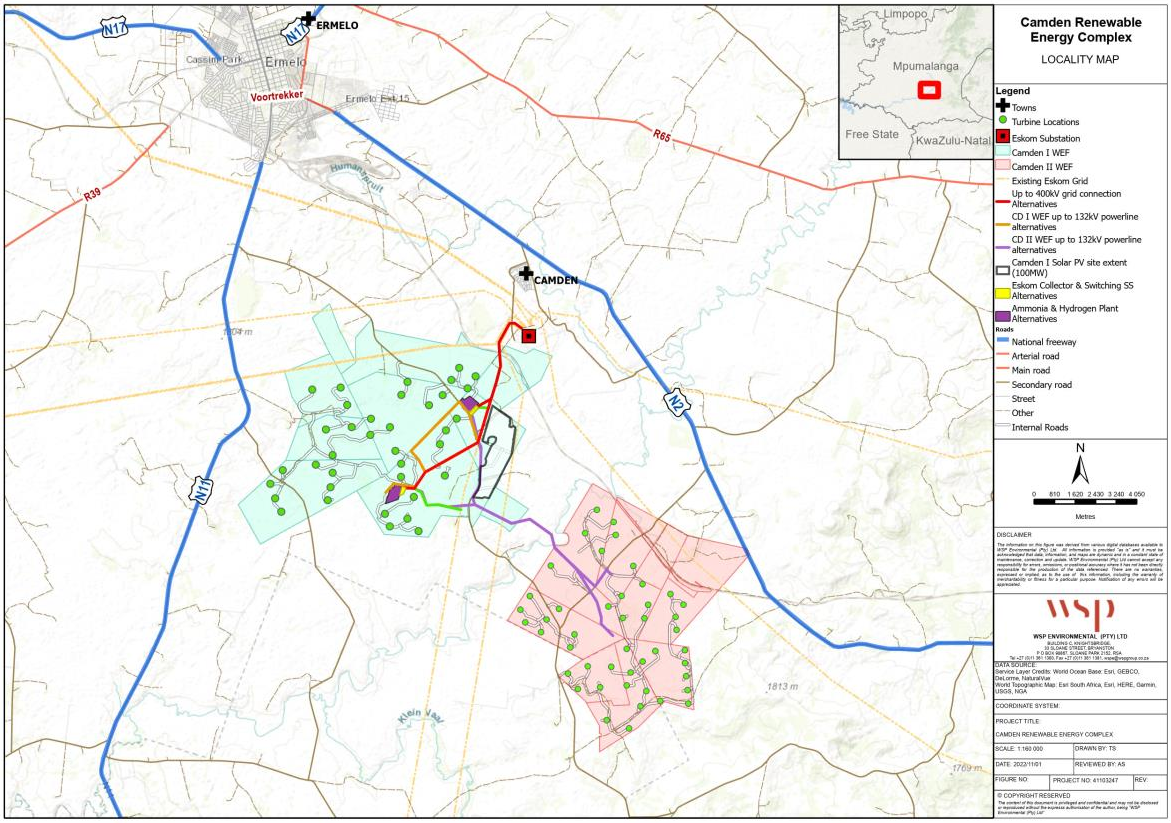


**Figure 1-1: Locality map for the proposed Camden Renewable Energy Complex, near Camden in the Mpumalanga Province.**

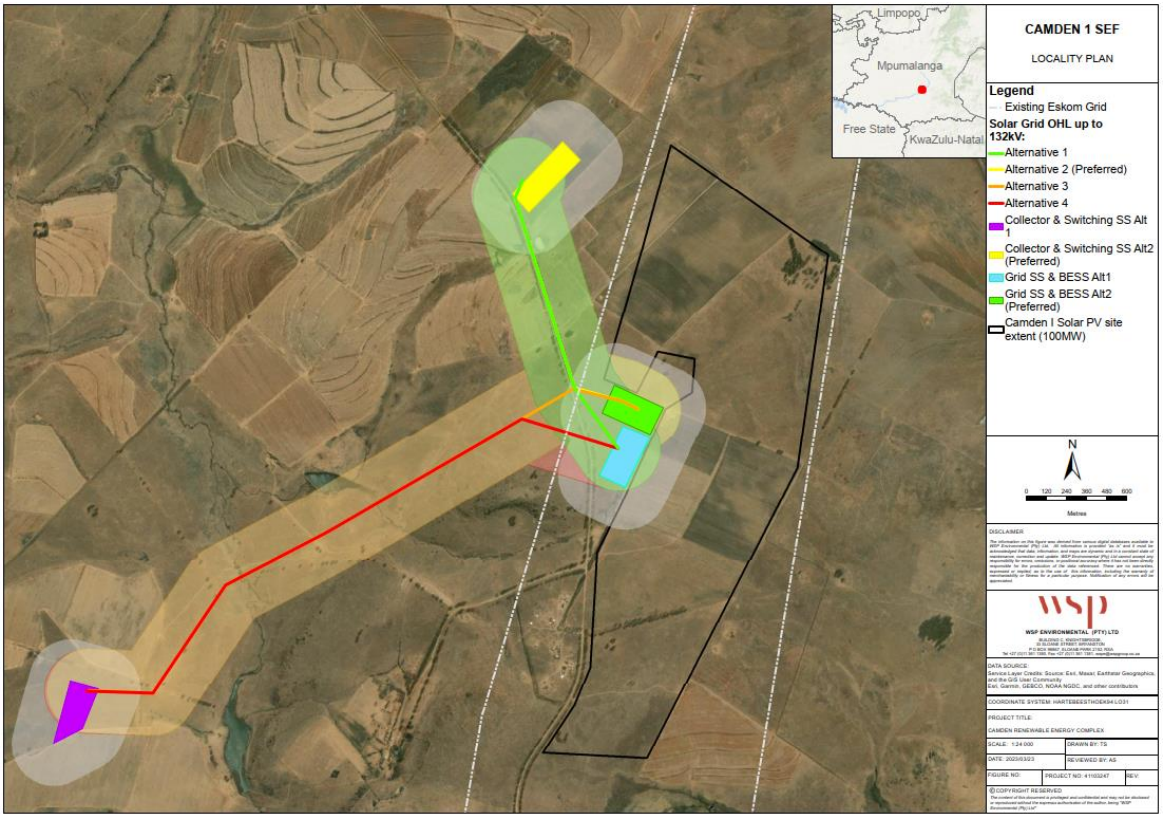


**Figure 1-2: Locality map for the proposed Camden I SEF up to 132kV OHPL project, showing the respective grid route corridors around the substation infrastructure.**

## 1.2 PURPOSE OF THE BA PROCESS

The BA process is an interdisciplinary procedure to ensure that environmental and social considerations are included in decisions regarding projects. Simply defined, the process aims to identify the possible environmental and social effects of a proposed activity and how those impacts can be mitigated. In the context of this report, the purpose of the BA process is to inform decision-makers and the public of potential negative and positive consequences of the proposed construction of the OHPL and substation. This provides the competent authority (CA) sufficient information to make an informed decision with regards to granting or refusing the EA applied for.

## 1.3 DETAILS OF KEY ROLE PLAYERS

### *1.3.1 PROJECT PROPONENT*

ESA is the project proponent (the developer) with regards to this application for the construction and operation of the Project. **Table 1-2** provides the relevant details of the project proponent.

**Table 1-2: Details of Project Proponent**

**PROPONENT: ENERTRAG SOUTH AFRICA (PTY) LTD**

| | |
|---|---|
| Contact Person: | Mercia Grimbeek |
| Postal Address | Suite 104, Albion Springs, 183 Main Road, Rondebosch, Cape Town, South Africa 7700 |
| Telephone: | 071 752 8033 |
| Email: | Gideon.raath@enertrag.com |

### *1.3.2 COMPETENT AND COMMENTING AUTHORITY*

Section 24C(2)(a) of NEMA stipulates that the Minister of Forestry, Fisheries and the Environment ("the Minister") must be identified as the CA if the activity has implications for international environmental commitments or relations. GN 779 of 01 July 2016 identifies the Minister as the CA for the consideration and processing of environmental authorisations and amendments thereto for activities related the Integrated Resource Plan (IRP) 2010 – 2030. The DFFE is the CA for the Project.

**Table 1-3** provides the relevant details of the competent authority for the Project.

**Table 1-3: Competent and Commenting Authorities**

| ASPECT | COMPETENT / COMMENTING AUTHORITY | CONTACT DETAILS |
|---|---|---|
| **Competent Authority:** Environmental Authorisation | Department of Forestry, Fisheries, and the Environment (DFFE) | Case Officer: Makhosi Yeni<br>Integrated Environmental Authorisations<br>Email: MYeni@dffe.gov.za<br>Current Ref no: 2021-10-0008 |

The commenting authorities for the project include:

- Department of Mineral Resources and Energy (DMRE);
- DFFE: Biodiversity and Conservation;

- DFFE: Protected Areas;
- Department of Agriculture, Land Reform and Rural Development (DALRRD)
- Mpumalanga Department Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA);
- Department of Water and Sanitation (DWS);
- Vaal Water Management Area (WMA) Authority;
- South African Heritage Resource Agency (SAHRA);
- Mpumalanga Heritage Resources Authority (MHRA);
- Mpumalanga Tourism and Parks Agency (MTPA);
- Civil Aviation Authority (CAA);
- Air Traffic and Navigation Services (ATNS);
- Department of Defence (SA Army) (DD);
- Astronomy Management Authority (AMA);
- South African Weather Services (SAWS);
- South African National Roads Agency Limited (SANRAL);
- Gert Sibande District Municipality;
- Msukaligwa Local Municipality; and
- Dr Pixley Ka Seme Local Municipality.

Refer to **Appendix D** for the relevant contact details.

### 1.3.3 ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP was appointed in the role of Independent EAP to undertake the BA processes for the proposed project. The CV of the EAP is available in **Appendix A**. The EAP declaration of interest and undertaking is included in **Appendix B**. **Table 1-4** details the relevant contact details of the EAP.

**Table 1-4: Details of the EAP**

| **EAP** | **WSP GROUP AFRICA (PTY) LTD** |
|---|---|
| Contact Person: | Ashlea Strong |
| Physical Address: | Building 1, Maxwell Office Park, Magwa Crescent West, Waterfall City, Midrand, 1685 |
| Postal Address: | P.O. Box 6001, Halfway House, 1685 |
| Telephone: | 011 361 1392 |
| Fax: | 011 361 1301 |
| Email: | Ashlea.Strong@wsp.com |
| EAP Qualifications: | – Masters in Environmental Management, University of the Free State<br>– B Tech, Nature Conservation, Technikon SA<br>– National Diploma in Nature Conservation, Technikon SA |
| EAPASA Registration Number: | EAPASA (2019/1005) |

**STATEMENT OF INDEPENDENCE**

Neither WSP nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any business, financial, personal or other interest that could be reasonably regarded as being capable of affecting their independence. WSP has no beneficial interest in the outcome of the assessment.

## 1.4 SPECIALISTS

Specialist input was required in support of this application for EA. The details of the specialists are provided in **Table 1-5** below. The Curriculum Vitae of the specialists are attached in **Appendix F** and their declarations in **Appendix C**.

**Table 1-5: Details of Specialists**

| ASSESSMENT | NAME OF SPECIALIST | COMPANY | SECTIONS IN REPORT | SPECIALIST REPORT ATTACHED AS |
|---|---|---|---|---|
| Avifauna | Chris van Rooyen | Chris van Rooyen Consulting | Section 6.2.5<br>Section 7.8<br>Section 8.6<br>Section 9.2.1<br>Appendix F-1 | **Appendix F-1** |
| Terrestrial Biodiversity (including Plant and Animal Species) | David Hoare | David Hoare Consulting (Pty) Ltd | Section 6.2.1 to 6.2.3<br>Section 7.5, 7.6 and 7.7<br>Section 8.7, 8.8 and 8.9<br>Section 9.1.2, 9.1.3 and 9.1.4<br>Section 9.2.2, 9.2.3 and 9.2.4<br>Appendix F-2 | **Appendix F-2** |
| Aquatic Biodiversity | Brian Colloty | EnviroSci Pty Ltd | Section 6.2.4<br>Section 0<br>Section 8.3<br>Section 9.1.5<br>Section 9.2.5<br>Appendix F-3 | **Appendix F-3** |
| Heritage and Palaeontology | Jaco van der Walt | Beyond Heritage | Section 6.3.2 and 6.3.2<br>Section 7.12 and 7.13<br>Section 8.5<br>Section 9.1.6<br>Section 9.2.6 and 9.2.6<br>Appendix F-4 and F-5 | **Appendix F-4 and F-5** |
| Socio-economic | Tony Barbour | Tony Barbour Environmental Consulting | Section 6.3.5<br>Section 7.14<br>Section 8.1<br>Section 9.2.8<br>Appendix F-6 | **Appendix F-6** |
| Visual | Kerry Schwartz | SLR Consulting (Pty) Ltd | Section 6.3.4<br>Section 7.9<br>Section 8.2<br>Section 9.2.9<br>Appendix F-7 | **Appendix 7** |

| ASSESSMENT | NAME OF SPECIALIST | COMPANY | SECTIONS IN REPORT | SPECIALIST REPORT ATTACHED AS |
|---|---|---|---|---|
| Agriculture | Johann Lanz | Independent consultant | Section 6.1.4<br>Section 7.14<br>Section 8.4<br>Section 9.1.1 | **Appendix F-8** |
| Geotechnical | Muhammad Osman | SLR Consulting (Pty) Ltd | Section 6.1.3<br>Section 9.2.10 | **Appendix F-9** |

## 1.5 BASIC ASSESSMENT REPORT STRUCTURE

The structure of the final BAR (this report) is presented in **Table 1-6**.

**Table 1-6: Structure of this report**

| SECTION | CONTENTS |
|---|---|
| **1 – Introduction** | Provides a brief background and outlines the purpose of this document, as well as identifying the key role players, content of the report and the assumptions and limitations applicable to the assessment. |
| **2- Governance Framework** | Provides a brief summary and interpretation of the relevant legislation in terms of the proposed project. |
| **3 – Basic Assessment Process** | Provides a description of the BA process being undertaken and the methodology employed |
| **4- Project Description** | Describes the project location and surrounding area, project history, and a project description. |
| **5 – Project Alternatives** | Provides a summary description of the proposed project alternatives. |
| **6 – Baseline Environment** | Describes the biophysical and socio-economic characteristics of the affected environment against which potential project impacts are assessed. |
| **7 – Environmental Impact Assessment** | Describes the specialist studies undertaken and assesses the potential impacts of the project as well as project alternatives. The significance of the impacts and proposed mitigation measures are presented |
| **8 – Cumulative Impacts Assessment** | Describes the cumulative impacts identified by the EAP and Specialists and assesses the cumulative impacts. The significance of the impacts and proposed mitigation measures are presented. |
| **9 – Environmental Impact Assessment** | Provides the Environmental Impacts Statement including principal findings as well as recommendations and the authorisation opinion. |
| **10 – Way Forward** | Outlines the stakeholder engagement details associated with the public review period. |

# 2 GOVERNANCE FRAMEWORK

## 2.1 NATIONAL LEGAL AND REGULATORY FRAMEWORK

The South African regulatory framework establishes well-defined requirements and standards for environmental and social management of industrial and civil infrastructure developments. Different authorities at both national and regional levels carry out environmental protection functions. The applicable legislation and policies are shown in **Table 2-1** and **Table 2-2** below.

**Table 2-1: Applicable Legislation**

| APPLICABLE LEGISLATION | DESCRIPTION OF LEGISLATION |
|---|---|
| **The Constitution of South Africa (No. 108 of 1996)** | Section 24(b) of the Constitution provides that "*everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation [and] promote conservation.*" The Constitution cannot manage environmental resources as a stand-alone law, hence additional legislation has been promulgated in order to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations are designed to focus on various industries or components of the environment to ensure that the objectives of the Constitution are effectively implemented and upheld in an on-going basis throughout the country. In terms of Section 7, a positive obligation is placed on the State to give effect to the environmental rights. |
| **National Environmental Management Act (No. 107 of 1998)** | In terms of Section 24(2) of the National Environmental Management Act (No. 107 of 1998) (NEMA), the Minister may identify activities which may not commence without prior authorisation. On 7 April 2017, the Minister amended GNR 327 (Listing Notice 1), 325 (Listing Notice 2) and 324 (Listing Notice 3) listing activities that may not commence prior to authorisation. The regulations outlining the procedures required for authorisation are published in GNR 326 EIA Regulations (2014, as amended). Listing Notice 1 and Listing Notice 3 identify activities that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 2 identifies activities that require a Scoping and EIA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity.<br><br>**Listed Activities 11, 12, 19, 24, 27, 28, 30, 48 and 56 of GNR 327 and Listed Activities 4, 10, 12, 14, 15, 18 and 23 of GNR 324** are considered applicable to the proposed project and therefore, a BA process must be followed to obtain an EA. |
| ***Listing Notice 1: GNR 327 (as amended)*** | ***Activity 11(i):***<br><br>*The development of facilities or infrastructure for the transmission and distribution of electricity—*<br><br>*(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or*<br><br>*excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —*<br><br>*(a) temporarily required to allow for maintenance of existing infrastructure;*<br><br>*(b) 2 kilometres or shorter in length;*<br><br>*(c) within an existing transmission line servitude; and*<br><br>*(d) will be removed within 18 months of the commencement of development.*<br><br>*excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —*<br><br>*(a) temporarily required to allow for maintenance of existing infrastructure;*<br><br>*(b) 2 kilometres or shorter in length;*<br><br>*(c) within an existing transmission line servitude; and*<br><br>*(d) will be removed within 18 months of the commencement of development.* |

| APPLICABLE LEGISLATION | DESCRIPTION OF LEGISLATION |
|---|---|
| | **Applicability:**<br>The proposed powerline and substation are located outside urban areas. The project entails the construction of an 132kV overhead powerline (OHPL) and associated grid connection substation, including termination works to connect the Camden I Solar PV Facility (SEF) to the Camden Common Collector substation.<br><br>In addition, the development of the OHPL infrastructure will have the following exclusions:<br>(a) the proposed project will be permanent.<br>(b) Grid connection corridors for all alternatives (substation corridors included) will be more than 2km in length.<br>(c) The proposed grid connection corridor is not within an existing transmission line servitude.<br>(d)The project will not be removed within 18months and is permanent. |
| | ***Activity 12 (ii), (a) and (c):***<br>*The development of—*<br>*(ii) infrastructure or structures with a physical footprint of 100 square metres or more;*<br>*where such development occurs—*<br>*(a) within a watercourse; or*<br>*(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse*<br>*excluding—*<br>*(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;*<br>*(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;*<br>*(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;*<br>*(dd) where such development occurs within an urban area;*<br>*(ee) where such development occurs within existing roads, road reserves or railway line reserves; or*<br>*(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared*<br>**Applicability:**<br>The construction of the Electrical Grid Infrastructure will result in construction activities within delineated watercourses on site, or within 32m of the outer extent of the delineated watercourses on site. The powerline traverses watercourses. The footprint of the infrastructure within the watercourse and 32m from the watercourse extent will be approximately 15 000 m2 (~1.5ha).<br>In addition, the development of the OHPL infrastructure will have the following exclusions:<br>(aa) the development of infrastructure or structures will not take place within existing ports or harbours, therefore will not increase the development footprint of the port or harbour;<br>(bb) The proposed development activities are not related to the development of a port or harbour, therefore, activity 26 in Listing Notice 2 of 2014 applies;<br>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 does not apply. However, both activity 12 of LN 1 and activity 14 in LN 3 is applicable due to the as they address different aspects. Activity 12 of LN 1 addresses the footprint of the disturbance, whilst activity 14 of LN 3 addresses the geographical aspect of the proposed development and its location within a protected area;<br>(dd) the proposed development will occur within outside area; |

| APPLICABLE LEGISLATION | DESCRIPTION OF LEGISLATION |
|---|---|
| | (ee) the proposed development will not occur within existing roads, road reserves or railway line reserves; or<br>(ff) the proposed development will be a permanent structure and will require indigenous vegetation to be cleared. |
| | ***Activity 19:***<br>*The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse*<br>*but excluding where such infilling, depositing, dredging, excavation, removal or moving—*<br>*(a) will occur behind a development setback;*<br>*(b) is for maintenance purposes undertaken in accordance with a maintenance management plan; [or]*<br>*(c)falls within the ambit of activity 21 in this Notice, in which case that activity applies;*<br>*(d)occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or*<br>*(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.*<br>**Applicability:**<br>The construction of the Electrical Grid Infrastructure, including associated infrastructure, will result in construction activities which require the excavation, infilling or removal of soil exceeding $10m^3$ from delineated watercourses along the powerline alignment.<br>The powerline will traverse watercourses.<br>In addition, the development of the OHPL infrastructure will have the following exclusions:<br>(a) The project will not occur behind a development setback;<br>(b) The project is not intended for maintenance purposes undertaken in accordance with a maintenance management plan; [or]<br>(c) The project does not falls within the ambit of activity 21 in this Notice and therefore, activity 19 of LN 1 applies;<br>(d) the project does not occur within existing ports or harbours, therefore, it will not increase the development footprint of the port or harbour; or<br>(e) The project development is not related to the development of a port or harbour, therefore, activity 26 in Listing Notice 2 of 2014 does not apply. |
| | ***Activity 24(ii):***<br>*The development of a road—*<br>*(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;*<br>*but excluding a road—*<br>*(a) which is identified and included in activity 27 in Listing Notice 2 of 2014;*<br>*(b) where the entire road falls within an urban area; or*<br>*(c) which is 1 kilometre or shorter.*<br>**Applicability:**<br>An access road will be required along the length of the powerline alignment. The road will be a maximum of 20m wide without reserve and will exceed 1km in length whilst being located outside an urban area. |

| APPLICABLE LEGISLATION | DESCRIPTION OF LEGISLATION |
|---|---|
| | In addition, the development of the OHPL infrastructure will have the following exclusions:<br>(a) The proposed road infrastructure does not trigger activity 27 in Listing Notice 2 of 2014.<br>(b) The proposed road infrastructure will fall outside an urban area.<br>(c) The proposed road will be more than 1 kilometre in length. |
| | ***Activity 27:***<br>*The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—*<br>*(i) the undertaking of a linear activity; or*<br>*(ii) maintenance purposes undertaken in accordance with a maintenance management plan.*<br>**Applicability:**<br>The powerlines and access roads are considered a linear activity and therefore this activity is not triggered by the proposed construction of the transmission lines or roads.<br>However, the construction of the 132 kV grid connection substations will require the clearance of indigenous vegetation of approximately 1.5ha for the grid operator substation, as well as an additional ~1.5ha for termination work upgrades required for connection into the common collector and Main Transmission Substation, thereby triggering this activity.<br>In addition, the development of the OHPL infrastructure will have the following exclusions:<br>The land has not been developed for residential, mixed, retail, commercial, industrial or institutional purposes. |
| | ***Activity 28 (ii):***<br>*Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:*<br>*(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare*<br>*excluding where such land has already been developed for residential, mixed, retail,*<br>*commercial, industrial or institutional purposes.*<br>**Applicability:**<br>The OHPL and substations are considered a commercial and/or industrial development, and will be located on farm portions outside an urban area, used for agricultural purposes on or after 01 April 1998. The total area to be developed for the substations will exceed 1 hectare within agricultural use land.<br>In addition, the development of the OHPL infrastructure will have the following exclusions:<br>The land has not been developed for residential, mixed, retail, commercial, industrial or institutional purposes. |
| | ***Activity 30:***<br>*Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).*<br>**Applicability:**<br>The Grid Connection infrastructure, including associated infrastructure, is located within, and will require vegetation clearance or disturbance of, Eastern Highveld Grassland and Chrissiesmeer Panveld. Both ecosystems are confirmed to be listed in the National List of Ecosystems that are Threated and in Need of Protection (as indicated in GNR 1002 of 9 December 2011). Due to the fact that these ecosystems are |

| APPLICABLE LEGISLATION | DESCRIPTION OF LEGISLATION |
|---|---|
| | listed as threatened it is assumed that various threatened or protected species may be found within the development area. The restricted activity of "cutting, chopping off, uprooting, damaging or destroying, any specimen" has been identified in terms of NEM:BA and is therefore applicable to the vegetation clearance that will be required to construct the development. In light of this, Activity 30 is considered applicable. |
| | ***Activity 48(i)(a)(c):***<br>*The expansion of—*<br>*(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or*<br>*where such expansion occurs—*<br>*(a) within a watercourse;*<br>*(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;*<br>*excluding—*<br>*(aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;*<br>*(bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;*<br>*(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;*<br>*(dd) where such expansion occurs within an urban area; or*<br>*(ee) where such expansion occurs within existing roads, road reserves or railway line reserves.*<br>**Applicability:**<br>The construction of access roads along the powerline alignment will require the expansion of existing access roads, culverts or similar drainage crossing infrastructure collectively exceeding 100m$^2$ or more within delineated watercourses on site, or within 32m of the outer extent of the delineated watercourses on site.<br>In addition, the development of the OHPL infrastructure will have the following exclusions:<br>(aa) does not relate to the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;<br>(bb) does not relate to the development of a port or harbour, and therefore activity 26 in Listing Notice 2 of 2014 does not apply;<br>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 does not apply. However, both activity 12 of LN 1 and activity 14 in LN 3 is applicable due to the as they address different aspects. Activity 12 of LN 1 addresses the footprint of the disturbance, whilst activity 14 of LN 3 addresses the geographical aspect of the proposed development and its location within a protected area;<br>(dd) does not occur within an urban area; or<br>(ee) where such expansion occurs within existing roads, road reserves or railway line reserves. |

| APPLICABLE LEGISLATION | DESCRIPTION OF LEGISLATION |
|---|---|
| | ***Activity 56(ii):***<br>*The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre—*<br>*(ii) where no reserve exists, where the existing road is wider than 8 metres;*<br>*excluding where widening or lengthening occur inside urban areas.*<br>**Applicability:**<br>The construction of access roads along the powerline alignment will require the widening of existing access roads where no reserve exists and where such road is wider than 8 metres. The project is located within a rural area.<br>Exclusions:<br>The proposed road will be developed outside an urban area. |
| ***Listing Notice 3: GNR 324 (as amended)*** | ***Activity 4(f)(i)(bb)(cc)(ee)(gg):***<br>*The development of a road wider than 4 metres with a reserve less than 13,5 metres.*<br>*f. Mpumalanga*<br>*i. Outside urban areas:*<br>*(bb) National Protected Area Expansion Strategy Focus areas;*<br>*(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;*<br>*(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*<br>*(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas, where such areas comprise indigenous vegetation;*<br>**Applicability:**<br>The proposed Camden I SEF Up to 132kV grid connection transmission line will be constructed on undisturbed areas. An access road up to 20m wide will be required along the powerline alignment and substation sites.<br>The Electrical Grid Infrastructure is located in the Mpumalanga Province outside urban areas, and wholly on Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940)(aa & gg). It should be noted that abovementioned Private Nature Reserve is not being managed as a nature reserve and a separate process is underway to have it withdrawn or deproclaimed (partially or wholly) as part of ongoing province-wide reserve verification efforts by the provincial authorities.<br>Furthermore, the development activity contemplated will require vegetation clearance or disturbance of, Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)(cc).<br>In addition, and on the basis of the DFFE Screening Tool output identifying the study area within the "Protected Areas Expansion Strategy" (Low Priority - Mpumalanga Protected Area Expansion Strategy), the development activity occurs within NPAES focus area thereby triggering this activity (bb).<br>Similarly, the development activity contemplated will be located within, and will require vegetation clearance or disturbance within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA)(ee).). |

| APPLICABLE LEGISLATION | DESCRIPTION OF LEGISLATION |
|---|---|
| | ***Activity 10 (f)(i)(aa)(bb)(cc)(ee)(gg)(hh)***<br>*The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80Cubic metres.*<br>*f. Mpumalanga*<br>*i. Outside urban areas:*<br>*(aa) A protected area identified in terms of NEMPAA, excluding conservancies;*<br>*(bb) National Protected Area Expansion Strategy Focus areas;*<br>*(cc) Sensitive areas as identified in an environmental management framework as*<br>*contemplated in chapter 5 of the Act and as adopted by the competent authority;*<br>*(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*<br>*(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, where such areas comprise indigenous vegetation;*<br>*(hh) Areas within a watercourse or wetland, or within 100 metres of a watercourse or wetland;*<br>**Applicability:**<br>The proposed up to 132kV grid connection transmission line and associated infrastructure will require storage of fuel (diesel & petrol), oils, paints and other necessary dangerous goods of approximately 79m3 combined.<br>The Electrical Grid Infrastructure is located in the Mpumalanga Province outside urban areas, and partly on Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940)(aa & gg). It should be noted that abovementioned Private Nature Reserve is not being managed as a nature reserve and a separate process is underway to have it withdrawn or deproclaimed (partially or wholly) as part of ongoing province-wide reserve verification efforts by the provincial authorities.<br>Furthermore, the development activity contemplated will require vegetation clearance or disturbance of, Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)(cc).<br>In addition, and on the basis of the DFFE Screening Tool output identifying the study area within the "Protected Areas Expansion Strategy" (Low Priority - Mpumalanga Protected Area Expansion Strategy), the development activity occurs within NPAES focus area thereby triggering this activity (bb).<br>Similarly, the development activity contemplated will be located within, and will require vegetation clearance or disturbance within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA)(ee).<br>Similarly, the development activity contemplated will be located within 100 metres of a watercourse or wetland (hh) |
| | ***Activity 12 (f) (i)(ii)(iii):***<br>*The clearance of an area of 300 square metres or more of indigenous vegetation. Except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.*<br>***f. Mpumalanga:*** |

| APPLICABLE LEGISLATION | DESCRIPTION OF LEGISLATION |
|---|---|
| | *i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;*<br><br>*ii. Within critical biodiversity areas identified in bioregional plans;*<br><br>*iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning or proclamation in terms of NEMPAA.*<br><br>**Applicability:**<br><br>The construction of the up to 132 kV Powerline and grid connection substations will require the clearance of indigenous vegetation.<br><br>Such clearance will be in excess of 300m$^2$ and be partly located within Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)(i).<br><br>Similarly, vegetation clearance required for the Facility will be located within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA), in excess of 300m$^2$(ii).<br><br>The Electrical Grid Infrastructure is located in the Mpumalanga Province outside urban areas, and wholly on Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940)(iii). It should be noted that abovementioned Private Nature Reserve is not being managed as a nature reserve and a separate process is underway to have it withdrawn or deproclaimed (partially or wholly) as part of ongoing province-wide reserve verification efforts by the provincial authorities. |
| | ***Activity 14(ii)(a)and(c);( f)(i)(aa)(bb)(dd)(ff)(hh)***<br>*The development of—*<br>*(ii) infrastructure or structures with a physical footprint of 10 square metres or more;*<br>*where such development occurs—*<br>*(a) within a watercourse; or*<br>*(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;*<br>***Mpumalanga:***<br>*i. Outside urban areas:*<br>*aa) A protected area identified in terms of NEMPAA, excluding conservancies;*<br>*(bb) National Protected Area Expansion Strategy Focus areas;*<br>*(dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;*<br>*(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*<br>*(hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve, where such areas comprise indigenous vegetation;;*<br>**Applicability:**<br><br>The construction of the Electrical Grid Infrastructure will result in construction activities occurring within delineated watercourses on site, or within 32m of the outer extent of the delineated watercourses on site The powerline will traverse watercourses.<br><br>In addition, the Facility is located in the Mpumalanga Province outside urban areas, partly within a National Protected Area Expansion Strategy Focus area (bb) and wholly on Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 |

| APPLICABLE LEGISLATION | DESCRIPTION OF LEGISLATION |
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| | of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940)(aa & hh). It should be noted that abovementioned Private Nature Reserve is not being managed as a nature reserve and a separate process is underway to have it withdrawn or deproclaimed (partially or wholly) as part of ongoing province-wide reserve verification efforts by the provincial authorities.<br><br>Furthermore, the physical footprint of internal access roads, stormwater control infrastructure and electrical cabling required to connect the various components of the Facility will either traverse the delineated watercourses on site, or be located within 32m of the outer extent of the delineated watercourses on site, which infrastructure will be located within Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)(dd).<br><br>Finally, the physical footprint of internal access roads, stormwater control infrastructure and electrical cabling required to connect the various components of the Facility will either traverse the delineated watercourses on site, or be located within 32m of the outer extent of the delineated watercourses on site, located within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA)(ff). |
| | ***Activity 15 (d)(ii):***<br>*The transformation of land bigger than 1000 square metres in size, to residential, retail, commercial, industrial or institutional use, where, such land was zoned open space, conservation or had an equivalent zoning, on or after 02 August 2010.*<br>*d. Mpumalanga*<br>*ii. A protected area identified in terms of NEMPAA, excluding conservancies.*<br>**Applicability:**<br>The Facility is considered a commercial and/or industrial development, and will require the transformation of a footprint of approximately 19ha (within two farm portions outside an urban area, zoned for agriculture, while being wholly located on Portion 1 & 2 of Farm No. 322 (Welgelegen), which is a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940)(ii). It should be noted that abovementioned Private Nature Reserve is not being managed as a nature reserve and a separate process is underway to have it withdrawn or deproclaimed (partially or wholly) as part of ongoing province-wide reserve verification efforts by the provincial authorities. |
| | ***Activity 18(f)(i)(aa)(bb)(cc)(ee)(gg):***<br>*The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.*<br>*f. Mpumalanga*<br>*i. Outside urban areas:*<br>*(aa) A protected area identified in terms of NEMPAA, excluding conservancies;*<br>*(bb) National Protected Area Expansion Strategy Focus areas;*<br>*(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;*<br>*(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*<br>*(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve, where such areas comprise indigenous vegetation;*<br>**Applicability:** |

| APPLICABLE LEGISLATION | DESCRIPTION OF LEGISLATION |
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| | The construction of the access road along the powerline alignment will require the widening of up to 14m of existing access roads where no reserve exists and lengthening exceeding 1km in length. The project is located within a rural area.<br><br>Such widening and lengthening will be occur partly within a National Protected Area Expansion Strategy Focus area (bb) and wholly on Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940)(aa & gg). It should be noted that abovementioned Private Nature Reserve is not being managed as a nature reserve and a separate process is underway to have it withdrawn or deproclaimed (partially or wholly) as part of ongoing province-wide reserve verification efforts by the provincial authorities.<br><br>Furthermore, such widening and lengthening will occur within Eastern Highveld Grassland and Chrissiesmeer Panveld both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)(cc).<br><br>Finally, such widening and lengthening will be located within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA)(ee). |
| | ***Activity 23(ii)(a)(c)(f)(i)(aa)(bb)(cc)(ee)(gg):***<br><br>*The expansion of—*<br><br>*(ii) infrastructure or structures where the physical*<br><br>*footprint is expanded by 10 square metres or more;*<br><br>*where such expansion occurs —*<br><br>*(a) within a watercourse;*<br><br>*(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;*<br><br>*f. Mpumalanga*<br><br>*i. Outside urban areas:*<br><br>*(aa) A protected area identified in terms of NEMPAA, excluding conservancies;*<br><br>*(bb) National Protected Area Expansion Strategy Focus areas;*<br><br>*(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;*<br><br>*(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*<br><br>*(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve, where such areas comprise indigenous vegetation;*<br><br>**Applicability:**<br><br>The construction of the access road along the powerline alignment will require the expansion of existing access roads, culverts or similar drainage crossing infrastructure collectively exceeding 100m$^2$ or more within delineated watercourses on site, or within 32m of the outer extent of the delineated watercourses on site.<br><br>In addition, the Facility is located in the Mpumalanga Province outside urban areas, and partly within a National Protected Area Expansion Strategy Focus area (bb) and wholly on Portion 1 & 2 of Farm No. 322 (Welgelegen), which are a declared Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940)(aa & gg). It should be noted that abovementioned Private Nature Reserve is not being managed as a nature reserve and a separate process is underway to have it withdrawn |

| APPLICABLE LEGISLATION | DESCRIPTION OF LEGISLATION |
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| | or deproclaimed (partially or wholly) as part of ongoing province-wide reserve verification efforts by the provincial authorities.<br><br>Furthermore, the physical footprint of the infrastructure contemplated above will be located within Eastern Highveld Grassland and Chrissiesmeer Panveld, both ecosystems of which are listed in the National List of Ecosystems that are Threatened and in need of Protection (GNR 1002 of 9 December 2011), and subsequently listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)(cc).<br><br>Finally, the physical footprint of the infrastructure contemplated above will be located within Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA)(ee). |
| **Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes (GNR 320, 20 March 2020 and GNR 1150, 30 October 2020)** | The protocols provide the criteria for specialist assessment and minimum report content requirements for impacts for various environmental themes for activities requiring environmental authorisation. The protocols replace the requirements of Appendix 6 of the EIA Regulations, 2014, as amended. The assessment and reporting requirements of the protocols are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (screening tool).<br><br>The following environmental themes were applicable to the proposed project(refer to Section 3.2 of this report examining each theme)::<br><br>– Agriculture Theme<br>– Animal Species Theme<br>– Aquatic Biodiversity Theme<br>– Archaeological and Cultural Heritage Theme<br>– Avian Theme<br>– Civil Aviation (Solar PV) Theme<br>– Defence Theme<br>– Landscape (Solar) Theme<br>– Palaeontology Theme<br>– Plant Species Theme<br>– RFI Theme<br>– Terrestrial Biodiversity Theme |
| **National Environmental Management Biodiversity Act (No. 10 of 2004)** | The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) was promulgated in June 2004 within the framework of NEMA to provide for the management and conservation of national biodiversity. The NEMBA's primary aims are for the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources. In addition, the NEMBA provides for the establishment and functions of a South African National Biodiversity Institute (SANBI).<br><br>SANBI was established by the NEMBA with the primary purpose of reporting on the status of the country's biodiversity and conservation status of all listed threatened or protected species and ecosystems.<br><br>The biodiversity assessment identifies CBAs which represent biodiversity priority areas which should be maintained in a natural to near natural state. The CBA maps indicate the most efficient selection and classification of land portions requiring safeguarding in order to meet national biodiversity objectives.<br><br>In addition, and on the basis of the DFFE Screening Tool output identifying the study area within the "Protected Areas Expansion Strategy" (Low Priority Mpumalanga Protected Area Expansion Strategy), the development activity occurs within NPAES focus area thereby triggering this activity (bb).<br><br>Based on the preliminary desktop assessment and the terrestrial ecology report, a significant part of the Project Area falls within CBA (Irreplaceable and Optimal) and other regions mapped as Ecological Support Area (ESA). |

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| | According to the description for the MBSP Terrestrial Assessment categories, CBAs are areas that are required to meet biodiversity targets (for biodiversity pattern and ecological process features). The management approach is that they should remain in a natural state. CBAs are areas of high biodiversity value which are usually at risk of being lost and usually identified as important in meeting biodiversity targets, except for Critically Endangered Ecosystems or Critical Linkages. CBAs in the Province can be divided into two sub-categories:<br>– Irreplaceable (parts of the site are within this sub-category), and<br>– Optimal (northern parts of the site are within this sub-category).<br>The Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA) Regulations with regards to alien and invasive species have been superseded by the National Environmental Management: Biodiversity Act, 2004 (Act no. 10 of 2004) – Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014. Specific management measures for the control of alien and invasive plants will be included in the Environmental Management Programme (EMPr). |
| **National Environmental Management Protected Areas Act (No. 57 of 2003)** | The purpose of the National Environmental Management Protected Areas Act (No. 57 of 2003) (NEMPAA) is to, inter alia, provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. To this end, it provides for the declaration and management of various types of protected areas.<br>Section 50(5) of NEMPAA states that "no development, construction or farming may be permitted in a nature reserve or world heritage site without the prior written approval of the management authority." As discussed in Activity 4 of Listing Notice 3 above, the designation of the of the portion of the site as protected in the MBSP is an error.<br>The Facility is located in the Mpumalanga Province outside urban areas, partly within a National Protected Area Expansion Strategy Focus area and within Portion 1 & 2 of Farm No. 322 (Welgelegen), which are declared as Private Nature Reserve (Langcarel Private Nature Reserve) under the Game Ordinance, 1949 (No. 23 of 1949) and the Native Flora Protection Ordinance, 1940 (No. 9 of 1940). This reserve is noted as having farming activity present, and is currently managed and actively utilised for agriculture. The landowner further was not aware of any protected area on these properties and intends to utilise any suitable legal avenues available to continue operation of the properties for the current land use of agriculture, in conjunction with the planned Renewable Energy complex (including electrical grid infrastructure as contemplated here) land use subject to this application.<br>The protected area and has undergone similar levels of degradation as surrounding areas due primarily to overgrazing, but also partially due to alien invasive plants. In addition, no conservation management activities were evident on site during the ecological field assessment. This pattern of over-utilization affects all grasslands on site, resulting in them being in moderate to poor condition. The habitat has been used for livestock production and is impacted by this land-use. The biodiversity specialist concluded that, on the basis of the current land use and levels of modification, the private nature reserve does not align with the objective and purpose of the protected area status.<br>It is important to note that the de-proclamation/withdrawal of the Protected Area is being addressed by the MTPA as part of ongoing province-wide reserve verification efforts by the provincial authorities. The MTPA has submitted a letter to the Department (letter dated, 20 June 2022) of the intent to issue a notice to withdraw the declaration of the Langcarel Private Nature Reserve in terms of the Mpumalanga Nature Conservation Act (Act No. 10 of 1998).<br>Consent letters to the withdrawal/de-proclamation have been received from the Landowner/s for those farm portions that that are directly affected by the proposed project and have been submitted to the Competent Authority as part of this application. These letters give consent of the respective Langcarel Private Nature Reserve properties to be withdrawn and/or de-proclaimed as a nature reserve by the relevant Mpumalanga MEC. These letters have also been provided to the MTPA towards the de-proclamation/withdrawal process. Proof of the de-proclamation/withdrawal process has been included in **Appendix J**. |

| APPLICABLE LEGISLATION | DESCRIPTION OF LEGISLATION |
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| **National Water Act (No. 36 of 1998)** | The National Water Act, 1998 (Act No. 36 of 1998) (NWA) provides the framework to protect water resources against over exploitation and to ensure that there is water for social and economic development, human needs and to meet the needs of the aquatic environment.<br>The Act defines water source to include watercourses, surface water, estuary or aquifer. A watercourse is defined in the Act as 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 that the Minister may declare a watercourse.<br>Section 21 of the Act outlines a number of categories that require a water user to apply for a Water Use License (WUL) and Section 22 requires water users to apply for a General Authorisation (GA) with the Department of Water and Sanitation (DWS) if they are under certain thresholds or meet certain criteria. The list of water uses applicable to the proposed Project include:<br>a) *Taking water from a water resource;*<br>*c) Impeding or diverting the flow of water in a watercourse;*<br>*g) Disposing of waste in a manner which may detrimentally impact on a water resource;*<br>*i) Altering the bed, banks, course or characteristics of a watercourse*;<br>The DWS will make the final decision on water uses that are applicable to the project through a pre-application meeting after which a Water Use Authorisation Application (WUA) as determined by the risk assessment will be undertaken in compliance with procedural regulations published by the DWS within General Notice 267 (GN267). These regulations specify required information per water use and the reporting structure of required supporting technical information. |
| **National Heritage Resources Act (No. 25 of 1999)** | The National Heritage Resource Act (Act No. 25 of 1999) (NHRA) serves to protect national and provincial heritage resources across South Africa. The NHRA provides for the protection of all archaeological and palaeontological sites, the conservation and care of cemeteries and graves by the South African Heritage Resources Agency (SAHRA), and lists activities that require any person who intends to undertake to notify the responsible heritage resources agency and furnish details regarding the location, nature, and extent of the proposed development.<br>Part 2 of the NHRA details specific activities that require a Heritage Impact Assessment (HIA) that will need to be approved by SAHRA. Parts of Section 35, 36 and 38 apply to the proposed project, principally:<br>- Section 35 (4) - No person may, without a permit issued by the responsible heritage resources authority-<br>- destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;<br>- destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite.<br>- Section 38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as-<br>- any development or other activity which will change the character of a site— (i) exceeding 5 000 $m^2$ in extent, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.<br>In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources |

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| | of significance be affected by the proposed Camden I SEF, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668).<br>The Heritage and Palaeontological Report (**Appendix F-4 and Appendix F-5** respectively) has been carried out by a suitably qualified specialist, revealing that feature CA005 and CA012 are located close to the proposed Grid infrastructure and is described below. No other recorded features are located closer than 250 meters from the proposed infrastructure and will not be directly impacted on.<br>According to the SAHRA, Paleontological sensitivity map the study area is in the non-fossiliferous Jurassic dolerite (grey) but some of the grid connections are on the Vryheid Formation (red; very highly sensitive). Dolerite is an intrusive igneous rock and do does not preserve fossils, in fact, dykes can destroy any fossils that were in the rocks through which they have intruded. The Palaeontological Impact Assessment (**Appendix F-5**) concluded that the impact on palaeontological resources is low and the project should be authorised from a paleontological point of view. A Fossil Chance Find Protocol has been added to the EMPr. |
| **National Environmental Management Waste Act (No. 59 of 2008)** | This Act provides for regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation. The Act also provides for the licensing and control of waste management activities through GNR. 921 (2013): List of Waste Management Activities that Have, or are Likely to Have, a Detrimental Effect on the Environment.<br>The proposed project does not constitute a Listed Activity requiring a Waste Management Licence (WML) as defined in GNR 921.<br>However, the contents of this Report will include reasonable measures for the prevention of pollution and good international industry practice (GIIP). |
| **Mineral and Petroleum Resources Development Act (No. 28 of 2002)** | The aim of the Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA) is to make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources.<br>Section 53(1) of the MPRDA provides that any person who intends to use the surface of any land in any way that may be contrary to any object of the MPRDA, or which is likely to impede any such object, must apply to the Minister of Mineral Resources (the Minister) for approval. Section 53 of the MPRDA provides a mechanism for ensuring that, inter alia, the mining of mineral resources is not detrimentally affected through the use of the surface of land, and which may, for example, result in the sterilisation of a mineral resource.<br>A Section 53 approval will be required due to the fact that the project is located on various mining right areas.<br>An application in terms of Section 53 of the MPRDA was submitted on 13 May 2022. An acknowledgement letter was issued by the DMRE on 20 September 2022 and the reference number allocated to this application is 11098SU – awaiting a decision from the DMRE. |
| **Noise Control Regulations in terms of the Environmental Conservation, 1989 (Act 73 of 1989)** | In South Africa, environmental noise control has been in place for three decades, beginning in the 1980s with codes of practice issued by the South African National Standards (formerly the South African Bureau of Standards, SABS) to address noise pollution in various sectors of the country. Under the previous generation of environmental legislation, specifically the Environmental Conservation Act 73 of 1989 (ECA), provisions were made to control noise from a National level in the form of the Noise Control Regulations (GNR 154 of January 1992). In later years, the ECA was replaced by the National Environmental Management Act 107 of 1998 (NEMA) as amended. The National Environmental Management: Air Quality Act 39 of 2004 (NEMAQA) was published in line with NEMA and contains noise control provisions under Section 34:<br>*(1) The minister may prescribe essential national standards –* |

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| | *(a) for the control of noise, either in general or by specific machinery or activities or in specified places or areas; or*<br><br>*(b) for determining –*<br><br>*(i) a definition of noise; and*<br><br>*(ii) the maximum levels of noise.*<br><br>*(2) When controlling noise, the provincial and local spheres of government are bound by any prescribed national standards.*<br><br>Under NEMAQA, the Noise Control Regulations were updated and are to be applied to all provinces in South Africa. The Noise Control Regulations give all the responsibilities of enforcement to the Local Provincial Authority, where location specific by-laws can be created and applied to the locations with approval of Provincial Government. Where province-specific regulations have not been promulgated, acoustic impact assessments must follow the Noise Control Regulations.<br><br>Furthermore, NEMAQA prescribes that the Minister must publish maximum allowable noise levels for different districts and national noise standards. These have not yet been accomplished and as a result all monitoring and assessments are done in accordance with the South African National Standards (SANS) 10103:2008 and 10328:2008. |
| **Conservation of Agricultural Resources Act (No. 43 of 1983)** | The Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) provides for the implementation of control measures for soil conservation works as well as alien and invasive plant species in and outside of urban areas.<br><br>In terms of the amendments to the regulations under the CARA, landowners are legally responsible for the control of alien species on their properties. Various Acts administered by the DFFE and the DWS, as well as other laws (including local by-laws), spell out the fines, terms of imprisonment and other penalties for contravening the law. Although no fines have yet been placed against landowners who do not remove invasive species, the authorities may clear their land of invasive alien plants and other alien species entirely at the landowners' cost and risk.<br><br>The CARA Regulations with regards to alien and invasive species have been superseded by NEMBA Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014. |
| **Civil Aviation Act (No. 13 of 2009)** | Civil aviation in South Africa is governed by the Civil Aviation Act (Act 13 of 2009). This Act provides for the establishment of a stand-alone authority mandated with controlling, promoting, regulating, supporting, developing, enforcing and continuously improving levels of safety and security throughout the civil aviation industry. This mandate is fulfilled by South African Civil Aviation Authority (SACAA) as an agency of the Department of Transport (DoT). SACAA achieves the objectives set out in the Act by complying with the Standards and Recommended Practices (SARPs) of the International Civil Aviation Organisation (ICAO), while considering the local context when issuing the South African Civil Aviation Regulations (SA CARs).<br><br>As of the 1st of May 2021, Air Traffic and Navigation Services (ATNS) has been appointed as the new Obstacle application Service Provider for Windfarms and later Solar Plants. Their responsibility would pertain to the assessments, maintenance, and all other related matters in respect to Windfarms and in due time Power Plant assessments.<br><br>The DEA Screening Tool Report identified Civil Aviation as having low sensitivity for the proposed Camden I SEF, and no major or other types of civil aviation aerodromes.<br><br>ATNS and SACAA will be included on the project stakeholder database. They will be informed of the proposed Project, and comment will be sought from these authorities as applicable. An Application for the Approval of Obstacles has been submitted to ATNS and the required permits will be obtained prior to the development of the project. |
| **Occupational Health and Safety Act (No. 85 of 1993)** | The National Occupational Health and Safety Act (No. 85 of 1993) (OHSA) and the relevant regulations under the Act are applicable to the proposed project. This includes |

| APPLICABLE LEGISLATION | DESCRIPTION OF LEGISLATION |
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| | the Construction Regulations promulgated in 2014 under Section 43 of the Act. Adherence to South Africa's OHSA and its relevant Regulations is essential. |
| **National Energy Act (No. 34 of 2008)** | The National Energy Act aims to ensure that diverse energy resources are available, in sustainable quantitates, and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, taking into account environmental management requirements and interactions amongst economic sectors. The Act provides the legal framework which supports the development of renewable energy facilities for the greater environmental and social good.<br>The main objectives of the Act are to:<br>— Ensure uninterrupted supply of energy to the Republic;<br>— Promote diversity of supply of energy and its sources;<br>— Facilitate effective management of energy demand and its conservation;<br>— Promote energy research;<br>— Promote appropriate standards and specifications for the equipment, systems and processes used for producing, supplying and consuming energy;<br>— Ensure collection of data and information relating to energy supply, transportation and demand;<br>— Provide for optimal supply, transformation, transportation, storage and demand of energy that are planned, organised and implemented in accordance with a balanced consideration of security of supply, economics, consumer protection and a sustainable development;<br>— Provide for certain safety, health and environment matters that pertain to energy;<br>— Facilitate energy access for improvement of the quality of life of the people of Republic;<br>— Commercialise energy-related technologies;<br>— Ensure effective planning for energy supply, transportation, and consumption; and<br>— Contribute to sustainable development of South Africa's economy.<br>In terms of the act, the Minister of Energy is mandated to develop and, on an annual basis, review and publish the Integrated Energy Plan (IEP) in the Government Gazette. The IEP analyses current energy consumption trends within different sectors of the economy (i.e. agriculture, commerce, industry, residential and transport) and uses this to project future energy requirements, based on different scenarios. The IEP and the Integrated Resource Plan are intended to be updated periodically to remain relevant. The framework is intended to create a balance between energy demand and resource availability so as to provide low-cost electricity for social and economic development, while taking into account health, safety and environmental parameters. |
| **Electricity Regulation Act (No. 4 of 2006)** | The Electricity Regulation Act (No. 4 of 2006) (ERA) aims to:<br>— Achieve the efficient, effective, sustainable, and orderly development and operation of electricity supply infrastructure in South Africa;<br>— Ensure that the interests and needs of present and future electricity customers and end users are safeguarded and met, having regard to the governance, efficiency. effectiveness and long-term sustainability of the electricity supply industry within the broader context of economic energy regulation in the Republic:<br>— Facilitate investment in the electricity supply industry;<br>— Facilitate universal access to electricity;<br>— Promote the use of diverse energy sources and energy efficiency;<br>— Promote competitiveness and customer and end user choice; and<br>— Facilitate a fair balance between the interests of customers and end users, licensees, investors in the electricity supply industry and the public.<br>The Act establishes a National Energy Regulator as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licenses and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated. |

**Table 2-2: Policies and Policies**

| Applicable Policy | Description of Policy |
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| **National Development Plan** | The National Development Plan aims to eliminate poverty and reduce inequality by 2030. The NDP identifies a number of enabling milestones. Of relevance to the proposed development the NDP refers to the need to produce sufficient energy to support industry at competitive prices and ensure access for poor households, while reducing carbon emissions per unit of power by about one-third. In this regard the infrastructure is not just essential for faster economic growth and higher employment. It also promotes inclusive growth, providing citizens with the means to improve their own lives and boost their incomes. Infrastructure is essential to development.<br><br>Chapter 3, Economy and Employment, identifies some of the structural challenges specific to South Africa, including an energy constraint that will act as a cap on growth and on options for industrialisation. The NDP notes that from an environmental perspective South Africa faces several related challenges. The reduction of greenhouse gas emissions and shift to a green low-carbon economy, is one of these challenges.<br><br>In terms of implementation the NDP identifies three phases. The first two are of specific relevance to the proposed project. The first phase (2012–2017) notes that ensuring the supply of energy and water is reliable and sufficient for a growing economy. The second phase (2018–2023) involves building on the first phase to lay the foundations for more intensive improvements in productivity. The provision of affordable and reliable energy is a key requirement for this to take place.<br><br>Chapter 4, Economic infrastructure, notes that economic infrastructure provides the foundation for social and economic development. In this regard South Africa must invest in a strong network of economic infrastructure designed to support the country's medium- and long-term economic and social objectives. The plan envisages that, by 2030, South Africa will have an energy sector that promotes:<br><br>Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation.<br><br>Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change. More specifically, South Africa should have adequate supply security in electricity and in liquid fuels, such that economic activity, transport, and welfare are not disrupted.<br><br>The plan sets out steps that aim to ensure that, in 20 years, South Africa's energy system looks very different to the current situation. In this regard coal will contribute proportionately less to primary-energy needs, while gas and renewable energy resources, will play a much larger role. |
| **Integrated Resource Plan 2010 – 2030** | The IRP is an electricity capacity plan which aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost. On 6 May 2011, the then Department of Energy (DoE) released the Integrated Resource Plan 2010-2030 (IRP 2010) in respect of South Africa's forecast energy demand for the 20-year period from 2010 to 2030. The promulgated IRP 2010–2030 identified the preferred generation technology required to meet expected demand growth up to 2030. It incorporated government objectives such as affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation and regional development.<br><br>The IRP recognises that Solar Photovoltaic (PV), wind and concentrated solar power (CSP) with storage present an opportunity to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Renewable technologies also present huge potential for the creation of new industries, job creation and localisation across the value chain. Grid connection projects such as this contemplates with this application, are an essential component of ensuring renewable projects are grid-tied and supporting the IRP aims. |
| **New Growth Path (23 November 2010)** | Government released the New Economic Growth Path Framework on 23 November 2010. The aim of the framework is to enhance growth, employment creation and equity. The policy's principal target is to create five million jobs over the next 10 years and reflects |

| Applicable Policy | Description of Policy |
|---|---|
| | government's commitment to prioritising employment creation in all economic policies. The framework identifies strategies that will enable South Africa to grow in a more equitable and inclusive manner while attaining South Africa's developmental agenda. Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy. In this regard the framework identifies investments in five (5) key areas namely: energy, transport, communication, water, and housing. |
| **National Infrastructure Plan (2012)** | The South African Government adopted a National Infrastructure Plan (NIP) in 2012. The NIP aims to transform the South African economic landscape while simultaneously creating significant numbers of new jobs and strengthening the delivery of basic services. It outlines the challenges and enablers which needs to be addressed in the building and developing of infrastructure. The Presidential Infrastructure Coordinating Commission (PICC) was established by the Cabinet to integrate and coordinate the long-term infrastructure build.<br><br>The plan also supports the integration of African economies. In terms of the plan Government will invest R827 billion over the next three years to build new and upgrade existing infrastructure. The aim of the investments is to improve access by South Africans to healthcare facilities, schools, water, sanitation, housing and electrification. The plan also notes that investment in the construction of ports, roads, railway systems, ***electricity plants***, hospitals, schools and dams will contribute to improved economic growth. Grid connection projects such as contemplates with this application, are an essential component of ensuring renewable projects are grid-tied and therefore supporting national infrastructure. |
| **Integrated Energy Plan** | The development of a National IEP was envisaged in the White Paper on the Energy Policy of the Republic of South Africa of 1998 and, in terms of the National Energy Act, 2008 (Act No. 34 of 2008), the Minister of Energy is mandated to develop and, on an annual basis, review and publish the IEP in the Government Gazette. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development.<br><br>The IEP notes that South Africa needs to grow its energy supply to support economic expansion and in so doing, alleviate supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean and modern forms of energy at an affordable price. As part of the Integrated Energy Planning process, eight (8) key objectives are identified, namely:<br><br>– Objective 1: Ensure security of supply<br>– Objective 2: Minimise the cost of energy<br>– Objective 3: Promote the creation of jobs and localisation<br>– Objective 4: Minimise negative environmental impacts from the energy sector<br>– Objective 5: Promote the conservation of water<br>– Objective 6: Diversify supply sources and primary sources of energy<br>– Objective 7: Promote energy efficiency in the economy<br>– Objective 8: Increase access to modern energy<br><br>The IEP provides an assessment of current energy consumption trends within different sectors of the economy (i.e., agriculture, commerce, industry, residential and transport) and uses this information to identify future energy requirements, based on different scenarios. The scenarios are informed by different assumptions on economic development and the structure of the economy and also take into account the impact of key policies such as environmental policies, energy efficiency policies, transport policies and industrial policies, amongst others.<br><br>Based on this information the IEP then determines the optimal mix of energy sources and technologies to meet those energy needs in the most cost-effective manner for each of the scenarios. The associated environmental impacts, socio-economic benefits and macroeconomic impacts are also analysed. The IEP is therefore focused on determining the long-term energy pathway for South Africa, taking into account a multitude of factors which are embedded in the eight objectives. |

| Applicable Policy | Description of Policy |
|---|---|
| | As part of the analysis four (4) key scenarios were developed, namely the Base Case, Environmental Awareness, Resource Constrained and Green Shoots scenarios:<br><br>The Base Case Scenario assumes that existing policies are implemented and will continue to shape the energy sector landscape going forward. It assumes moderate economic growth in the medium to long term.<br><br>The Environmental Awareness Scenario is characterised by more stringent emission limits and a more environmentally aware society, where a higher cost is placed on externalities caused by the supply of energy.<br><br>The Resource Constrained Scenario in which global energy commodity prices (i.e. coal, crude oil and natural gas) are high due to limited supply.<br><br>The Green Shoots Scenario describes an economy in which the targets for high economic growth and structural changes to the economy, as set out in the National Development Plan (NDP), are met.<br><br>The IEP notes that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources. In terms of existing electricity generation capacity, the IEP indicates that existing capacity starts to decline notably from 2025, with significant plant retirement occurring in 2031, 2041 and 2048. By 2050 only 20% of the current electricity generation capacity remains. As a result, large investments are required in the electricity sector in order to maintain an adequate supply in support of economic growth.<br><br>By 2020, various import options become available, and some new coal capacity is added along with new wind, solar and gas capacity. The mix of generation capacity technologies by 2050 is considerably more diverse than the current energy mix, across all scenarios. The main differentiating factors between the scenarios are the level of demand, constraints on emission limits and the carbon dioxide externality costs. In all scenarios the energy mix for electricity generation becomes more diverse over the period to 2050, with coal reducing its share from about 85% in 2015 to 15–20% in 2050 (depending on the scenario). Solar, wind, nuclear, gas and electricity imports increase their share. The Environmental Awareness and Green Shoots scenarios take on higher levels of renewable energy.<br><br>An assessment of each scenario against the eight (8) objectives with reference to renewable energy notes while all scenarios seek to ensure that costs are minimised within the constraints and parameters of each scenario, the Base Case Scenario presents the least cost followed by the Environmental Awareness, Resource Constrained and Green Shoots scenarios respectively when total energy system costs are considered. In terms of promoting job creation and localisation potential the Base Case Scenario presents the greatest job creation potential, followed by the Resource Constrained, Environmental Awareness and Green Shoots scenarios respectively. In all scenarios, approximately 85% of total jobs are localisable. For electricity generation, most jobs result from solar technologies followed by nuclear and wind, with natural gas and coal making a smaller contribution. The Environmental Awareness Scenario, due to its stringent emission constraints, shows the lowest level of total emissions over the planning horizon. This is followed by the Green Shoots, Resource Constrained and Base Case scenarios. These trends are similar when emissions are considered cumulatively and individually by type. |
| **National Protected Area Expansion Strategy, 2010** | The National Protected Area Expansion Strategy 2010 (NPAES) areas were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for fine scale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2010). On the basis of the Screening Tool output, which identifies "Protected Areas Expansion Strategy" as a factor within the study area, the terrestrial Biodiversity Specialist has assumed that natural areas within the study area fall within this category (Low Priority - Mpumalanga Protected Area Expansion Strategy). |

## 2.2 PROVINCIAL AND MUNICIPAL LEGAL AND REGULATORY FRAMEWORK

**Table 2-3: Provincial and Municipal Legislation and Plans**

| APPLICABLE PLAN | DESCRIPTION OF PLAN |
|---|---|
| **Mpumalanga Growth and Development Path** | The primary objective of the Mpumalanga Economic Growth and Development Path (MEGDP) (2011) is to foster economic growth that creates employment, reduces poverty and inequality in the Province. The MEGDP identifies supporting the development of clean forms of energy such as wind and hydro power generation opportunities, as well as opportunities including gas production from landfill and organic waste, as one of the key interventions to facilitate growth and job creation in the manufacturing sector. A focal point of the MEGDP is massive investments in infrastructure as a key driver of employment creation across the economy, with alternative energy production identified as one of the key opportunities in the Mpumalanga Economic sectors. |
| **Mpumalanga Spatial Development Framework (MSDF), 2019** | The Mpumalanga Spatial Development Framework (SDF) (2019) identifies that tourism is an important economic sector and has emerged as a robust driver of growth for emerging economies. The SDF also notes that a significant portion of Mpumalanga's land area is classified as Moderate to High-Very High agricultural potential which can be utilised for agricultural production. However, there are other factors affecting the agricultural sector including loss of agricultural land to other activities, availability of water, contamination of the water used for irrigation by other economic activities, and access to the market. The SDF further notes that mining is the largest economic sector in the province and has assisted other sectors such as manufacturing and power generation, to grow in the province. However, the mining sector has posed some key challenges, including soil and water contamination and environmental pollution, development of mines on good agricultural soil thus threatening food security, restriction of animal movement due to open cast mining thus affecting the ecosystem etc. It also notes that Mpumalanga's manufacturing plants and coal fired power plants are the key polluters of air, with climate change also identified as a key challenge in the province. Therefore, the province must carefully design interventions that provide a gradual shift from mining-oriented sectors to the sustainable economic sectors to maintain sustained growth of the provincial economy.<br><br>The SDF notes that a significant amount of the country's electricity comes from coal-fired stations in Mpumalanga. It also observes that there is a steady increase in the demand for electricity in the province, mostly attributed to residential, commercial and industrial development, including mining and heavy industry. The Provincial SDF also notes that the abundance of coal has led to the development of many coal-fired power stations in the province, however these coalfields are depleting, therefore making it necessary to consider renewable power sources in Mpumalanga. The SDF also recognises that Mpumalanga's Coal Mining and Coal Fired Power Plant region (mainly the Highveld area) will be under immense pressure for environmental considerations and as a result, the region will witness a possible decline in demand of coal and large-scale employment. The SDF proposes to diversify the regional economy and facilitate the gradual transition of economic activities in the region. |
| **Mpumalanga Industrial Development Plan** | In terms of industry, the purpose of the Mpumalanga Industrial Development Plan (MIDP) (2015) is to promote the establishment of new industries and promote growth of existing industries in the province. It is however noted that the Msukaligwa Municipality (within which the project falls under) is not directly impacted by the 2025 MIDP and its proposed priority hubs. |

**Table 2-4: District and Local Municipality Plans**

| APPLICABLE PLAN | DESCRIPTION OF PLAN |
|---|---|
| **Gert Sibande Municipality Integrated Development Plan** | According to the Municipal Systems Act (Act 32 of 2000) (MSA), all municipalities have to undertake an Integrated Development Plan (IDP) process. The IDP is a legislative requirement thus it has legal status and supersedes all other plans that guide development at local government level.<br><br>The Gert Sibande Municipality (GSM) IDP Review (2019/ 2020) and Final IDP (2020/2021) has identified the following development priorities:<br><br>— Municipal Transformation and Organisational Development<br>— Basic Service Delivery and Infrastructure Development<br>— Local Economic Development<br>— Municipal Financial Viability and Management<br>— Good Governance and Public Participation<br>— Spatial Development Analysis and Rationale<br><br>The main goal and strategic objective of the Basic Service Delivery and Infrastructure Development priority is a reliable and sustainable service. One of the main strategic objectives for reaching the goal is the provision of basic services such as water and electricity to an approved minimum level of standards in a sustainable manner, as per the national guidelines. |
| **Msukaligwa Local Municipality IDP** | The Msukaligwa Local Municipality Revised IDP (2020/2021) has identified the following key Municipal priorities:<br><br>— Revenue collection.<br>— Access to basic services by communities.<br>— Job creation and economic development.<br>— Infrastructure maintenance and upgrading.<br>— Community participation in the affairs of the municipality.<br>— Fight against fraud and corruption.<br>— Capable and responsive organizational structure.<br>— Capabilities of the municipal ICT.<br>— Integrated human settlements<br><br>One of the main strategic objectives for the access to basic services priority is to provide sustainable and reliable services to communities. Most of the basic services are rendered within the municipality. However, some rural areas are still faced with some challenges in the provision water, sanitation and electricity. The Municipality, through the IDP, aims to facilitate the provision of electricity, with a number of key projects planned to be implemented over the period of five (5) years linked to the Municipal IDP. |
| **Msukaligwa Spatial Development Framework** | The Msukaligwa SDF is informed by a number of spatial objectives, including:<br><br>— Providing a spatial structure that facilitates access to services for all communities.<br>— Protecting strategic water sources and sensitive eco-systems.<br>— Providing space for the diversification of the local economy.<br>— Eliminating past spatial settlement patterns.<br><br>The provision of space of the diversification of the local economy is of specific relevance to the proposed development.<br><br>The SDF highlights the key role and spatial extent of mining in the Msukaligwa Municipality, including reference to the Camden coal-fired power station located in proximity to the proposed development. Over the longer term the rehabilitation of mining areas and a range of alternative peri-urban uses should be considered for the impacted areas in view of the decrease reliance on coal. Commercial Agriculture also represents a key economic activity in the Municipality. |

# 2.3 INTERNATIONAL STANDARDS AND GUIDELINES

## *2.3.1 IFC PERFOMANCE STANDARDS*

The International Finance Corporation (IFC) is an international financial institution that offers investment, advisory, and asset management services to encourage private sector development in developing countries. The IFC is a member of the World Bank Group (WBG) and is headquartered in Washington, D.C., United States. It was established in 1956 as the private sector arm of the WBG to advance economic development by investing in strictly for-profit and commercial projects that purport to reduce poverty and promote development.

The IFC's stated aim is to create opportunities for people to escape poverty and achieve better living standards by mobilizing financial resources for private enterprise, promoting accessible and competitive markets, supporting businesses and other private sector entities, and creating jobs and delivering necessary services to those who are poverty-stricken or otherwise vulnerable. Since 2009, the IFC has focused on a set of development goals that its projects are expected to target. Its goals are to increase sustainable agriculture opportunities, improve health and education, increase access to financing for microfinance and business clients, advance infrastructure, help small businesses grow revenues, and invest in climate health.

The IFC is owned and governed by its member countries but has its own executive leadership and staff that conduct its normal business operations. It is a corporation whose shareholders are member governments that provide paid-in capital, and which have the right to vote on its matters. Originally more financially integrated with the WBG, the IFC was established separately and eventually became authorized to operate as a financially autonomous entity and make independent investment decisions. It offers an array of debt and equity financing services and helps companies face their risk exposures, while refraining from participating in a management capacity. The corporation also offers advice to companies on making decisions, evaluating their impact on the environment and society, and being responsible. It advises governments on building infrastructure and partnerships to further support private sector development.

The IFC’s Sustainability Framework articulates the Corporation’s strategic commitment to sustainable development and is an integral part of IFC’s approach to risk management. The Sustainability Framework comprises IFC’s Policy and Performance Standards on Environmental and Social Sustainability, and IFC’s Access to Information Policy. The Policy on Environmental and Social Sustainability describes IFC’s commitments, roles, and responsibilities related to environmental and social sustainability. IFC’s Access to Information Policy reflects IFC’s commitment to transparency and good governance on its operations and outlines the Corporation’s institutional disclosure obligations regarding its investment and advisory services. The Performance Standards (PSs) are directed towards clients, providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. In the case of its direct investments (including project and corporate finance provided through financial intermediaries), IFC requires its clients to apply the PSs to manage environmental and social risks and impacts so that development opportunities are enhanced. IFC uses the Sustainability Framework along with other strategies, policies, and initiatives to direct the business activities of the Corporation to achieve its overall development objectives. The PSs may also be applied by other financial institutions (FIs).

The Project is considered a Category B project in terms of the IFC Policy on E&S Sustainability (2012), having the potential to cause limited adverse environmental or social risks and/or impacts that are few in number, generally site specific, largely reversible, and readily addressed through mitigation measures.

The objectives and applicability of the eight (8) PSs are outlined in **Table 2-5**.

**Table 2-5: Objectives and Applicability of the IFC Performance Standards**

| REFERENCE | REQUIREMENTS | | PROJECT SPECIFIC APPLICABILITY |
|---|---|---|---|
| **Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts** | | | |
| **Overview** | Performance Standard 1 underscores the importance of managing environmental and social performance throughout the life of a project. An effective Environmental and Social Management System (ESMS) is a dynamic and continuous process initiated and supported by management, and involves engagement between the client, its workers, local communities directly affected by the project (the Affected Communities) and, where appropriate, other stakeholders. | | |
| **Objectives** | – To identify and evaluate environmental and social risks and impacts of the project.<br>– To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment.<br>– To promote improved environmental and social performance of clients through the effective use of management systems.<br>– To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately.<br>– To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated. | | |
| **Aspects** | 1.1 | Policy | The IFC Standards state under PS 1 (Guidance Note 23) that "*the breadth, depth and type of analysis included in an ESIA must be proportionate to the nature and scale of the proposed project's potential impacts as identified during the course of the assessment process*." This document is the final deliverable from the BA process undertaken for the proposed Project. The impact assessment comprehensively assesses the key environmental and social impacts and complies with the requirements of the South African EIA Regulations. |
| | 1.2 | Identification of Risks and Impacts | |
| | 1.3 | Management Programmes | |
| | 1.4 | Organisational Capacity and Competency | |
| | 1.5 | Emergency Preparedness and Response | |
| | 1.6 | Monitoring and Review | |
| | 1.7 | Stakeholder Engagement | |
| | 1.8 | External Communication and Grievance Mechanism | |
| | 1.9 | Ongoing Reporting to Affected Communities | |
| **Performance Standard 2: Labour and Working Conditions;** | | | |
| **Overview** | Performance Standard 2 recognises that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers. | | |
| **Objectives** | – To promote the fair treatment, non-discrimination, and equal opportunity of workers.<br>– To establish, maintain, and improve the worker-management relationship.<br>– To promote compliance with national employment and labour laws.<br>– To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain.<br>– To promote safe and healthy working conditions, and the health of workers.<br>– To avoid the use of forced labour. | | |

| REFERENCE | REQUIREMENTS | | PROJECT SPECIFIC APPLICABILITY |
|---|---|---|---|
| **Aspects** | 2.1 | — Working Conditions and Management of Worker Relationship<br>— Human Resources Policy and Management<br>— Working Conditions and terms of Engagement<br>— Workers organisation<br>— Non- Discrimination and Equal Opportunity<br>— Retrenchment<br>— Grievance Mechanism | The construction activities will require contractors for completion. A safe working environment and fair contractual agreements must be in place. The operational phase will have permanent employees for day-to-day activities as well as contractors who will all need a safe working environment and fair contractual agreements.<br>Whilst PS2 will be applicable to the Project, it is not intended to be addressed in detail at the final BA stage. Recommendations are provided concerning development of a detailed Human Resources (HR) and Occupational Health and Safety (OHS) system by the developer and its partners as the Project moves towards implementation. In addition, measures to address the Interim Advice for IFC Clients on Supporting Workers in the Context of COVID-19 are referenced.<br>The EMPr (**Appendix G**) incorporates the requirements for compliance with local and international Labour and Working legislation and good practice on the part of the contractors. |
| | 2.2 | — Protecting the Workforce<br>— Child Labour<br>— Forced Labour | |
| | 2.3 | — Occupational health and Safety | |
| | 2.4 | — Workers Engaged by Third Parties | |
| | 2.5 | — Supply Chain | |
| **Performance Standard 3: Resource Efficiency and Pollution Prevention** | | | |
| **Overview** | Performance Standard 3 recognises that increased economic activity and urbanisation often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. There is also a growing global consensus that the current and projected atmospheric concentration of greenhouse gases (GHG) threatens the public health and welfare of current and future generations. At the same time, more efficient and effective resource use and pollution prevention and GHG emission avoidance and mitigation technologies and practices have become more accessible and achievable in virtually all parts of the world. | | |
| **Objectives** | — To avoid or minimise adverse impacts on human health and the environment by avoiding or minimising pollution from project activities.<br>— To promote more sustainable use of resources, including energy and water.<br>— To reduce project related GHG emissions. | | |
| **Aspects** | 3.1 | — Policy Resource Efficiency<br>— Greenhouse Gases<br>— Water Consumption | PS3-related impacts, such as the management of construction waste, hazardous substances, and stormwater are assessed in **Section 7** of this report.<br>There are no material resource efficiency issues associated with the Project. Refer to the EMPr for general resource efficiency measures.<br>The project is not GHG emissions intensive and a climate resilience study or a GHG emissions-related assessment is not deemed necessary for a project of this nature. However, as supporting infrastructure to the Camden I SEF, the OHPL and substation seeks to facilitate resource efficiency and pollution prevention by contributing to the South African green economy.<br>Dust air pollution in the construction phase will be addressed in the EMPr.<br>The Project will not result in the release of industrial effluents. Potential pollution associated with sanitary wastewater is low and mitigation measures are be included in the EMPr (Appendix G). |
| | 3.2 | — Pollution Prevention<br>— Air Emissions<br>— Stormwater<br>— Waste Management<br>— Hazardous Materials Management<br>— Pesticide use and Management | |

| REFERENCE | REQUIREMENTS | | PROJECT SPECIFIC APPLICABILITY |
|---|---|---|---|
| | | | Land contamination of the site from historical land use (i.e., low intensity agricultural / grazing) is not considered to be a cause for concern.<br>The waste generation profile of the project is not complex. Waste mitigation and management measures will be included in EMPr.<br>Hazardous materials are not a key issue; small quantities of construction materials (oil, grease, diesel fuel etc.) are the only wastes expected to be associated with the project. The EMPr will take these anticipated hazardous materials into account and recommend relevant mitigation and management measures. |
| **Performance Standard 4: Community Health, Safety, and Security** | | | |
| **Overview** | Performance Standard 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. | | |
| **Objectives** | — To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances.<br>— To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities | | |
| **Aspects** | 4.1 | — Community Health and Safety<br>— Infrastructure and Equipment Design and Safety<br>— Hazardous Materials Management and Safety<br>— Ecosystem Services<br>— Community Exposure to Disease<br>— Emergency Preparedness and Response | The requirements included in PS 4 will be addressed in the BA process and the development of the EMPr.<br>During the construction phase there will be an increase in vehicular traffic along public roads, largely due to the need for importation of construction material. Pedestrian and road safety risks will be qualitatively evaluated in the BA process and the clients' standard safety and security measures, as well as potential additional measures recommended by WSP is detailed in the EMPr. |
| | 4.2 | — Security Personnel | |
| **Performance Standard 5: Land Acquisition and Involuntary Resettlement** | | | |
| **Overview** | Performance Standard 5 recognises that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood) as a result of project-related land acquisition and/or restrictions on land use. | | |
| **Objectives** | — To avoid, and when avoidance is not possible, minimise displacement by exploring alternative project designs.<br>— To avoid forced eviction.<br>— To anticipate and avoid, or where avoidance is not possible, minimise adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected.<br>— To improve, or restore, the livelihoods and standards of living of displaced persons.<br>— To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites. | | |
| **Aspects** | 5.1 | — Displacement<br>— Physical Displacement<br>— Economic Displacement | PS5 is not applicable to the proposed Camden I SEF Grid Connection as no physical or economic displacement or livelihood restoration will be required. |

| REFERENCE | REQUIREMENTS | | PROJECT SPECIFIC APPLICABILITY |
|---|---|---|---|
| | | — Private Sector Responsibilities under Government Managed Resettlement | The proposed powerline route is located on privately owned land that is utilised for agriculture by the landowners. The significance of all potential agricultural impacts is kept low by the very small proportion of the land that is impacted. |
| **Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources** | | | |
| **Overview** | Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. | | |
| **Objectives** | — To protect and conserve biodiversity.<br>— To maintain the benefits from ecosystem services.<br>— To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities. | | |
| **Aspects** | 6.1 | — Protection and Conservation of Biodiversity | The Project Area falls within CBAs (Irreplaceable and Optimal) with some regions mapped as an ESA. A Biodiversity Impact Assessment as well as an Avifaunal Impact Assessment and Freshwater Ecology Impact Assessment have been included in the proposed scope.<br>The methodologies for the specialist assessments include a combination of literature review, in-field surveys and sensitivity mapping. This substantively complies with the PS 6 general requirements for scoping and baseline assessment for determination of biodiversity and ecosystem services issues. The determination of habitat sensitivity was undertaken within the legal and best practice reference framework for South Africa.<br>The prevalence of invasive alien species was determined, and mitigation and management measures is included in the EMPr (**Appendix G**). |
| **Performance Standard 7: Indigenous People** | | | |
| **Overview** | Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded. | | |
| **Objectives** | — To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples.<br>— To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts.<br>— To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner.<br>— To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project's life-cycle.<br>— To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present.<br>— To respect and preserve the culture, knowledge, and practices of Indigenous Peoples. | | |
| **Aspects** | 7.1 | — General<br>— Avoidance of Adverse Impacts<br>— Participation and Consent | As per the international instruments under the United Nations (UN) Human Rights Conventions, no indigenous peoples are present within the study area. The Project does not involve displacement. PS7 will not be triggered. |

| REFERENCE | REQUIREMENTS | | PROJECT SPECIFIC APPLICABILITY |
|---|---|---|---|
| | 7.2 | — Circumstances Requiring Free, Prior, and Informed Consent<br>— Impacts on Lands and Natural Resources Subject to Traditional Ownership or Under Customary Use<br>— Critical Cultural Heritage<br>— Relocation of Indigenous Peoples from Lands and Natural Resources Subject to Traditional Ownership or Under Customary Use | |
| | 7.3 | — Mitigation and Development Benefits | |
| | 7.4 | — Private Sector Responsibilities Where Government is Responsible for Managing Indigenous Peoples Issues | |
| **Performance Standard 8: Cultural Heritage** | | | |
| **Overview** | Performance Standard 8 recognizes the importance of cultural heritage for current and future generations. | | |
| **Objectives** | — To protect cultural heritage from the adverse impacts of project activities and support its preservation.<br>— To promote the equitable sharing of benefits from the use of cultural heritage. | | |
| **Aspects** | 8.1 | — Protection of Cultural Heritage in Project Design and Execution | A Heritage assessment (**Appendix F-4**) has been carried out by a suitably qualified specialist and the findings are discussed in Section 6.3.2 of this report.<br>A Chance Find Procedure is included in the EMPr (**Appendix G**). |

## 2.3.2 WORLD BANK GROUP ENVIRONMENTAL HEALTH AND SAFETY GUIDELINES

### EHS GENERAL GUIDELINES

The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of GIIP. They contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs.

The EHS General Guidelines contain information on cross-cutting environmental, health and safety issues potentially applicable to all industry sectors, used together with the relevant industry sector guideline(s), to guide the development of management and monitoring strategies for various project-related impacts.

### EHS GUIDELINES FOR ELECTRIC POWER TRANSMISSION AND DISTRIBUTION

The EHS Guidelines for Electric Power Transmission and Distribution (2007) include information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas.

The Guidelines includes industry-specific impacts and management, provides a summary of EHS issues associated with electric power transmission and distribution that occur during the construction and operation phases of a facility,

along with recommendations for their management. Additionally, it includes performance indicators and monitoring related to the environment an occupational health and safety.

These Guidelines have been considered in the impact assessment and formulation of mitigation measures in this BAR.

### 2.3.3 EQUATOR PRINCIPLES

The Equator Principles (EPs) is a risk management framework, adopted by financial institutions, for determining, assessing, and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making.

The EPs apply globally to all industry sectors and to five financial products 1) Project Finance Advisory Services, 2) Project Finance, 3) Project-Related Corporate Loans, 4) Bridge Loans and 5) Project-Related Refinance and Project-Related Acquisition Finance. The relevant thresholds and criteria for application is described in detail in the Scope section of the EP. Currently 118 Equator Principles Financial Institutions (EPFIs) in 37 countries have officially adopted the EPs, covering the majority of international project finance debt within developed and emerging markets. EPFIs commit to implementing the EPs in their internal environmental and social policies, procedures and standards for financing projects and will not provide Project Finance or Project-Related Corporate Loans to projects where the client will not, or is unable to, comply with the EPs.

While the EPs are not intended to be applied retroactively, EPFIs apply them to the expansion or upgrade of an existing project where changes in scale or scope may create significant environmental and social risks and impacts, or significantly change the nature or degree of an existing impact. The EPs have greatly increased the attention and focus on social/community standards and responsibility, including robust standards for indigenous peoples, labour standards, and consultation with locally affected communities within the Project Finance market.

The EPs have also helped spur the development of other responsible environmental and social management practices in the financial sector and banking industry and have supported member banks in developing their own Environmental and Social Risk Management Systems.

The requirements and applicability of the EPs are outlined in **Table 2-6**. It should be noted that Principles 8 and 10 relate to a borrower's code of conduct and are therefore not considered relevant to the BA process and have not been included in this discussion.

**Table 2-6: Requirements and Applicability of the Equator Principles**

| REQUIREMENT | | PROJECT SPECIFIC APPLICABILITY |
|---|---|---|
| **Principle 1: Review and Categorisation** | | |
| **Overview** | When a project is proposed for financing, the EPFI will, as part of its internal social and environmental review and due diligence, categorise such project based on the magnitude of its potential impacts and risks in accordance with the environmental and social screening criteria of the IFC.<br>Using categorisation, the EPFI's environmental and social due diligence is commensurate with the nature, scale, and stage of the Project, and with the level of environmental and social risks and impacts.<br>The categories are:<br>– Category A: Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented;<br>– Category B: Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and | Based upon the significance and scale of the Project's environmental and social impacts, the proposed project is regarded as a Category B project i.e. a project with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures. |

| REQUIREMENT | | PROJECT SPECIFIC APPLICABILITY |
|---|---|---|
| | – Category C: Projects with minimal or no adverse environmental and social risks and/or impacts. | |
| **Principle 2: Environmental and Social Assessment** | | |
| **Overview** | For all Category A and Category B Projects, the EPFI will require the client to conduct an appropriate Assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and scale of impacts of the proposed Project (which may include the illustrative list of issues found in Exhibit II). The Assessment Documentation should propose measures to minimise, mitigate, and where residual impacts remain, to compensate/offset/remedy for risks and impacts to Workers, Affected Communities, and the environment, in a manner relevant and appropriate to the nature and scale of the proposed Project.<br>The Assessment Documentation will be an adequate, accurate and objective evaluation and presentation of the environmental and social risks and impacts, whether prepared by the client, consultants or external experts. For Category A, and as appropriate, Category B Projects, the Assessment Documentation includes an Environmental and Social Impact Assessment (ESIA). One or more specialised studies may also need to be undertaken. For other Category B and potentially C Projects, a limited or focused environmental or social assessment may be appropriate, applying applicable risk management standards relevant to the risks or impacts identified during the categorisation process. | This document is the final deliverable from the BA process undertaken for the proposed Project. The impact assessment comprehensively assesses the key environmental and social impacts and complies with the requirements of the South African EIA Regulations (2014, as amended). In addition, a site-specific EMPr has been compiled and is included in **Appendix G**, which is to be read in conjunction with the generic powerline and substation EMPRs. |
| **Principle 3: Applicable Environmental and Social Standards** | | |
| **Overview** | The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues.<br>The EPFI's due diligence will include, for all Category A and Category B Projects globally, review and confirmation by the EPFI of how the Project and transaction meet each of the Principles.<br>For Projects located in Non-Designated Countries, the Assessment process evaluates compliance with the then applicable IFC PS and WBG EHS Guidelines. For Projects located in Designated Countries, compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues. | As South Africa has been identified as a non-designated country, the reference framework for environmental and social assessment is based on the IFC Performance Standards (PS) and applicable Industry Specific Environmental, Health, and Safety (EHS) Guidelines. In addition, this BA process has been undertaken in accordance with NEMA (the host country's relevant legislation). |
| **Principle 4: Environmental and Social Management System and Equator Principles Action Plan** | | |
| **Overview** | For all Category A and Category B Projects, the EPFI will require the client to develop or maintain an Environmental and Social Management System (ESMS).<br>Further, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the assessment process and incorporate actions required to comply with the | A project specific ESMS which will align with the Equator Principles, the IFC Performance Standards and applicable World Bank/IFC Environmental, Health and Safety (EHS) and Sector specific Guidelines and applicable GIIP will be developed for the project. The proposed project, from inception, development, construction, operation, and any decommissioning will be required to fully comply with the requirements of the ESMS. |

| REQUIREMENT | | PROJECT SPECIFIC APPLICABILITY |
|---|---|---|
| | applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, the client and the EPFI will agree on an Equator Principles Action Plan (EPAP). The EPAP is intended to outline gaps and commitments to meet EPFI requirements in line with the applicable standards. | The project specific ESMS will be compiled in the event that the project is developed in the future. Management and monitoring plans outlined in the EMPr will be incorporated into the ESMS for the proposed Project. |
| **Principle 5: Stakeholder Engagement** | | |
| **Overview** | EPFI will require the client to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities Workers and, where relevant, Other Stakeholders. For Projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process.<br>To accomplish this, the appropriate assessment documentation, or non-technical summaries thereof, will be made available to the public by the borrower for a reasonable minimum period in the relevant local language and in a culturally appropriate manner. The borrower will take account of and document the process and results of the consultation, including any actions agreed resulting from the consultation.<br>Disclosure of environmental or social risks and adverse impacts should occur early in the Assessment process, in any event before the Project construction commences, and on an ongoing basis. | The BA process includes an extensive stakeholder engagement process which complies with the South African EIA Regulations (2014, as amended). The process includes consultations with local communities, nearby businesses and a range of government sector stakeholders (state owned enterprises, national, provincial and local departments). The consultation process will be tailored to the risks and impacts of the Project; the Project's phase of development; the language preferences of the Affected Communities; their decision-making processes; and the needs of disadvantaged and vulnerable groups.<br>No Indigenous People will be affected.<br>The stakeholder engagement process solicits interest from potentially interested parties through the placement of site notices and newspaper advertisements as well as written and telephonic communication.<br>The stakeholder engagement process is detailed in Section 3.6. |
| **Principle 6: Grievance Mechanism** | | |
| **Overview** | For all Category A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the ESMS, to establish effective grievance mechanisms which are designed for use by Affected Communities and Workers, as appropriate, to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance.<br>The borrower will inform the Affected Communities and Workers about the grievance mechanism in the course of the stakeholder engagement process and ensure that the mechanism addresses concerns promptly and transparently, in a culturally appropriate manner, and is readily accessible, at no cost, and without retribution to the party that originates the issue or concern. | The EMPr (**Appendix G**) includes a Grievance Mechanism Process for Public Complaints and Issues. This procedure effectively allows for external communications with members of the public to be undertaken in a transparent and structured manner. This procedure will be revised and updated as part of the EMPr amendment process in the event that the project is developed in the future and incorporated into the Project specific ESMS. |
| **Principle 7: Independent Review** | | |
| **Overview** | For all Category A and, as appropriate, Category B Projects, an Independent Environmental and Social Consultant, not directly associated with the client, will carry out an Independent Review of the Assessment Documentation including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation in order to assist the EPFI's due diligence, and assess Equator Principles compliance. | This principle will only become applicable in the event that the project is developed in the future. |

| REQUIREMENT | | PROJECT SPECIFIC APPLICABILITY |
|---|---|---|
| **Principle 9: Independent Monitoring and Reporting** | | |
| **Overview** | To assess Project compliance with the Equator Principles after Financial Close and over the life of the loan, the EPFI will require independent monitoring and reporting for all Category A, and as appropriate, Category B projects. Monitoring and reporting should be provided by an Independent Environmental and Social Consultant; alternatively, the EPFI will require that the client retain qualified and experienced external experts to verify its monitoring information, which will be shared with the EPFI in accordance with the frequency required. | This principle will only become applicable in the event that the project is developed in the future. |

## 2.4 OTHER GUIDELINES AND BEST PRACTICE RECOMMENDATIONS

### *2.4.1 GENERIC EMPR RELEVANT TO AN APPLICATION FOR SUBSTATION AND OVERHEAD ELECTRICITY TRANSMISSION AND DISTRIBUTION INFRASTRUCTURE*

NEMA requires that an EMPr be submitted where an EIA has been identified as the environmental instrument to be utilised as the basis for a decision on an application for environmental authorisation. The content of an EMPr must either contain the information set out in Appendix 4 of the EIA Regulations, 2014, as amended, or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a government notice. Once the Minister has identified, through a government notice, that a generic EMPr is relevant to an application for EA, that generic EMPr must be applied by all parties involved in the EA process, including, but not limited to, the applicant and the CA.

GN 435 of 22 March 2019 identified a generic EMPr relevant to applications for substations and overhead electricity transmission and distribution infrastructure which require authorisation in terms of Section 42(2) of NEMA. Applications for overhead electricity transmission and distribution infrastructure that trigger Activity 11 of Listing Notice 1 or Activity 9 of Listing Notice 2, and any other listed or specified activities must use the generic EMPr.

The objective of the generic EMPr is "to prescribe and pre-approve generally accepted impact management outcomes and impact management actions, which can commonly and repeatedly be used for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of overhead electricity transmission and distribution infrastructure. The use of a generic EMPr is intended to reduce the need to prepare and review individual EMPrs for applications of a similar nature[1]."

The generic EMPrs (for both OHPL and Substations) are attached in the Site-Specific EMPr included as **Appendix G**.

[1] DEA (2019) *Appendix 1: Generic Environmental Management Programme (EMPr) for the Development and Expansion for Overhead Electricity Transmission and Distribution Infrastructure*

# 3 BASIC ASSESSMENT PROCESS

## 3.1 OBJECTIVES OF THE BASIC ASSESSMENT PROCESS AS PER THE PROCEDURAL FRAMEWORK

As defined in Appendix 1 of the EIA Regulations, 2014 (as amended), the objective of the impact assessment process is to, through a consultative process:

- Determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- Identify the alternatives considered, including the activity, location, and technology alternatives;
- Describe the need and desirability of the proposed alternatives;
- Through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine—
- The nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
- The degree to which these impacts—
    - Can be reversed;
    - May cause irreplaceable loss of resources; and
    - Can be avoided, managed, or mitigated.
- Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to–
    - Identify and motivate a preferred site, activity and technology alternative;
    - Identify suitable measures to avoid, manage or mitigate identified impacts; and
    - Identify residual risks that need to be managed and monitored.

## 3.2 DFFE WEB-BASED ENVIRONMENTAL SCREENING TOOL

DFFE has developed the National Web-based Environmental Screening Tool in order to flag areas of potential environmental sensitivity related to a site as well as a development footprint and produces the screening report required in terms of regulation 16 (1)(v) of the EIA Regulations (2014, as amended). The *Notice of the requirement to submit a report generated by the national web-based environmental screening tool in terms of section 24(5)(h) of the NEMA, 1998 (Act No 107 of 1998) and regulation 16(1)(b)(v) of the EIA regulations, 2014, as amended* (GN 960 of July 2019) states that the submission of a report generated from the national web-based environmental screening tool, as contemplated in Regulation 16(1)(b)(v) of the EIA Regulations, 2014, published under Government Notice No. R982 in Government Gazette No. 38282 of 4 December 2014, as amended, is compulsory when submitting an application for environmental authorisation in terms of regulation 19 and regulation 21 of the EIA Regulations, 2014 as of 04 October 2019.

The Screening Report generated by the National Web-based Environmental Screening Tool contains a summary of any development incentives, restrictions, exclusions or prohibitions that apply to the proposed development footprint as well as the most environmentally sensitive features on the footprint based on the footprint sensitivity screening results for the application classification that was selected.

A screening report for the proposed transmission line was generated on 02 July 2022 and is attached as **Appendix H**. The Screening Report for the project identified various sensitivities for the site. The report also generated a list of specialist assessments that should form part of the BA based on the development type and the environmental sensitivity of the site. Assessment Protocols in the report provide minimum information to be included in a specialist report to facilitate decision-making. **Table 3-1** below provides a summary of the sensitivities identified for the development footprint.

**Table 3-1: Sensitivities identified in the screening report**

| THEME | VERY HIGH SENSITIVITY | HIGH SENSITIVITY | MEDIUM SENSITIVITY | LOW SENSITIVIY |
|---|---|---|---|---|
| Agricultural Theme | ✓ | | | |
| Animal Species Theme | | ✓ | | |
| Aquatic Biodiversity Theme | ✓ | | | |
| Archaeological and Cultural Heritage Theme | | | | ✓ |
| Civil Aviation Theme | | | | ✓ |
| Defence Theme | | | | ✓ |
| Palaeontology Theme | ✓ | | | |
| Plant Species Theme | | | ✓ | |
| Terrestrial Biodiversity Theme | ✓ | | | |

Based on the selected classification, and the environmental sensitivities of the proposed development footprint, the following list of specialist assessments have been identified for inclusion in the assessment report as determined by the screening tool (please refer to **Section 3.2.1** below for the EAP motivation applicable to this list):

- Agricultural Impact Assessment
- Archaeological and Cultural Heritage Impact Assessment
- Palaeontology Impact Assessment
- Landscape/Visual Impact Assessment
- Terrestrial Biodiversity Impact Assessment
- Aquatic Biodiversity Impact Assessment
- Avifauna Impact Assessment
- Social Impact Assessment
- A Geotechnical Assessment
- Civil Aviation Impact Assessment
- Plant Species Assessment
- Animal Species Assessment

### *3.2.1 MOTIVATION FOR SPECIALIST STUDIES*

The report recognises that "it is the responsibility of the EAP to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist study including the provision of photographic evidence of the footprint situation."

As summarised in **Table 3-1** above, the following specialist assessments have been commissioned for the project based on the environmental sensitivities identified by the Screening Report (**Appendix H**):

- Soils and Agricultural Potential Assessment;
- Archaeological and Cultural Heritage Assessment;

- Palaeontology Impact Assessment;
- Visual Impact Assessment;
- Biodiversity Impact Assessment (inclusive of terrestrial biodiversity, plant species and animal species);
- Freshwater Assessment;
- Avifauna Impact Assessment;
- Social Impact Assessment; and
- Desktop Geotechnical Assessment.

Four (4) of the identified specialist studies will not be undertaken as part of the BA process for the proposed Camden I SEF Grid Connection Project. Motivation for the exclusion of these specialist studies is provided below:

- **Detailed Geotechnical**

  A desktop Geotechnical Assessment has been commissioned and has been incorporated into the BA. However, a detailed Geotechnical Assessment will not be undertaken as part of the Process as this will be undertaken during the detailed design phase.

- **RFI Assessment**

  A RFI Study will not be undertaken. The RFI theme was not identified by the Screening tool as a sensitivity for the development area. The proposed development area is not located within any Astronomy Advantage Area. The South African Weather Service (SAWS) and relevant telecommunications stakeholders will be engaged with as part of the Public Participation Process.

- **Civil Aviation**

  According to the DFFE Screening Tool Report, civil aviation is regarded as having low sensitivity. Therefore, no compliance statement is required. No major or other types of civil aviation aerodromes. A formal Civil Aviation Assessment will not be undertaken as part of the BA Process. Nevertheless, the relevant Authorities will be included on the project stakeholder database. As of the 1st of May 2021, Air Traffic and Navigation Services (ATNS) has been appointed as the new Obstacle application Service Provider for Windfarms and later Solar Plants. Their responsibility would pertain to the assessments, maintenance, and all other related matters in respect to Windfarms and in due time Power Plant assessments. An Application for the Approval of Obstacles will also be submitted to ATNS. The South African Civil Aviation Authority (SACAA) will be included on the project stakeholder database. They will be informed of the proposed Project, and comment will be sought from these authorities as applicable.

- **Defence**

  According to the DFFE Screening Tool Report, defence is regarded as having low sensitivity. Therefore, no compliance statement is required The Department of Defence will be included on the project stakeholder database. They will be informed of the proposed Project, and comment will be sought from this authority as applicable.

## SITE SENSITIVITY VERIFICATION

Specialist assessments were conducted in accordance with the *Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes*, which were promulgated in Government Notice No. 320 of 20 March 2020 and in Government Notice No. 1150 of 30 October 2020 (i.e., "the Protocols"). The assessment protocols followed as well as section references to where the outcomes of the site sensitivity verifications are detailed within each specialist report are indicated in **Table 3-2**.

**Table 3-2: Assessment protocols followed and site sensitivity verifications**

| SPECIALIST ASSESSMENT | ASSESSMENT PROTOCOL | SITE SENSITIVITY VERIFICATIONS |
|---|---|---|
| **Agricultural Compliance Statement** | Protocol for the specialist assessment and minimum report content requirements of environmental impacts on agricultural resources gazetted on 20 March 2020 in GN 320 (in terms of Sections 24(5)(A) and (H) and 44 of 4 NEMA, 1998) | Page 3, & 4 of the Agricultural Compliance Statement outlines the specific sections of the report which align with the agricultural protocol.<br><br>The outcome of the site sensitivity verification can be found in Section 7 of the Agricultural Compliance Statement (**Appendix F-8** of this final BA report).<br><br>The specialist confirmed that the development can be considered to be of low agricultural sensitivity. |
| **Landscape/Visual Impact Assessment** | Where a specialist assessment is required and no specific environmental theme protocol has been prescribed, the required level of assessment must be based on the findings of the site sensitivity verification and must comply with Appendix 6 of the EIA Regulations. | Page (iii & iv) of the Visual Impact Assessment (**Appendix F-7** of this final BA report) outlines the specific sections of the specialist report which align with Appendix 6 of the EIA regulations.<br><br>No preliminary visual/landscape sensitivities or sensitivity rating was identified in the relevant Screening Tools. However, sections 6.1 and 6.3 of the specialist report assesses the sensitivity and current land use of the site. |
| **Archaeological and Cultural Heritage Impact Assessment** | Where a specialist assessment is required and no specific environmental theme protocol has been prescribed, the required level of assessment must be based on the findings of the site sensitivity verification and must comply with Appendix 6 of the EIA Regulations. | Page (4) of the Archaeological and Cultural Heritage Impact Assessment (**Appendix F-4** of this final BA report) outlines the specific sections of the specialist report which align with Appendix 6 of the EIA regulations.<br><br>Section 8 of the study outlines the outcome of the site sensitivity verification. The specialist confirmed the archaeological sensitivity of the site to be low, based on a field survey conducted within the study area. |
| **Palaeontology Impact Assessment** | Where a specialist assessment is required and no specific environmental theme protocol has been prescribed, the required level of assessment must be based on the findings of the site sensitivity verification and must comply with Appendix 6 of the EIA Regulations | Page (9) of the Palaeontology Impact Assessment (**Appendix F-5** of this final BA report) outlines the specific sections of the specialist report which align with Appendix 6 of the EIA regulations.<br><br>The results of the palaeontological study indicated that the proposed project would have a low impact on palaeontological resources and the project should be authorised from a paleontological point of view. A Fossil Chance Find Protocol has been included in the draft EMPr (**Appendix G**). |
| **Terrestrial Biodiversity Impact Assessment** | 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 (GN 320, 20 March 2020)) provides the criteria for the assessment and reporting of impacts on terrestrial biodiversity for activities requiring environmental authorisation. | Page 6 of the specialist report outlines the specific sections of the report which align with the terrestrial biodiversity protocol. The site sensitivity verification is discussed in the "Assessment Outcomes" section of the Terrestrial Ecology Assessment (**Appendix F-2** of this final BA report).<br><br>The study area falls within two listed ecosystems that overlap, and there is a proclaimed conservation area on site, the Langcarel Private Nature Reserve, and Natural grassland on site is in moderate to poor condition. However, the specialist confirmed that the site has moderate significance after mitigation measures are implemented. |

| SPECIALIST ASSESSMENT | ASSESSMENT PROTOCOL | SITE SENSITIVITY VERIFICATIONS |
|---|---|---|
| **Plant Species Assessment** | Protocol (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 NEMA, gazetted on 30 October 2020), provides the criteria for the assessment and reporting of impacts on plant and animal species for activities requiring environmental authorisation. | Page 4 of the specialist report outlines the specific sections of the report which align with the terrestrial biodiversity protocol. The site sensitivity verification is discussed in the "Assessment Outcomes" section of the Terrestrial Plant Species Assessment (**Appendix F-2** of this final BA report).<br><br>The specialist confirmed that plants of conservation concern were identified using the screening tool and historical SANBI databases, however, none were seen during general field surveys. Therefore, the specialist recommended a targeted walk-through survey of footprint of construction areas is required prior to the commencement of construction, to determine whether any occur in the footprint of the development. |
| **Animal Species Assessment** | Protocol (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 NEMA, gazetted on 30 October 2020), provides the criteria for the assessment and reporting of impacts on plant and animal species for activities requiring environmental authorisation. | Page v to viii of the specialist report outlines the specific sections of the report which align with the terrestrial biodiversity protocol. The site sensitivity verification is discussed in the "Assessment Outcomes" section of the Terrestrial Animal Species Assessment (**Appendix F-2** of this final BA report).<br><br>The study concluded that following mitigation measures, the impact of the proposed project will have low or very low significance. |
| **Aquatic Biodiversity Impact Assessment** | 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 (GN 320, 20 March 2020)) provides the criteria for the assessment and reporting of impacts on aquatic biodiversity for activities requiring environmental authorisation. | Page 7 & 8 of the specialist report outlines the specific sections of the report which align with the aquatic protocol.<br><br>The site sensitivity verification can be found in Section 5, 6 and 7 of the Freshwater Ecological (Aquatic Biodiversity) Assessment (**Appendix F-3** of this final BA report). The study concluded that the impact on the aquatic environment would be low post mitigation and the development should proceed. |
| **Avian Impact Assessment** | Minimum report requirements listed in the protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species (Government Gazette No 43855, 30 October 2020) | Page 15 of the specialist report outlines the specific sections of the report which align with the protocol for the assessment of environmental impacts on terrestrial animal species.<br><br>The site sensitivity verification can be found in Section 6 of the Avifaunal Impact Assessment (**Appendix F-2** of this final BA report). The specialist confirmed that the proposed project will have a mostly moderate impact on priority avifauna. This can be reduced to low impact with the implementation of appropriate mitigations. |
| **Desktop Geotechnical Assessment** | Where a specialist assessment is required and no specific environmental theme protocol has been prescribed, the required level of assessment must be based on the findings of the site sensitivity verification and must comply with Appendix 6 of the EIA Regulations. | Page i & ii of the Desktop Geotechnical Impact Assessment (**Appendix F-9,** of this final BA report) outlines the specific sections of the specialist report which align with Appendix 6 of the EIA regulations as well as well as Section 9, and Section 3 which assess the sensitivity and current land use of the site respectively.<br><br>No preliminary geotechnical sensitivities or sensitivity rating was identified in the relevant Screening Tools. |

| SPECIALIST ASSESSMENT | ASSESSMENT PROTOCOL | SITE SENSITIVITY VERIFICATIONS |
|---|---|---|
| **Socio-Economic Impact Assessment** | Where a specialist assessment is required and no specific environmental theme protocol has been prescribed, the required level of assessment must be based on the findings of the site sensitivity verification and must comply with Appendix 6 of the EIA Regulations. | Page vii & viii of the Desktop Geotechnical Impact Assessment (**Appendix F-6** of this final BA report) outlines the specific sections of the specialist report which align with Appendix 6 of the EIA regulations.<br><br>No preliminary socio-economic sensitivities or sensitivity rating was identified or provided based on the Screening Tools (i.e., a preliminary sensitivity rating was not provided that could then be confirmed or altered based on further assessment).<br><br>However, the specialist assessment report contains a detailed assessment of the socio-economic impacts of the proposed project. As such, it provides all the necessary information and assessment data to provide an opinion on the sensitivity rating of the site. In particular, Section 3 and 4 of the report speaks to the site sensitivity of the site as confirmed by the site visit. |

## 3.3 APPLICATION FOR ENVIRONMENTAL AUTHORISATION

The application phase consists of the completion of the appropriate application form by the EAP and the Proponent as well as the subsequent submission and registration of the application for EA with DFFE.

A request for a pre-application meeting was submitted to DFFE on 11 October 2021. DFFE responded with the allocation of an assessing officer and reference number (2021-10-0008). A virtual pre-application meeting was held on **19 October 2021** with the DFFE to discuss the proposed Camden I SEF 132kV Grid connection. The minutes of the meeting and the public participation plan were approved on **18 November** and **22 November 2021** respectively and are included in **Appendix I**.

## 3.4 BASELINE ENVIRONMENTAL ASSESSMENT

The description of the environmental attributes of the Project area was compiled through a combination of desktop reviews and site investigations. Desktop reviews made use of available information including existing reports, aerial imagery, and mapping. The specialist teams undertook site investigations between July and September 2021 to provide impact assessments for the proposed OHPL route.

## 3.5 IMPACT ASSESSMENT METHODOLOGY

### *3.5.1 ASSESSMENT OF IMPACTS AND MITIGATION*

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between

activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct,[2] indirect,[3] secondary[4] as well as cumulative[5] impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria[6] presented in **Table 3-3**.

**Table 3-3: Impact Assessment Criteria and Scoring System**

| CRITERIA | SCORE 1 | SCORE 2 | SCORE 3 | SCORE 4 | SCORE 5 |
|---|---|---|---|---|---|
| **Impact Magnitude (M)** The degree of alteration of the affected environmental receptor | Very low: No impact on processes | Low: Slight impact on processes | Medium: Processes continue but in a modified way | High: Processes temporarily cease | Very High: Permanent cessation of processes |
| **Impact Extent (E)** The geographical extent of the impact on a given environmental receptor | Site: Site only | Local: Inside activity area | Regional: Outside activity area | National: National scope or level | International: Across borders or boundaries |
| **Impact Reversibility (R)** The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change | Reversible: Recovery without rehabilitation | | Recoverable: Recovery with rehabilitation | | Irreversible: Not possible despite action |
| **Impact Duration (D)** The length of permanence of the impact on the environmental receptor | Immediate: On impact | Short term: 0-5 years | Medium term: 5-15 years | Long term: Project life | Permanent: Indefinite |
| **Probability of Occurrence (P)** The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation | Improbable | Low Probability | Probable | Highly Probability | Definite |
| **Significance (S)** is determined by combining the above criteria in the following formula: | $[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$ | | | | |
| **IMPACT SIGNIFICANCE RATING** | | | | | |
| **Total Score** | **4 to 15** | **16 to 30** | **31 to 60** | **61 to 80** | **81 to 100** |
| Environmental Significance Rating (Negative (-)) | **Very low** | **Low** | **Moderate** | **High** | **Very High** |
| Environmental Significance Rating (Positive (+)) | **Very low** | **Low** | **Moderate** | **High** | **Very High** |

## 3.5.2 IMPACT MITIGATION

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is

[2] Impacts that arise directly from activities that form an integral part of the Project.
[3] Impacts that arise indirectly from activities not explicitly forming part of the Project.
[4] Secondary or induced impacts caused by a change in the Project environment.
[5] Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.
[6] The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The mitigation sequence/hierarchy is shown in **Figure 3-1** below.


**Figure 3-1: Mitigation Sequence/Hierarchy**

The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

## 3.6 STAKEHOLDER ENGAGEMENT PROCESS

Stakeholder engagement (public participation) is a requirement of the BA process. It consists of a series of inclusive and culturally appropriate interactions aimed at providing stakeholders with opportunities to express their views, so that these can be considered and incorporated into the BA decision-making process. Effective engagement requires the prior disclosure of relevant and adequate project information to enable stakeholders to understand the risks,

impacts, and opportunities of the proposed project. The objectives of the stakeholder engagement process can be summarised as follows:

- Identify relevant individuals, organisations and communities who may be interested in or affected by the proposed project;
- Clearly outline the scope of the proposed project, including the scale and nature of the existing and proposed activities;
- Identify viable proposed project alternatives that will assist the relevant authorities in making an informed decision;
- Identify shortcomings and gaps in existing information;
- Identify key concerns, raised by Stakeholders that should be addressed in the specialist studies;
- Highlight the potential for environmental impacts, whether positive or negative; and
- To inform and provide the public with information and an understanding of the proposed project, issues, and solutions.

A Stakeholder Engagement Report (SER) has been included in **Appendix D** and has been updated in this, the final BAR, detailing the project's compliance with Chapter 6 of the NEMA EIA Regulations 2014, as amended.

### 3.6.1 STAKEHOLDER CONSULTATION

As part of the pre-application consultation meeting held with DFFE on **19 October 2021**, the proposed plan for public participation was discussed. A public participation plan was subsequently submitted to DFFE, along with the meeting minutes, for approval on **18 November 2022**. The meeting minutes and public participation plan were approved by DFFE on **22 November 2021**. Refer to the SER for details of the approved public participation plan and stakeholder consultation undertaken to date.

### 3.6.2 PUBLIC REVIEW

The final BAR was placed on public review for a period of 30 days from **11 May 2023 to 12 June 2023**, at the following public places:

- Ermelo Public Library;
- Thusiville Public Library;
- WSP website (https://www.wsp.com/en-ZA/services/public-documents) ; and
- Datafree Website (https://wsp-engage.com/) .

### 3.6.3 WAY FORWARD

#### FINAL BASIC ASSESSMENT REPORT SUBMISSION

All issues raised in the draft Basic Assessment Report (BAR) of the proposed project was incorporated into this final BAR. The DFFE will be allocated time to review the final (BAR). After submitting the final BAR, a notification of will be sent to all registered Interested and Affected Parties (I&APs) and the report will be made available for review. The DFFE's final review and decision-making process will result to a decision on whether to grant or not to grant the Environmental Authorisation (EA). If the EA is granted, a notification will be sent to all I&APs. The registered I&APs will be given twenty (20) days to appeal the granting of the EA. The details of the appeal process of will be included in the notification.

#### ONGOING CONSULTATION AND ENGAGEMENT

In addition to the public documents distributed to stakeholders, there will be ongoing communication between the proponent, the WSP and stakeholders throughout the BA process. These interactions include the following:

- In addition to the project announcement letters, a letter will be sent out to all registered stakeholders providing them with an update of the proposed project once the Basic Assessment has been approved;
- Interactions with stakeholders will take place in English, Afrikaans and isiZulu;

- Feedback to stakeholders, individually and collectively;
- Written responses (email, faxes or letters) will be provided to stakeholders acknowledging issues and providing information requested (dependent on availability); and
- As per the GNR 982, as amended, particular attention will be paid to landowners, and neighbouring communities, specifically where literacy levels and language barriers may be an issue.

## 3.7 ASSUMPTIONS AND LIMITATIONS

General assumptions and limitations relating to the BA process are listed below:

- The EAP hereby confirms that they have undertaken to obtain project information from the Camden I Solar (RF) Pty Ltd that is deemed to be accurate and representative of the project;
- Site visits have been undertaken to better understand the project and ensure that the information provided by the client is correct, based on site conditions observed;
- The EAP hereby confirms their independence and understands the responsibility they hold in ensuring all comments received are accurately replicated and responded to within the BA documentation;
- The comments received in response to the public participation process, will be representative of comments from the broader community;
- WSP's assessment of the significance of impacts of the proposed project on the affected environment has been based on the assumption that the activities will be confined to those described in Section 4. If any substantial changes to the project description are made, impacts may need to be reassessed;
- Where detailed design information is not available, the precautionary principle (i.e. a conservative approach that overstates negative impacts and understates benefits) has been adopted;
- The competent authority would not require additional specialist input, as per the proposals made in this report, in order to make a decision regarding the application; and
- All information is assumed to be accurate and relevant at the time of writing this report.
- The information provided by ESA, and the specialists is assumed to be accurate.

Key assumptions and limitations relevant to the specialist assessments include:

- **Aquatic Ecology:**
  - To obtain a comprehensive understanding of the dynamics of both the flora and fauna of communities within a study site, as well as the status of endemic, rare or threatened species in any area, assessments should always consider investigations at different time scales (across seasons/years) and through replication. However, due to time constraints these long-term studies are not feasible and are thus mostly based on instantaneous sampling.
  - A concerted effort was made to sample and assess as much of the potential site, as well as make use of any supporting literature, species distribution data and aerial photography. This limitation is common to many impact assessment type studies, but the findings are deemed adequate for the purposes of decision-making support regarding project acceptability in this Phase, unless otherwise stated.
  - It should be emphasised that information, as presented in this document, only has reference to the study area as indicated on the accompanying maps inclusive of any of the associated accesses, pipelines and grid corridors. Therefore, this information cannot be applied to any other area without detailed investigation.
- **Avifauna:**
  - The SABAP2 dataset is a comprehensive dataset which provides a reasonably accurate snapshot of the avifauna which could occur at the proposed site. For purposes of completeness, the list of species that could be encountered was supplemented with personal observations, general knowledge of the area, and the results of the pre-construction monitoring which was conducted over 12 months.
  - According to the specifications received from the proponent, the up to 33kV medium-voltage lines will be buried where practically feasible. It was therefore assumed that there could be up to 33kV overhead lines which could pose an electrocution risk to priority species.
- **Terrestrial Biodiversity:**
  - The assessment is based on a field survey conducted 3-7 February 2020. The current study is based on an extensive site visit as well as a desktop study of the available information. The time spent on site was adequate

for understanding general patterns across affected areas. The seasons in which the fieldwork (peak summer flowering period) was conducted was ideal for assessing the composition and condition of the vegetation.
  - The vegetation was in good condition for sampling at the time of the field assessment, and the species lists obtained are considered reliable and relatively comprehensive.
  - Compiling the list of species that could potentially occur on site is limited by the paucity of collection records for the area. The list of plant species that could potentially occur on site was therefore taken from a wider area and from literature sources that may include species that do not occur on site and may miss species that do occur on site. To compile a comprehensive site-specific list of the biota on site, studies would be required that would include different seasons, be undertaken over a number of years and include extensive sampling. Due to time constraints inherent in the BA process, this was not possible for this study. However, the comprehensive field survey is sufficient for the purposes of this report and towards sufficiently informing the decision-making process by the Competent Authority.

- **Animal Species:**
  - Inventory surveys of animal species occurring on a site are difficult to achieve within the timeframes associated with an BA. To compile a comprehensive site-specific list of the biota on site, studies would be required that would include different seasons, be undertaken over a number of years and include extensive sampling. It is more important to know of fauna of value, as well as ecological processes. Therefore, the assessment attempts to identify threatened and other significant species, important habitats, and ecological processes.
  - Compiling the list of species that could potentially occur on site is limited by the density of collection records for the area. The list of animal species that could potentially occur on site was therefore taken from a wider area and from literature sources that may include species that do not occur on site and may miss species that do occur on site.
  - The assessment is based on a field survey conducted 3-7 February 2020. The current study is based on an extensive site visit as well as a desktop study of the available information. The time spent on site was adequate for understanding general patterns across affected areas. The seasons in which the fieldwork (peak summer flowering period) was conducted was ideal for assessing the composition and condition of the vegetation, which is also suitable for assessing habitat condition and suitability for animals.
- **Plant Species:**
  - The purpose of the fieldwork undertaken for this Project to characterize the habitat of the study area, compile species checklists from as diverse a variety of habitats as possible, and to map habitats within the entire collection of farms within which the Project is situated. The proposed project layout was provided during the BA process; therefore, no development footprint areas were assessed for the Project, only the general area in which the project is located. A final walk-through to survey conducted in Spring or Summer, where possible, is therefore recommended to check for potential species of conservation concern within footprints of the development
- **Social:**
  - Technical suitability: It is assumed that the development site represents a technically suitable site for the establishment of the proposed development.
  - Strategic importance of the project: The strategic importance of promoting renewable and other forms of energy is supported by the national and provincial energy policies.
  - Fit with planning and policy requirements: Legislation and policies reflect societal norms and values. The legislative and policy context therefore plays an important role in identifying and assessing the potential social impacts associated with a proposed development. In this regard, a key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents. As such, if the findings of the study indicate that the proposed development in its current format does not conform to the spatial principles and guidelines contained in the relevant legislation and planning documents, and there are no significant or unique opportunities created by the development, the development cannot be supported.
  - Assessment of components: The potential social impacts associated with the internal substations are negligible and do not have a bearing on the findings of the SIA. The focus of the SIA is therefore on transmission lines.
  - Demographic data: Some of the provincial documents do not contain data from the 2011 Census and or 2016 Household Community Survey. However, where required the relevant 2011 and 2016 data has been provided.
- **Visual:**
  - In assessing the potential visual impacts of the proposed up to 132kV power line, the visual assessment zone is assumed to encompass a zone of 5km from the outer boundary of the power line assessment corridors.
  - The identification of visual receptors involved a combination of desktop assessment as well as field-based observation. Initially Google Earth imagery was used to identify potential receptors within the study area.

Where possible, these receptor locations were verified and assessed during a site visit which was undertaken in mid-September 2019. Due to the extent of the study area however and the number of receptors that could potentially be sensitive to the proposed development, it was not possible to visit or verify every potentially sensitive visual receptor location. As such, a number of broad assumptions have been made in terms of the likely sensitivity of the receptors to the proposed development.

- It should be noted that not all receptor locations would necessarily perceive the proposed development in a negative way. This is usually dependent on the use of the facility, the economic dependency of the occupants on the scenic quality of views from the facility and on people's perceptions of the value of "Green Energy". Sensitive receptor locations typically include sites such as tourism facilities and scenic locations within natural settings which are likely to be adversely affected by the visual intrusion of the proposed development. Thus, the presence of a receptor in an area potentially affected by the proposed development does not necessarily mean that any visual impact will be experienced.
- The potential visual impact at each sensitive visual receptor location was assessed using a matrix developed for this purpose. The matrix is based on three main parameters relating to visual impact and, although relatively simplistic, it provides an indicative assessment of the degree of visual impact likely to be experienced at each receptor location as a result of the proposed development. It is however important to note the limitations of quantitatively assessing a largely subjective or qualitative type of impact and as such the matrix should be seen merely as a representation of the likely visual impact at a receptor location.
- As stated, the exact status of all the receptors could not be verified during the field investigation and as such the receptor impact rating was largely undertaken via desktop means. Where details of the levels of leisure / tourism activities on different sectors of the relevant farms are not known, the impact rating matrix for these receptors is based on the assumed location of the main accommodation complex on each property.
- Visual analysis in respect of the power lines is based on a worst-case scenario where power line tower heights are assumed to be 40 m.
- Due to the varying scales and sources of information; maps may have minor inaccuracies. Terrain data for this area, derived from the National Geo-Spatial Information (NGI)'s 25m Digital Elevation Model (DEM), is fairly coarse and somewhat inconsistent and as such, localised topographic variations in the landscape may not be reflected on the DEM used to generate the viewshed(s) and visibility analysis conducted in respect of the proposed development.
- In addition, the viewshed / visibility analysis does not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.
- No feedback regarding the visual environment has been received from the public participation process to date. (including the public during the review period of the Draft Basic Assessment Report) will
- At the time of undertaking the visual study no information was available regarding the type and intensity.
- In the light of the fact that the renewable energy industry is still relatively new in South Africa, this report draws on international literature and web material to describe the generic impacts associated with SEFs.
- This study includes an assessment of the potential cumulative impacts of other renewable energy and infrastructural / mining developments on the existing landscape character and on the identified sensitive receptors. This assessment is based on the information available at the time of writing the report and where information has not been available, assumptions have been made as to the likely impacts of these developments.
- It should be noted that the fieldwork for this study was undertaken in mid-September 2019, during late winter which is characterised by low levels of rainfall and reduced vegetation cover. In these conditions, increased levels of visual impact will be experienced from receptor locations in the surrounding area.

- **Heritage:**
  - The authors acknowledge that the brief literature review is not exhaustive on the literature of the area. Due to the nature of heritage resources and pedestrian surveys, the possibility exists that some features or artefacts may not have been discovered/recorded and the possible occurrence of graves and other cultural material cannot be excluded. This limitation is successfully mitigated with the implementation of a Chance Find Procedure and monitoring of the study area by the Environmental Control Officer (ECO). This report only deals with the footprint area of the proposed development and consisted of non-intrusive surface surveys, however assessed the broader cadastral portions for the Project and therefore is representative of the entire study area. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components will be highlighted through the public consultation process if relevant. It is possible that new information could come to light in future, which might change the results of this Impact Assessment.
- **Palaeontological:**

- Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and only some do contain fossil plant, insect, invertebrate and vertebrate material. The site visit and walk through confirmed that there are no fossils present on the land surface. It is not known if there are any fossils below the land surface. The sands of the Quaternary period and the Jurassic dolerite would not preserve fossils.

- **Agriculture:**
  - There are no specific assumptions, uncertainties or gaps in knowledge or data that affect the findings of this study.

- **Geotechnical:**
  - The interpretation of the overall geotechnical conditions across the site is based on a review o available information on the project area. Subsurface and geotechnical conditions have been inferred at a desktop level from the available information, past experience in the project area and professional judgement. The information and interpretations are given as a guideline only and there is no guarantee that the information given is totally representative of the entire area in every respect. No responsibility will be accepted for consequences arising out of the fact that actual conditions vary from those inferred. The information must be verified by the undertaking of a detailed geotechnical site investigation.

# 4 PROJECT DESCRIPTION

This section provides a description of the location of the project area and the site location alternatives considered for the project are discussed in the Project Alternatives Section (**Section 5).** The descriptions encompass the activities to be undertaken during the construction and operational phases as well as the consideration for site accessibility, water demand, supply, storage, and site waste management. This section also considers the need and desirability of the project in accordance with Appendix 1 of GNR 326.

## 4.1 LOCATION OF THE PROPOSED PROJECT

The proposed up to 132kV OHPL, 33/132kV Substation and associated infrastructure will be developed in an area south-west of Ermelo, in Mpumalanga, and falls within ward 11 of the Msukaligwa Local Municipality and the Gert Sibande District Municipality. The proposed project including the associated alternatives, is indicated in **Figure 4-1** below.

The proposed project (substation and transmission line) is located over two properties. The details of the properties including the 21-digit Surveyor General (SG) codes for the cadastral land parcels are outlined in **Table 4-2**.

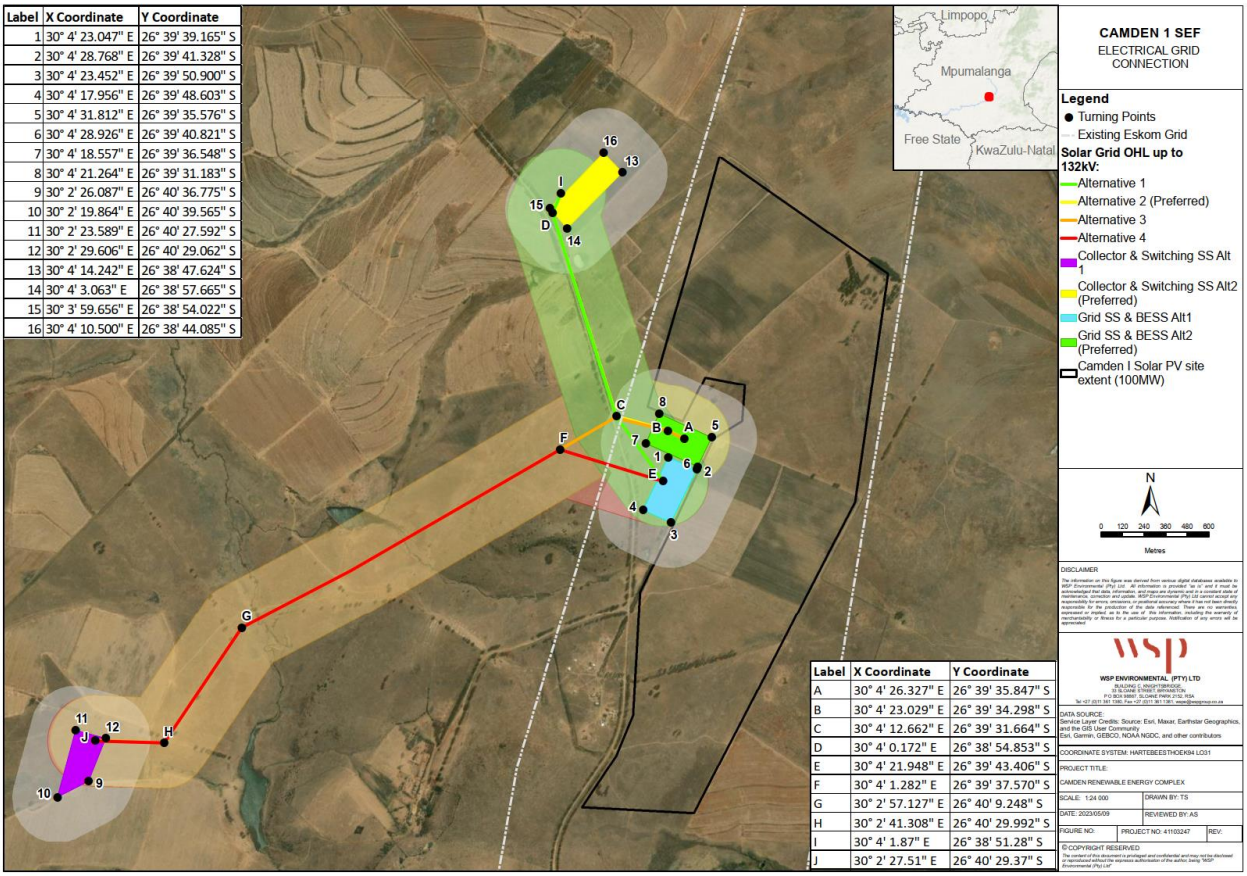



**Figure 4-1: Camden I SEF showing 132 kV Powerline Alternatives and coordinates, including assessment corridors proposed for authorisation.**

**Table 4-1** below provides the co-ordinates for the proposed alternatives and layout of the OHPL. Refer to **Figure 4-1** and **Section 5.2** for the coordinates of the alternative substations.

**Table 4-1: Co-ordinates of the OHPL routes**

| POINT | BEND POINT CO-ORDINATES | |
|---|---|---|
| **132kV OHPL: Alternative 1** | | |
| **E** | 30° 4' 21.948" E | 26° 39' 43.406" S |
| **C** | 30° 4' 12.662" E | 26° 39' 31.664" S |
| **D** | 30° 4' 0.172" E | 26° 38' 54.853" S |
| **I** | 30° 4'1.87" E | 26°38'51.28" S |
| **132kV OHPL: Alternative 2 (Preferred)** | | |
| **A** | 30° 4' 26.327" E | 26° 39' 35.847" S |
| **B** | 30° 4' 23.029" E | 26° 39' 34.298" S |
| **C** | 30° 4' 12.662" E | 26° 39' 31.664" S |
| **D** | 30° 4' 0.172" E | 26° 38' 54.853" S |
| **I** | 30° 4'1.87" E | 26°38'51.28" S |
| **132kV OHPL: Alternative 3** | | |
| **A** | 30° 4' 26.327" E | 26° 39' 35.847" S |
| **B** | 30° 4' 23.029" E | 26° 39' 34.298" S |
| **C** | 30° 4' 12.662" E | 26° 39' 31.664" S |
| **F** | 30° 4' 1.282" E | 26° 39' 37.570" S |
| **G** | 30° 2' 57.127" E | 26° 40' 9.248" S |
| **H** | 30° 2' 41.308" E | 26° 40' 29.992" S |
| **J** | 30° 2' 27.51" E | 26° 40' 29.37" S |
| **132kV OHPL: Alternative 4** | | |
| **E** | 30° 4' 21.948" E | 26° 39' 43.406" S |
| **F** | 30° 4' 1.282" E | 26° 39' 37.570" S |
| **G** | 30° 2' 57.127" E | 26° 40' 9.248" S |

| POINT | BEND POINT CO-ORDINATES | |
|---|---|---|
| **H** | 30° 2' 41.308" E | 26° 40' 29.992" S |
| **J** | 30° 2'27.51"E | 26°40'29.37"S |

**Table 4-2: Farm portions on which the proposed powerline is located**

| FARM NAME & NUMBER | 21 DIGIT SG CODE | MUNICIPALITY / PROVINCE | PROVINCE |
|---|---|---|---|
| Portion 1 of Welgelen Farm 322:<br>– Powerline Alternative 1;<br>– Powerline Alternative 2 (Preferred)<br>– Powerline Alternative 3<br>– Powerline Alternative 4<br>– IPP substation 1<br>– IPP substation 2 (preferred)<br>– Collector Substation Alternative 2 (Preferred) | T0IT00000000032200001 | Msukaligwa Local Municipality/<br>Gert Sibande District Municipality/ Mpumalanga Province | Mpumalanga Province |
| Portion 2 of Welgelen Farm 322:<br>– Powerline Alternative 3;<br>– Powerline Alternative 4<br>– Collector Substation Alternative 1; | T0IT00000000032200002 | Msukaligwa Local Municipality/<br>Gert Sibande District Municipality/ Mpumalanga Province | Mpumalanga Province |

## 4.2 PROJECT INFRASTRUCTURE

The proposed project entails the construction of an up to 132kV grid connection overhead powerline including associated infrastructure, from the Camden I Solar PV Facility to the nearby Camden Collector substation (which in turn will connect to the Camden Power Station). The powerline will be approximately 5km in length, depending on the authorized location of the collector substation (hereafter know as 'ECSS').

The onsite grid connection substation will consist of high voltage substation yard to allow for multiple (up to) 132kV feeder bays and transformers, control building, telecommunication infrastructure, access roads, etc. The area for the onsite substation will be up to 1.5ha. The up to 132kV powerline and substation will have a 500m corridor (250m either side of the centre line, and 250m around the entire perimeter of the proposed substation sites), to allow for micro-siting and avoidance of sensitive features where possible. This corridor, as opposed to the line routing, is proposed for authorisation. This application includes the necessary up to 132kV voltage electrical components required for connection at the Collector Substation (i.e., the termination works). The proposed project entails the construction of an up to 132kV Grid connection overhead powerline from the Camden. A technical summary of the up to 132kV grid connection and its associated infrastructure is included in **Table 4-3**.

**Table 4-3: Details of the proposed Camden I SEF up to 132kV electrical grid connection, grid assessment corridor, substation and termination works.**

**OVERHEAD POWERLINE**

| | |
|---|---|
| Powerline capacity | Up to 132kV (note this includes 132kV exactly for the avoidance of doubt) |
| Powerline corridors width | A grid connection corridor has been identified for the assessment and placement of the grid connection infrastructure, comprising 500 m (i.e. 250 m on either side of centre line). As detailed above, the entire corridor is proposed for development provided the infrastructure remains within the assessed corridor. |
| Powerline servitude width | 40m |
| Powerline pylons: | Monopole or Lattice pylons, or a combination of both where required and as informed by detailed design |
| Construction clearance required (per pylon) | To allow for crane and large component access and installation, clearing required for each tower depends on local terrain, but up to 1500m$^2$, or where existing OHL crossings are made or powerlines are constructed adjacent each other, up to 2500m$^2$. |
| Powerline pylon height: | Up to a maximum of 40 m |
| Minimum conductor clearance | 8.1 m |
| Pylon spacing | Up to 250m apart, depending on complexity and slope of terrain |
| Pylon designs | Various pylon design types are considered (and will be determined during the detailed design engineering phase), and may include any of the following:<br>– Up to 132kV (single or double circuit)<br>– Intermediate self-supporting monopole<br>– Inline or angle-strain self-supporting monopole<br>– Suspension self-supporting monopole<br>– Triple pole structure<br>– Cross rope suspension;<br>– Guyed "V" Structure<br>– Steel lattice structure; or<br>– Similar pylon design at 132kV specification<br>The above designs may require anchors with guy-wires or be anchorless. For up to 132kV structures, concrete foundation sizes may vary depending on design type up to 140m$^2$ (12m by 12m), with depths reaching up to 4m typically in a rectangular 'pad' shape. |
| **Substation (and Collector Substation connection components)** | |
| Substation Footprint | 1.5ha |
| Substation Capacity | 33/132kV |

**OVERHEAD POWERLINE**

| | |
|---|---|
| Corridor width | A grid connection corridor has been identified for the assessment and placement of the grid connection infrastructure, comprising 250m around the entire perimeter of the proposed substation sites. As detailed above, the entire corridor is proposed for development provided the infrastructure remains within the assessed corridor. |
| Associated infrastructure | The substation will consist of high voltage substation yard to allow for multiple (up to) 132kV feeder bays and transformers, control building, telecommunication infrastructure, access roads, etc, including the following:<br>Standard substation electrical equipment, including but not limited to transformers, busbars, office area, operation and control room, workshop, and storage area, feeder bays, transformers, stringer strain beams, insulators, isolators, conductors, circuit breakers, lightning arrestors, relays, capacitor banks, batteries, wave trappers, switchyard, metering and indication instruments, equipment for carrier current, surge protection and outgoing feeders, as may be needed.<br>The control building, telecommunication infrastructure, oil dam(s)<br>Workshop and office area within the substation footprint<br>Fencing around the substation<br>Lighting and security infrastructure<br>All the access road infrastructure to and within the substation<br>Further ancillary infrastructure including but not limited to lighting, lightning protection, fencing, buildings required for operation (ablutions, office, workshop and control room, security fencing and gating, parking area, concrete batching plant (if required), waste storage/disposal and storerooms). |
| Termination works | All works and components required for connection at and into the Collector Substation comprising the necessary up to 132kV voltage electrical components, including amongst others standard substation electrical equipment as may be needed (feeder bays, transformers, busbars, stringer strain beams, insulators, isolators, conductors, circuit breakers, lightning arrestors, relays, capacitor banks, batteries, wave trappers, switchyard, metering and indication instruments, equipment for carrier current, surge protection and outgoing feeders. |
| **Roads Infrastructure** | |
| Road servitude and access roads | Approximately 6 meters wide, however where required for turning circle/bypass areas, access or internal roads will be up to 20m wide to allow for larger component transport. During operation, vegetation maintenance by partial clearing/maintenance in grid servitude for operation, safety and maintenance reasons. |

### *4.2.1 OVERHEAD POWERLINE*

It is proposed that Camden I SEF will connect to the nearby Camden Collector substation (which in turn will connect to the Camden Power Station), through an up to 132 kV OHPL (either single or double circuit) between the grid connection substation portion (immediately adjacent the Camden I Solar PV on-site IPP substation portion) and that of the Camden Collector substation. The OHPL will be approximately 5 km in length, depending on the authorized location of the collector substation. The onsite grid connection substation will consist of high voltage substation yard to allow for multiple (up to) 132 kV feeder bays and transformers, control building, telecommunication infrastructure, access roads, etc. The area for the onsite substation will be up to 1.5 ha. The OHPL and substation (including terminating substation works) will have a 250 m corridor (250m on either side of the centre line and 250m around the entire perimeter of the substation and termination works). This application includes the necessary up to 132 kV voltage electrical components required for connection at the Collector Substation (i.e. the termination works).

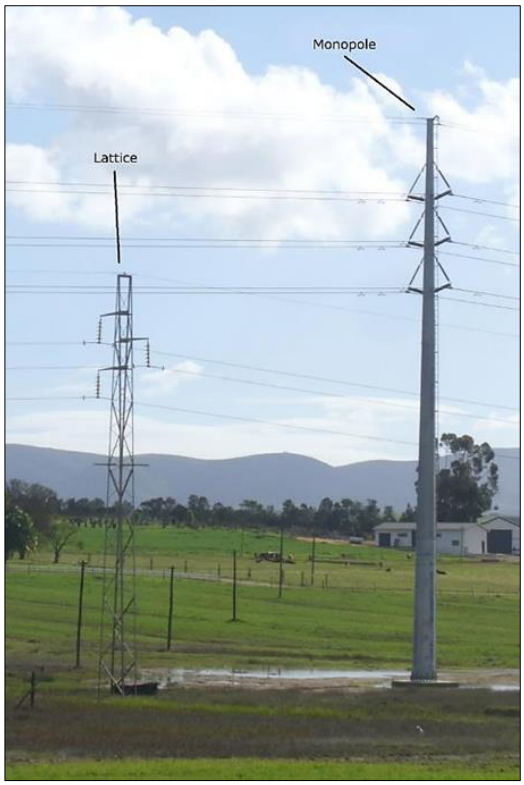



**Figure 4-2: Conventional lattice powerline tower compared with a steel monopole structure**

## 4.2.2 ELECTRICITY POWER TRANSMISSION AND DISTRIBUTION

Electricity is carried at high voltages (kilovolts, or kV) along transmission lines in order to reduce the electrical losses that occur over long distances between power generation and consumption points. In order for electricity to be transmitted safely and efficiently over long distances, it must be at a high voltage and a low current. The voltages at which power is generated at the power generation facility are too low for transmission over long distances. To overcome this problem, transformers are installed at the power stations and substations to increase the voltage level. Transformer's step-up the voltage from, for example, 11 or 22 kV to higher voltages such as 66 kV, 132kV, 220 kV, 275 kV, 400 kV or 765 kV, and feed the generated power into Eskom's national grid.

When the electricity arrives at a distribution substation, bulk supplies of electricity are taken for primary distribution to towns and industrial areas, groups of villages, farms and similar concentrations of consumers. The lines are fed into intermediate substations where transformers reduce (step-down) the voltage level. This could be 11 kV in large factories and 380/220 Volts in shops and homes. Power is distributed to end-users via reticulation power lines and cables. **Figure 4-4** illustrates a typical distribution system.

As of March 2019, South Africa's transmission network comprised 32,802 km of line length, 167 substations and 152,135 MVA of transformer capacity. All the high voltage lines, plus the transformers and related equipment, form the transmission system also known as the national grid.

## 4.2.3 COMPONENTS OF A TYPICAL TRANSMISSION LINE SYSTEM

The main components of a typical electrical transmission system include the following:

### TRANSMISSION STRUCTURES

Transmission structures are the most visible components of the power transmission system. Their function is to inter alia, keep the high-voltage conductors separated from their surroundings and from each other. Some structure designs reflect the specific function of the structure, while others have come about as a result of technological progress. Structure design alternatives for this project are discussed in **Section 5.4**.

## CONDUCTORS

Conductors carry the power through and from the grid. Generally, several conductors per phase are strung from structure to structure. The number of conductors per phase depends on the performance of the line, typically, more than one conductor per phase is used when the operating voltage exceeds 132kV. Conductors are constructed primarily of aluminium, aluminium-alloy, steel or other types of materials as appropriate.

## SUBSTATIONS

The very high voltages used for power transmission are converted at substations to lower voltages for further distribution and consumer use. Substations vary in size and configuration but may cover several hectares; they are cleared of vegetation and typically surfaced with gravel. They are fenced and are normally reached by a permanent access road. In general, substations include a variety of indoor and outdoor electrical equipment such as switchgear, transformers, control and protection panels and batteries, and usually include other components such as control buildings, fencing, lighting etc.

For the substation to perform it needs sophisticated protection equipment to detect faults and abnormal conditions that may occur on the network. Action may consist for example, of automatically tripping a transmission line to cater for abnormal conditions such as lightning strikes, fires or trees falling on transmission lines. This action is necessary for safety reasons in the event of an accident or to maintain electricity supply and limit the disruption caused. **Figure 4-3** provides an illustration of a typical substation layout.

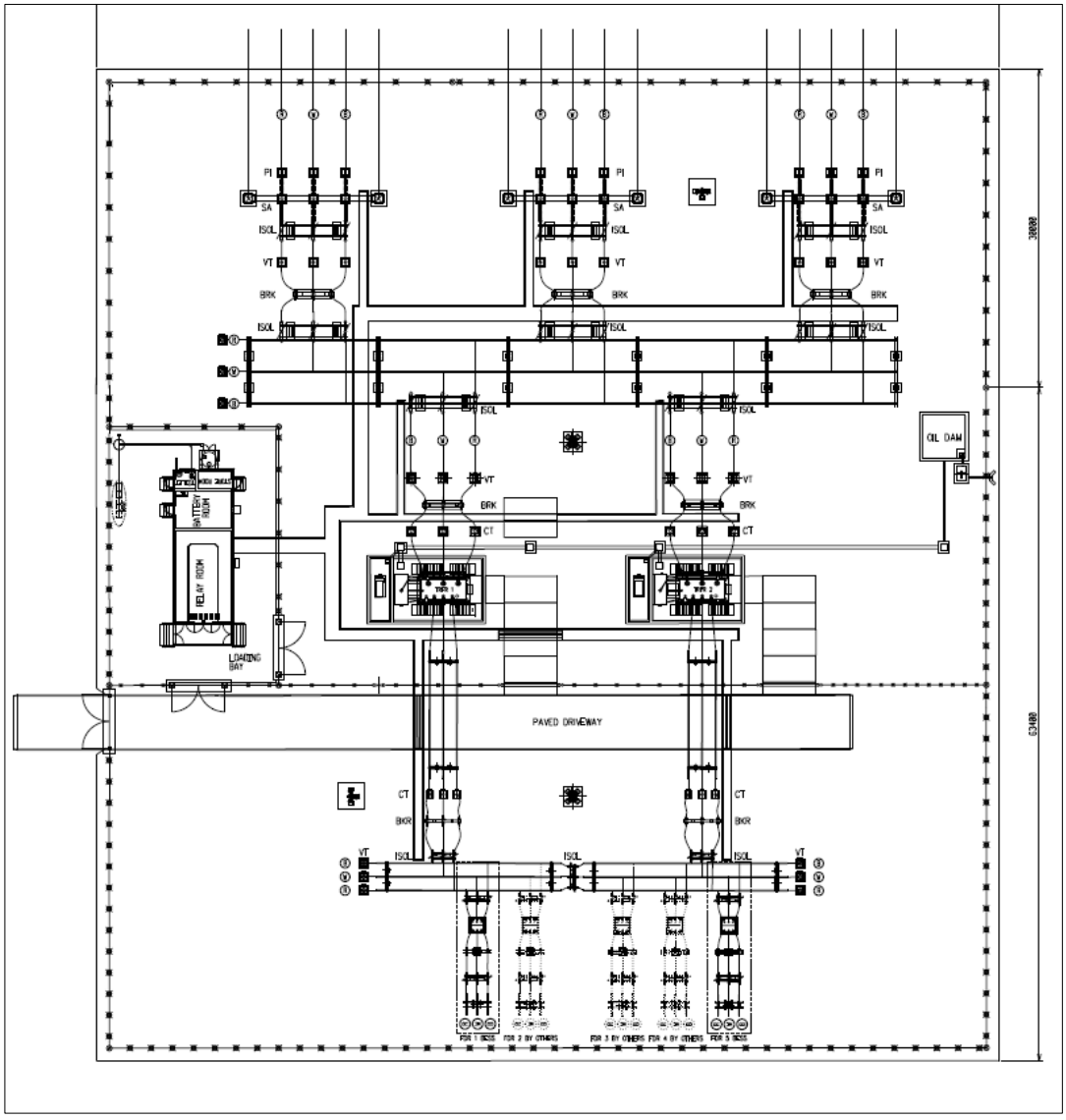



**Figure 4-3: Typical Substation Layout (illustrative only)**

**TRANSFORMERS**

Transformers are major items found in a transmission or distribution substation. There may be a number of different types of transformers in a substation such as power transformers, voltage transformers or current transformers.

A power transformer is a very simple device piece of electrical equipment where alternating current (AC) is led through a primary coil of wire, which produces an alternating magnetic field in the ring-shaped core of soft iron. This in turn creates a voltage in a secondary coil, from which the output current can be drawn. If the secondary coil has more turns than the primary coil, the output voltage is higher than the input voltage. This is a step-up transformer. A step-down transformer has more turns in the primary coil than in the secondary coil to reduce the voltage.

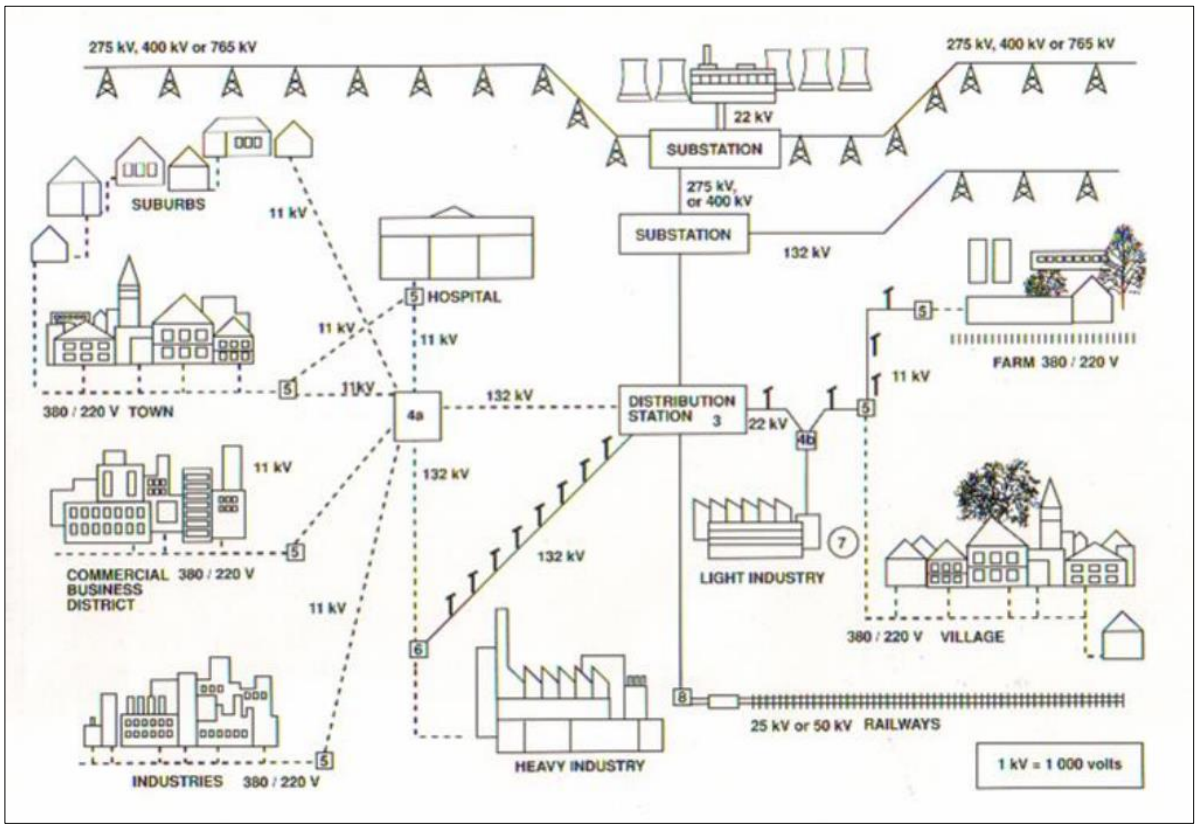



**Figure 4-4: Typical Distribution System**

# 4.3 PROPOSED PROJECT DEVELOPMENT ACTIVITIES

The typical steps involved in the construction and operation of a transmission line is summarised below:

- Planning Phase
  - Step 1: Surveying of the development area and negotiation with affected landowners; and
  - Step 2: Final design and micro-siting of the infrastructure based on geotechnical, topographical conditions and potential environmental sensitivities.
- Construction Phase
  - Step 3: Vegetation clearing and construction of access roads/tracks (where required);
  - Step 4: Construction of tower structure foundations;
  - Step 5: Assembly and erection of infrastructure on site;
  - Step 6: Stringing of conductors; and
  - Step 6: Rehabilitation of disturbed areas and protection of erosion sensitive areas.
- Operation Phase
  - Step 7: Continued maintenance during operation.

### 4.3.1 CONSTRUCTION PHASE

#### CONSTRUCTION SCHEDULE

Construction of the Overhead Powerline (OHPL) and associated infrastructure is anticipated to take 6-24 months.

#### SITE ESTABLISHMENT AND TRANSPORTATION OF MATERIALS AND EQUIPMENT TO SITE

The selected contractor will establish a temporary site camp including, but not be limited to, temporary offices, laydown areas for equipment and materials, storage facilities, ablutions, waste storage and handling area, and parking area. The location and extent of the Contractors camp, to be established within the Project, are undertaken as part of a different application and are not covered in the EMPr. It is anticipated that materials will be collected on a daily basis from the contractor laydown area for the construction activities along the servitude. This limits areas to be impacted for storage along the servitude as well as for security purposes when activities cease at the end of each day.

The required materials and equipment will be transported to the site via public roads and private farm roads/tracks along the proposed servitude, as far as possible. It is expected that the components will generally be transported to site with normal heavy load vehicles. Large mobile plant including mechanical/hydraulic augers, mobile cranes, bucket trucks/cherry pickers will be used during installation of the OHPL. Mobile plant required for the installation of the OHPL will be determined by the contractor.

#### LABOUR REQUIREMENTS

During site preparation and installation of Project related infrastructure the selected Contractor, working on behalf of Camden I SEF, is anticipated to require 20-30 people to undertake the required works. Approximately 5% of workers would be highly skilled, 15% medium skilled, and 80% low skilled, subject to a skills assessment and confirmation of staffing availability.

#### VEGETATION CLEARING

Due to the nature of the vegetation within the Project area, which is predominantly sparse, low shrubs and grasses, limited vegetation clearing will be required. Clearing of vegetation will be limited to pylon areas to facilitate installation of each pylon and that required for the substation and associated infrastructure footprints and clearing of roads where existing roads are not available. Clearing will be done in phases along the OHPL route as required prior to installation activities.

#### INSTALLATION OF OHPL

Standard OHPL installation methods will be employed, which entails the drilling of holes (typically 2 to 3m in depth), planting of monopoles (compaction only, no concrete casting) and stringing of the conductors. It is not envisaged that any large excavations and stabilized backfill will be required. However, this will be verified on site once the geotechnical assessment has been undertaken at each monopole position (part of construction works). A number of tower options could be utilised with a maximum height of up to 40m above ground level, which are reported to have a life expectancy of more than 25 years. The actual height of the pylons will vary based on the site topography to maintain the specified clearance of the transmission lines.

Once the pylons have been installed, the lines will be strung. The Contractor in collaboration with Eskom will be responsible for functional testing and commissioning of the OHPL. This consists of connecting the line from the common collector substation to the Camden MTS.

#### ONSITE SUBSTATION

A new onsite substation will be established within the extent of the authorized Camden I SEF. The Camden I SEF substation EA is undertaken as part of a different process; however, the Eskom Switching Substation is part of this application. The Eskom Switching Substation will be constructed on area of 5 ha. In addition, all works required to connect into the Camden I Common Collector Substation (i.e., terminating works) forms part of this application.

#### DEMOBILISATION

Upon completion of the installation phase, any temporary infrastructure will be removed, and the affected areas rehabilitated.

### 4.3.2 OPERATIONAL PHASE

Eskom will be responsible for managing the operations of the OHPL and associated infrastructure in line with their internal management systems. Eskom is considered to have the requisite expertise to operate and maintain the transmission line. Eskom will adhere to all existing Safety Codes and Guidelines for the operation and maintenance of the OHPL infrastructure.

During the operational phase there will be little to no project-related movement along the servitude as the only activities are limited to maintaining the servitude (including maintenance of access roads and cutting back or pruning of vegetation to ensure that vegetation does not affect the OHPL), inspection of the powerline and associated infrastructure and repairs when required. Limited impact is expected during operation since there will not be any intrusive work done outside of maintenance in the event that major damage occurs to site infrastructure.

Operation of the OHPL and associated infrastructure will involve the following activities, discussed below.

#### SERVITUDE MANAGEMENT AND ACCESS ROAD MAINTENANCE

Servitude and access road maintenance is aimed at eliminating hazards, ensuring safety standards are met and facilitating continued maintenance access to the OHPL. The objective is to prevent all forms of potential interruption of power supply due to overly tall vegetation/climbing plants or establishment of illegal structures within the right servitude. It is also to facilitate ease of access for maintenance activities on the transmission line. During the operational phase of the project, the servitude will be maintained to ensure that the OHPL functions optimally and does not compromise the safety of persons within the vicinity of the OHPL.

#### TRANSMISSION LINE MAINTENANCE AND OPERATIONS

Eskom will develop comprehensive planned and emergency programmes through its technical operations during the operation and maintenance phase for the OHPL. The maintenance activities will include:

- Eskom's Maintenance Team will carry out periodic physical examination of the OHPL and its safety, security and integrity.
- Defects that are identified will be reported for repair. Such defects may include defective conductors, flashed over insulators, defective dampers, vandalised components, amongst others.
- Maintenance / repairs will then be undertaken.

### 4.3.3 DECOMMISSIONING PHASE

Decommissioning will be considered when the OHPL is regarded obsolete and will be subject to a separate authorisation and impact assessment process. This is not expected to occur in the near future.

## 4.4 NEED AND DESIRABILITY OF THE PROJECT

The DEA&DP Guideline (2013) states that the essential aim of need and desirability is to determine the suitability (i.e. is the activity proposed in the right location for the suggested land-use/activity) and timing (i.e. is it the right time to develop a given activity) of the development. Therefore, need and desirability addresses whether the development is being proposed at the right time and in the right place. Similarly, the 'Best Practicable Environmental Option' (BPEO) as defined in NEMA is "*the option that provides the most benefit and causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term*."

The development of renewable energy and the associated energy infrastructure is strongly supported at a national, provincial, and local level. The development of, and investment in, renewable energy and associated energy distribution infrastructure is supported by the National Development Plan, New Growth Path Framework and National Infrastructure Plan, which all highlight the importance of energy security and investment in energy infrastructure. The

development of the proposed power line is therefore supported by key policy and planning documents and is in line with South Africa's strategic energy planning context (Refer to **Section 2)**.

The energy security benefits associated with the proposed Camden I SEF is dependent upon it being able to connect to the national grid via the establishment of grid connection infrastructure. The proposed OHPL is therefore essential supporting infrastructure to the solar energy facility development, which, once developed, will generate power from renewable energy resources.

The land on which the OHPL will be constructed is located within the extent of the Camden I SEF site and the proposed Camden common collector substation. No physical or economic displacement will be required along the proposed route.

Furthermore, negative environmental impacts associated with the activity will be mitigated to acceptable levels in accordance with the EMPr (**Appendix G**). Refer to **Section 7** below for the Environmental Impact Assessment and recommended mitigation measures.

# 5 PROJECT ALTERNATIVES

In terms of the EIA Regulations, feasible alternatives are required to be considered. All identified, feasible alternatives are required to be evaluated in terms of social, biophysical, economic, and technical factors. A key challenge of the BA Process is the consideration of alternatives. Most guidelines use terms such as 'reasonable', 'practicable', 'feasible' or 'viable' to define the range of alternatives that should be considered.

Effectively there are two types of alternatives:

- Incrementally different (modifications) alternatives to the project; and
- Fundamentally (totally) different alternatives to the project.

**"Alternatives",** in relation to a proposed activity, means different ways of meeting the general purpose and requirements of the activity, which may include alternatives to –

a) the property on which or location where it is proposed to undertake the activity;
b) the type of activity to be undertaken;
c) the design or layout of the activity;
d) the technology to be used in the activity;
e) the operational aspects of the activity; and
f) the option of not implementing the activity (i.e. no-go).

The relevant alternatives to the proposed Project are discussed below.

## 5.1 ACTIVITY ALTERNATIVE

Four (4) route alternatives have been assessed for the transmission lines and two (2) structural alternatives have been assessed (i.e., on site substation alternatives). Alternative activities for the current Project are not reasonable or feasible as the purpose of this project is to transmit electrical energy generated by the proposed Camden I SEF to the Camden collector substation for distribution via the national electrical grid network.

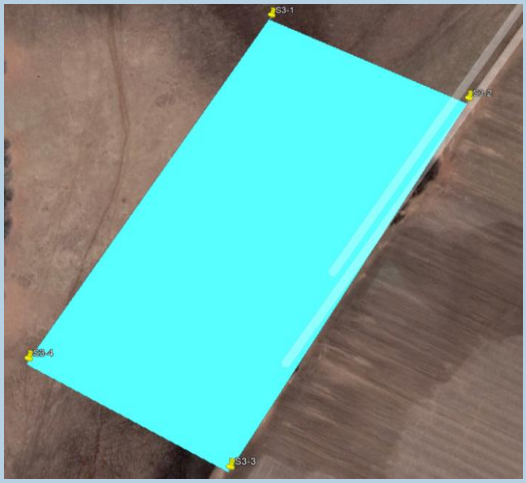
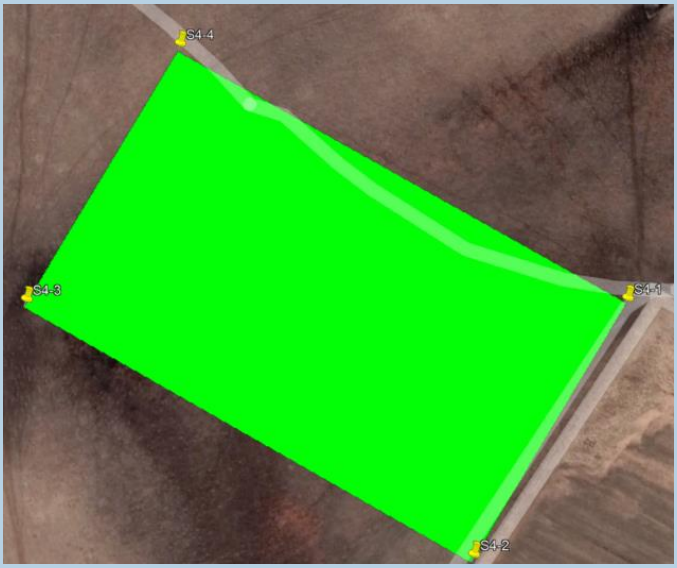
## 5.2 LOCATION ALTERNATIVES

The purpose of the OHPL is to connect the Proposed Camden I SEF to the national grid. Therefore, the OHPL is required to be located between the grid on-site IPP substation for the solar facility and that of the Camden Collector substation. No alternative location for the proposed Project is deemed viable.

*It must be noted that the preferred options outlined below are linked to the approved 400kV collector substation (DFFE Ref: 14/12/16/3/3/2/2134) as well as the approved Camden I SEF IPP Substation (DFFE Ref: 14/12/16/3/3/2/2136).*

**Table 5-1: Substation Alternative co-ordinates**

| POINT | LATITUDE | LONGITUDE |
|---|---|---|
| **Alternative 1: Grid operator Collector and Switching Substation** | | |
|  | | |
| **S1-1** | 26°40'36.82"S | 30° 2'26.07"E |
| **S1-2** | 26°40'39.57"S | 30° 2'19.87"E |
| **S1-3** | 26°40'27.62"S | 30° 2'23.60"E |
| **S1-4** | 26°40'29.07"S | 30° 2'29.60"E |
| **Alternative 2 – Preferred: Grid operator Collector & Switching Substation** | | |
|  | | |
| **S2-1** | 26°38'47.65"S | 30° 4'14.23"E |
| **S2-2** | 26°38'57.66"S | 30° 4'3.07"E |
| **S2-3** | 26°38'54.03"S | 30° 3'59.66"E |
| **S2-4** | 26°38'44.10"S | 30° 4'10.51"E |
| **Alternative 1: Grid Substation & BESS** | | |

| POINT | LATITUDE | LONGITUDE |
|---|---|---|
|  | | |
| **S3-1** | 26°39'39.20"S | 30° 4'23.08"E |
| **S3-2** | 26°39'41.33"S | 30° 4'28.76"E |
| **S3-3** | 26°39'50.91"S | 30° 4'23.44"E |
| **S3-4** | 26°39'48.61"S | 30° 4'17.98"E |
| **Alternative 2- Preferred: Grid Substation & BESS** | | |
|  | | |
| **S4-1** | 26°39'35.64"S | 30° 4'31.79"E |
| **S4-2** | 26°39'40.82"S | 30° 4'28.93"E |
| **S4-3** | 26°39'36.55"S | 30° 4'18.57"E |
| **S4-4** | 26°39'31.19"S | 30° 4'21.27"E |

## 5.3 LAYOUT ALTERNATIVES

As mentioned before, four (4) alternatives have been developed for the proposed project, the alternatives are discussed below:

*It must be noted that the preferred options outlined below are linked to the approved 400kV collector substation (DFFE Ref: 14/12/16/3/3/2/2134) as well as the approved Camden I SEF IPP Substation (DFFE Ref: 14/12/16/3/3/2/2136).*

### 5.3.1 ALTERNATIVE 1

Alternative 1 transmission line will be constructed from the Camden I SEF alternative 1 substation through an OHPL 132 kV transmission line in a northly direction into the Alternative 2 (Preferred) common collector substation which is situated approximately 1.7 km north of the Camden I SEF Alternative 1 substation. Alternative 1, up to 132kV transmission line is approximately 1.8 km in length. The powerline will be constructed parallel to a regional dirt road that runs through the study area. This route will be constructed on an area that is largely grassland as shown in **Figure 5-1**. The centre point of Camden I SEF up to 132kV grid connection transmission line Alternative 1 transmission line route is located at 26°39'16.61"S, 30° 4'7.54"E. **Figure 4-1, Figure 5-1** and **Table 5-2** below provides the transmission line route as well as bend points coordinates.

**Table 5-2: Alternative 1 route coordinates**

| LABEL | LATITUDE | LONGITUDE |
|---|---|---|
| **E** | 30° 4' 21.948" E | 26° 39' 43.406" S |
| **C** | 30° 4' 12.662" E | 26° 39' 31.664" S |
| **D** | 30° 4' 0.172" E | 26° 38' 54.853" S |
| **I** | 30° 4'1.87" E | 26°38'51.28" S |

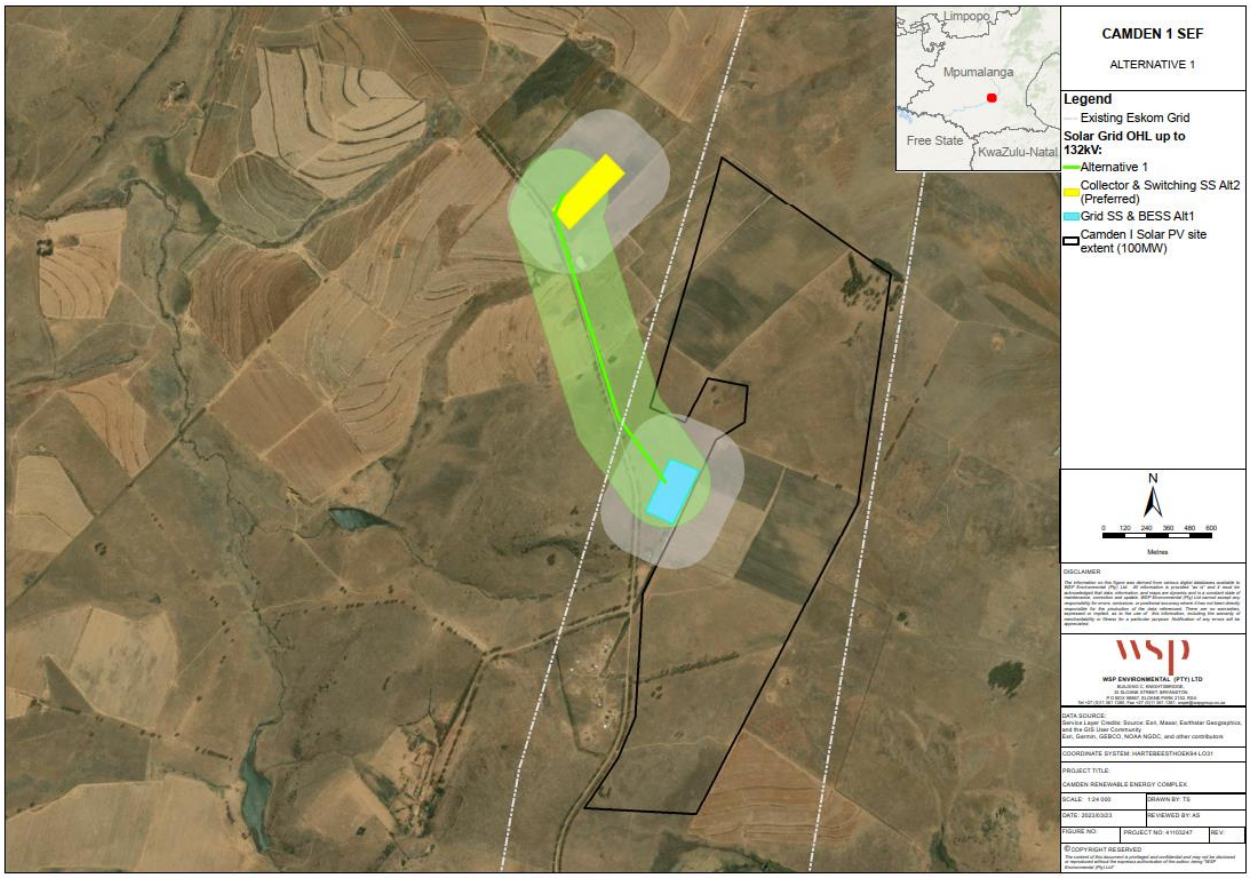



**Figure 5-1: Alternative 1 grid assessment corridor for the project indicated in green**

## *5.3.2 ALTERNATIVE 2 (PREFERRED OPTION)*

Alternative 2 (Preferred option) transmission line runs from the Camden I SEF Alternative 2 substation (preferred substation) through an overhead 132kV powerline in a northly direction into the preferred option of the common collector substation. The transmission line will be approximately 2.1 km in length and will run parallel to a regional dirt road that runs through the study area. The centre point of Camden I SEF up to 132kV grid connection transmission line Alternative 2 transmission line route is located at 26°39'16.61"S, 30° 4'7.62"E. **Figure 4-1, Figure 5-2** and **Table 5-3** below provides the powerline route as well as bend points coordinates.

**Table 5-3: Alternative 2 (Preferred) Transmission route coordinates**

| LABEL | LATITUDE | LONGITUDE |
|---|---|---|
| **A** | 30° 4' 26.327" E | 26° 39' 35.847" S |
| **B** | 30° 4' 23.029" E | 26° 39' 34.298" S |
| **C** | 30° 4' 12.662" E | 26° 39' 31.664" S |
| **D** | 30° 4' 0.172" E | 26° 38' 54.853" S |
| **I** | 30° 4'1.87" E | 26°38'51.28" S |

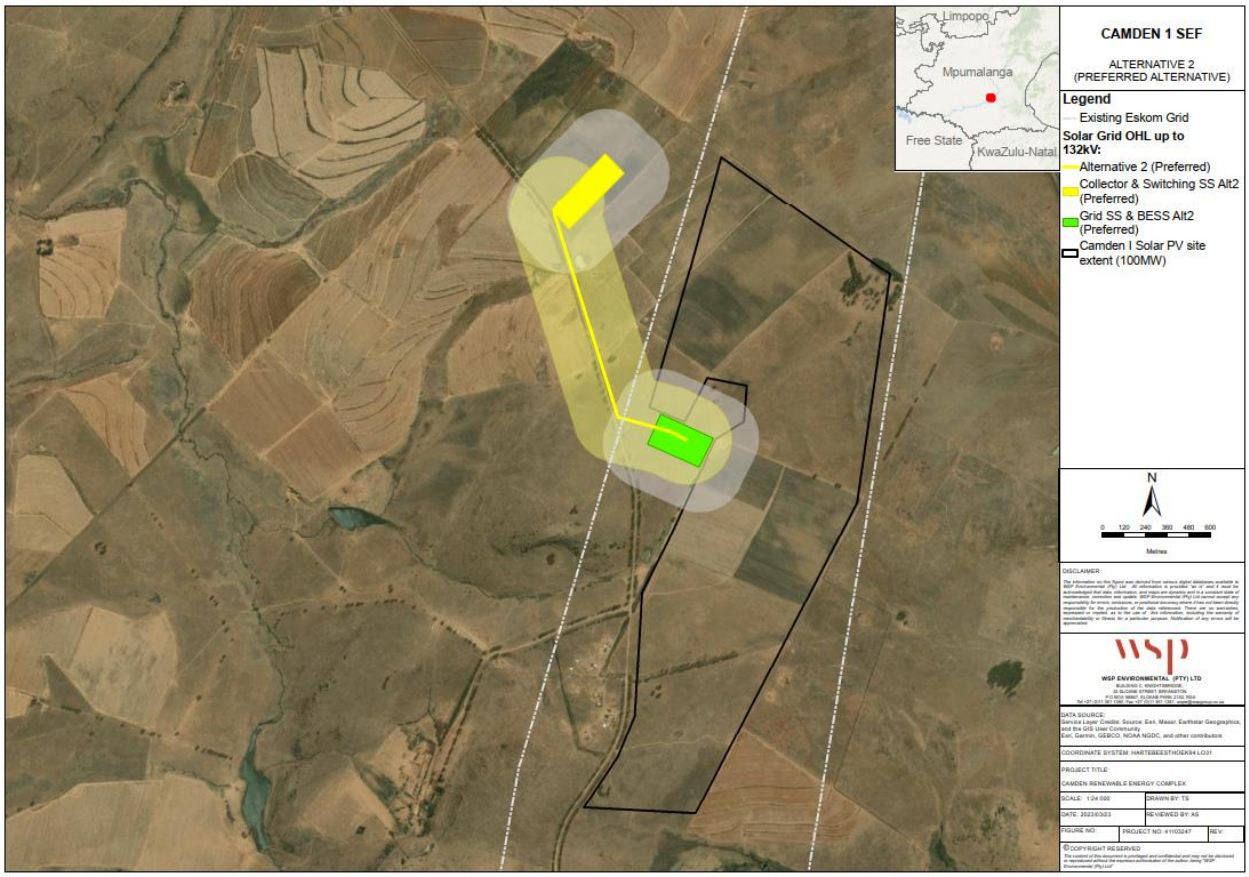



**Figure 5-2: Alternative 2 (preferred alternative) grid assessment corridor for the project indicated in yellow**

## 5.3.3 ALTERNATIVE 3

Alternative 3 transmission line will be constructed from the Camden I SEF Alternative 2 (Preferred) substation through an overhead 132kV transmission line to the Alternative 1 common collector substation. The transmission route will cross two tributaries of the Vaal River and secondary roads and two farm roads see **Figure 5-3**.

The centre point of Camden I SEF alternative 3 powerline route is located at 26°39'57.15"S, 30° 3'22.97"E. **Figure 4-1**, **Figure 5-3** and **Table 5-4** illustrates the co-ordinates of all the bend points along the proposed powerline route.

**Table 5-4: Alternative 3 route coordinates**

| LABEL | LATITUDE | LONGITUDE |
|---|---|---|
| **A** | 30° 4' 26.327" E | 26° 39' 35.847" S |
| **B** | 30° 4' 23.029" E | 26° 39' 34.298" S |
| **C** | 30° 4' 12.662" E | 26° 39' 31.664" S |
| **F** | 30° 4' 1.282" E | 26° 39' 37.570" S |
| **G** | 30° 2' 57.127" E | 26° 40' 9.248" S |
| **H** | 30° 2' 41.308" E | 26° 40' 29.992" S |
| **J** | 30° 2' 27.51" E | 26° 40' 29.37" S |

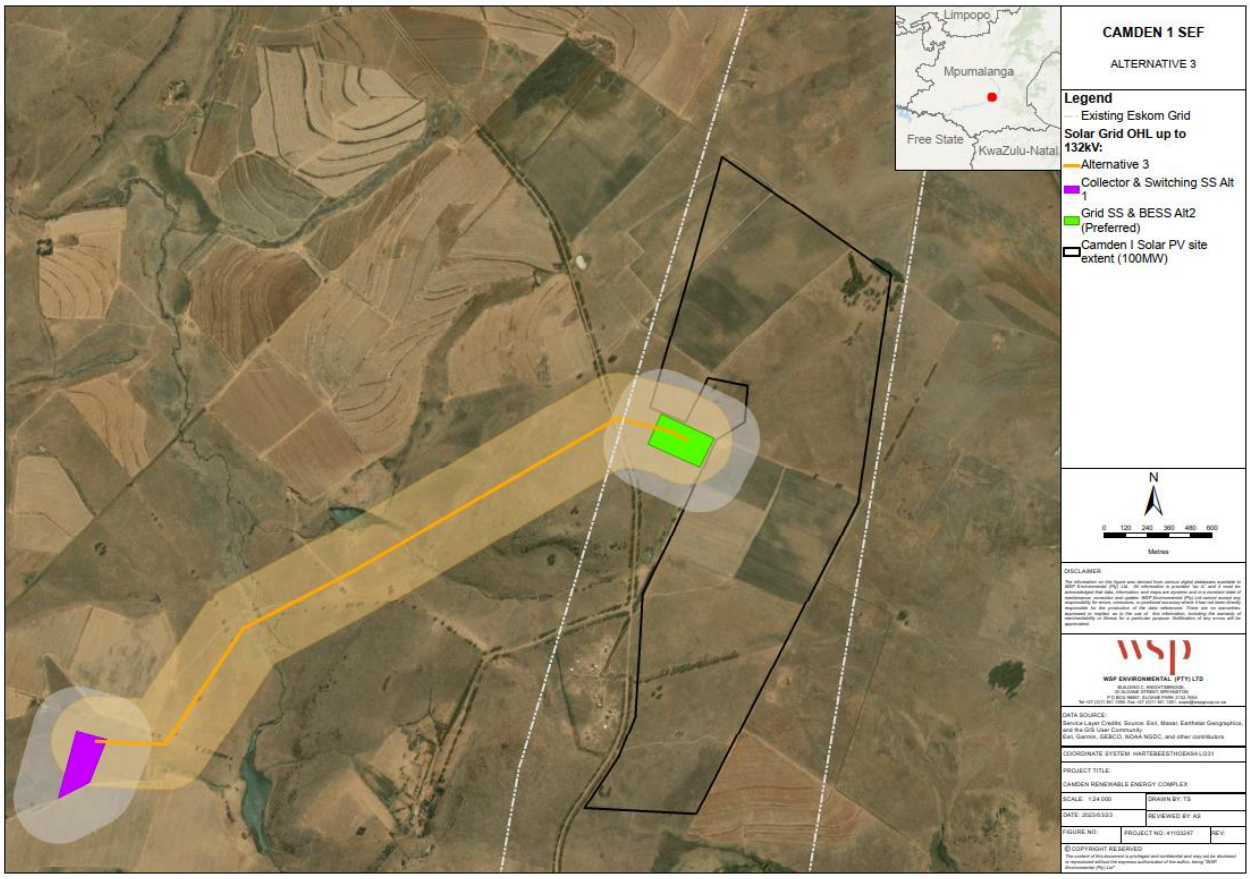



**Figure 5-3: Alternative 3 grid assessment corridor for the project indicated in orange**

### *5.3.4 ALTERNATIVE 4*

Alternative 4 transmission line will run from the Camden I SEF Alternative 1 substation through a 132kV OHPL to the Alternative 1 common collector substation. The transmission route will cross two tributaries of the Vaal River and secondary roads and two farm roads see **Figure 5-4.** The centre point of Camden I SEF alternative 4 powerline route is located at 26°39'57.13"S, 30° 3'22.98"E. **Figure 4-1**, **Figure 5-4** and **Table 5-5** illustrates the co-ordinates of all the bend points along the proposed powerline route.

**Table 5-5: Alternative 4 route coordinates**

| LABEL | LATITUDE | LONGITUDE |
|---|---|---|
| **E** | 30° 4' 21.948" E | 26° 39' 43.406" S |
| **F** | 30° 4' 1.282" E | 26° 39' 37.570" S |
| **G** | 30° 2' 57.127" E | 26° 40' 9.248" S |
| **H** | 30° 2' 41.308" E | 26° 40' 29.992" S |
| **J** | 30° 2' 27.51" E | 26° 40' 29.37" S |

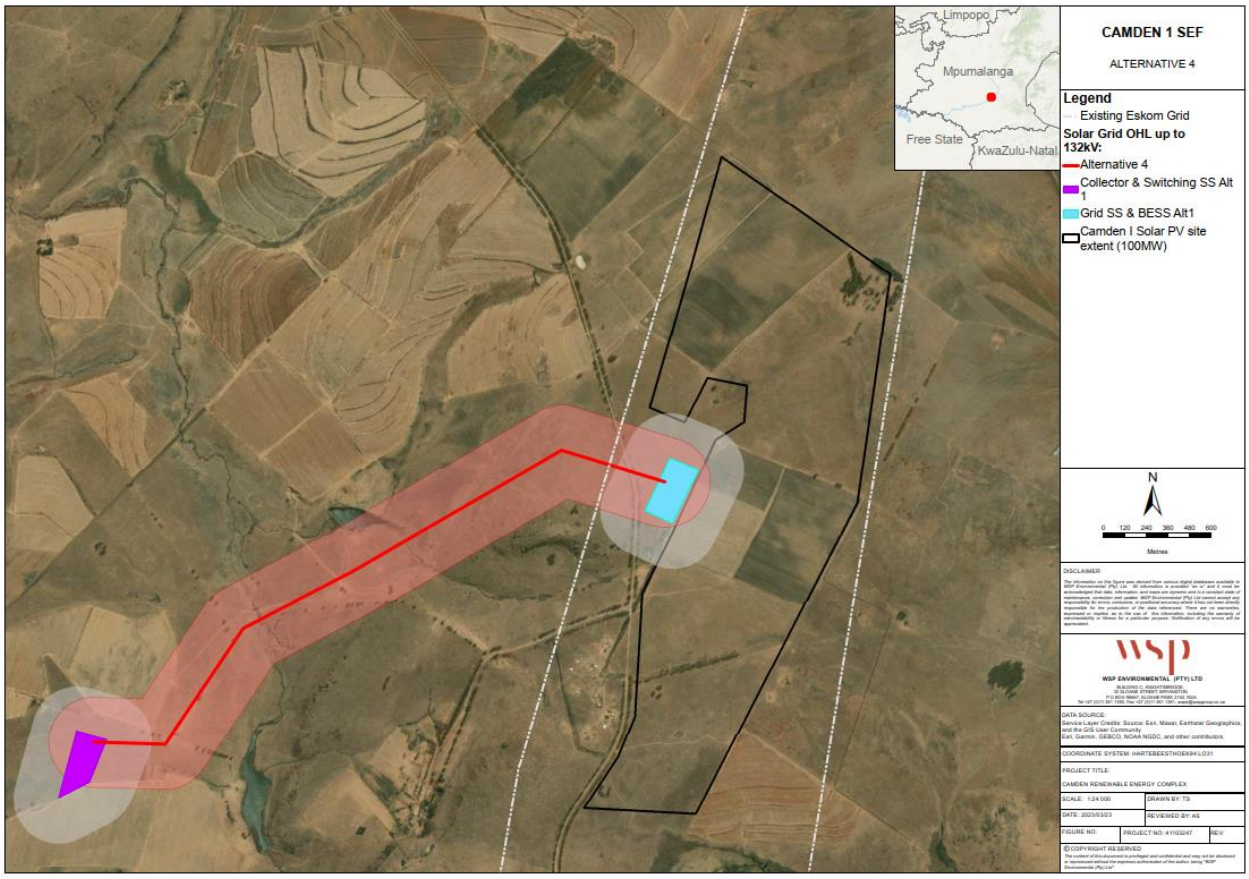



**Figure 5-4: Alternative 4 grid assessment corridor for the project indicated in red**

**Table 5-6: OHPL Routes Alternative Aspects.**

| ASPECT | ALTERNATIVE 1 | ALTERNATIVE 2 (PREFERRED OPTION) | ALTERNATIVE 3 | ALTERNATIVE 4 |
|---|---|---|---|---|
| Length | 1.8 km | 2.1km | 3.93km | 3.087km |
| Starting point | 26°39'43.41"S<br>30° 4'21.95"E | 26°39'35.85"S<br>30° 4'26.33"E | 26°40'29.38"S<br>30° 2'27.54"E | 26°40'29.38"S<br>30° 2'27.55"E |
| Centre point | 26°39'16.61"S<br>30° 4'7.54"E | 26°39'16.61"S<br>30° 4'7.62"E | 26°39'57.15"S<br>30° 3'22.97"E | |
| End point | 26°38'51.28"S<br>30° 4'1.87"E | 26°38'52.67"S<br>30° 4'1.21"E | 26°39'35.84"S,<br>30° 4'26.32"E | 30° 4' 21.948" E<br>26° 39' 43.406" S |
| Number of bend points | 2 | 3 | 4 | 3 |
| Number of road crossings | 1 | 1 | 4 | 4 |
| Number of water crossing | 0 | 0 | 2 | 2 |

| ASPECT | ALTERNATIVE 1 | ALTERNATIVE 2 (PREFERRED OPTION) | ALTERNATIVE 3 | ALTERNATIVE 4 |
|---|---|---|---|---|
| General | Majority of the Land use is grass land (used for livestock grazing) with some cultivations to the common collector substation. The route runs along a farm road, this route will result to clearing of trees running along the farm road | Majority of the Land use is grass land (used for livestock grazing) with some cultivations to the common collector substation. The route runs along a farm road, this route will result to clearing of trees running along the farm road. | The Land use where this route is planned is largely cultivated land and a few wetland areas. This route will result in closing two tributaries of the Vaal River and crossing of farm roads in three points. | The Land use where this route is planned is largely cultivated land and a few wetland areas. This route will result in closing two tributaries of the Vaal River and crossing of farm roads in three points. |
| Farm portions | The proposed powerline route will be developed within Portion 1 of the Farm Welgelegen 322. | The proposed powerline route will be developed within Portion 1 of the Farm Welgelegen 322. | The proposed powerline route will cross the Remaining Extent and Portion 1 and 2 of the Farm Welgelegen 322. | The proposed powerline route will cross the Remaining Extent and Portion 1 and 2 of the Farm Welgelegen 322. |

## 5.4 TECHNOLOGY ALTERNATIVES

There are two (2) methods of power transmission, these being overhead lines and underground cables. Underground cables are considerably more difficult and expensive to install and maintain, relative to overhead lines. Considering the proposed terrain of the proposed OHPL, which traverses several watercourses including the tributaries of the Vaal River, underground cables would require extensive trenching which would result in greater environmental impacts. Underground distribution lines are therefore not considered feasible for the proposed Project.

Therefore, only one (1) technology has been assessed, namely distribution of electricity via a 132 kV OHPL as this is considered the most appropriate technology and is in line with Eskom design requirements.

### *5.4.1 MONOPOLE-TYPE PYLONS*

The type of pylon to be used depends on the topography and the alignment of the powerline corridors. In general, monopole-type pylons are used for transmission lines with shorter spans.

#### 132KV INTERMEDIATE SELF-SUPPORTING DOUBLE CIRCUIT MONOPOLE (PREFERRED)

Self-supporting galvanised steel Monopole Intermediate or Suspension structure with no stays/anchors. The monopole is designed to support a double electrical circuit with a twin conductor arrangement. The monopole height varies between 26m and 32m.

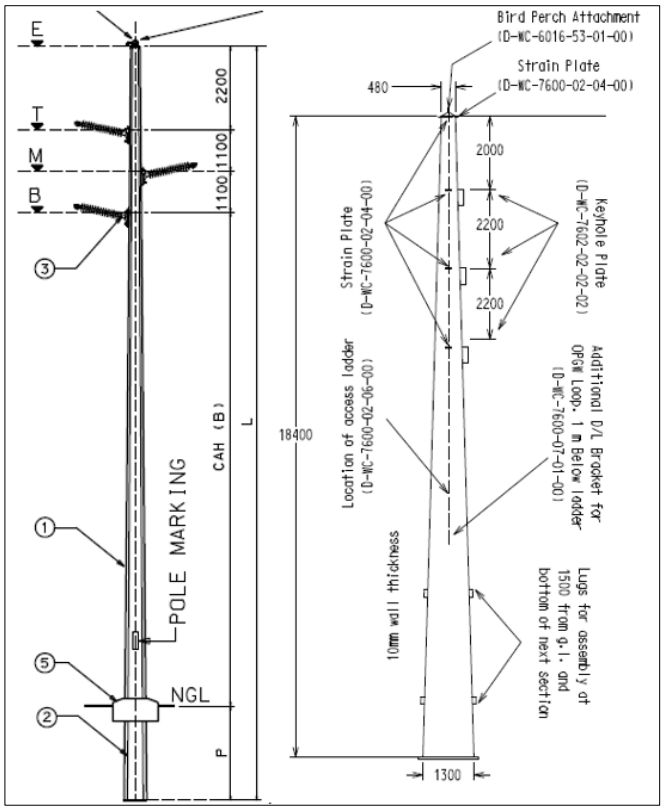



**Figure 5-5: 132kV intermediate self-supporting double circuit monopole**

## 132KV INLINE OR ANGLE STRAIN SELF-SUPPORTING DOUBLE CIRCUIT MONOPOLE

Self-supporting galvanised steel Monopole inline or Angle Strain structure with no stays/anchors. The monopole is designed to support a double electrical circuit with a twin conductor arrangement. This structure will be used as the strain structure and will be positioned at the angle points along the line or as an inline position where a strain point is required due to the ground elevation. The monopole height varies between 26m and 32m.

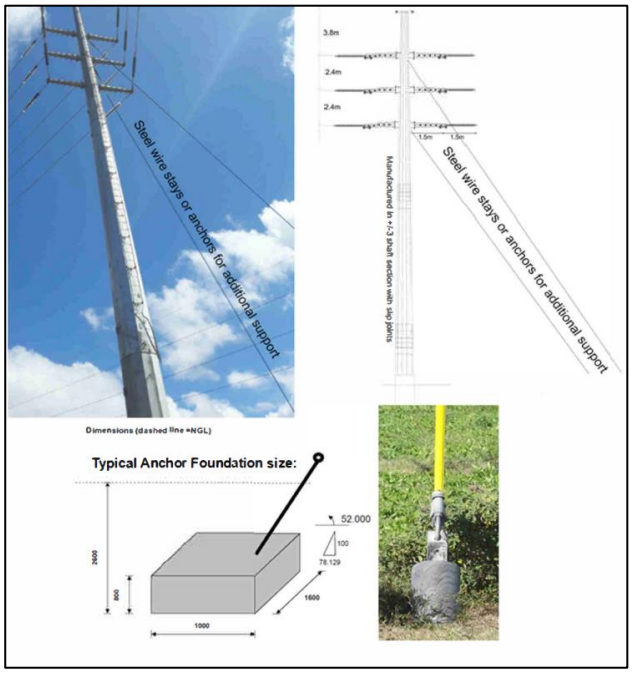



**Figure 5-6: 132kV inline or angle strain self-supporting double circuit monopole**

### 132KV SUSPENSION SELF-SUPPORTING SINGLE CIRCUIT MONOPOLE WITH SINGLE CONDUCTOR

Self-supporting galvanised steel Monopole Suspension structure with no stays/anchors. The monopole is designed to support a single electrical circuit with a single conductor arrangement. The monopole height varies between 22m and 26m.

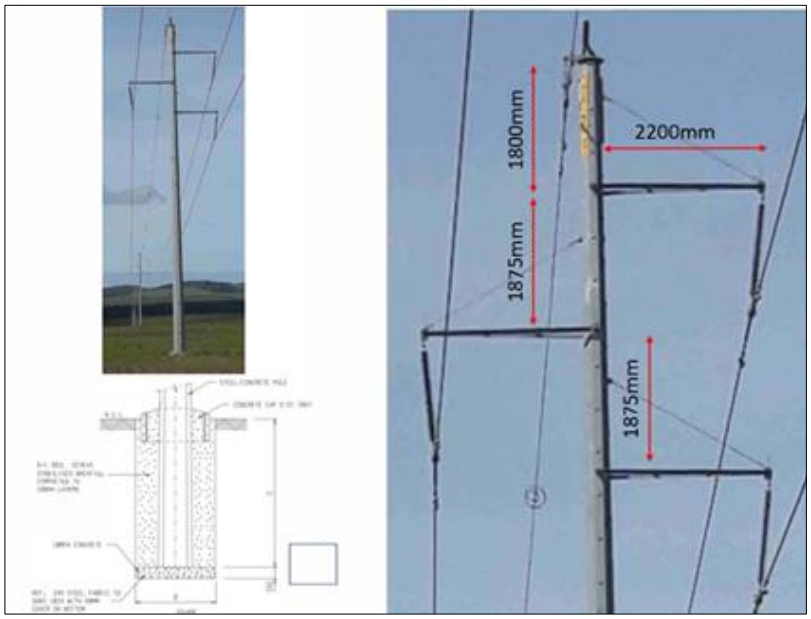



**Figure 5-7: 132kV suspension self-supporting single circuit monopole with single conductor**

### 132KV INLINE OR ANGLE STRAIN SELF-SUPPORTING SINGLE CIRCUIT MONOPOLE WITH SINGLE CONDUCTOR

Self-supporting galvanised steel Monopole Inline or Angle Strain structure with no stays/anchors. The monopole is designed to support a single electrical circuit with a single conductor arrangement. The monopole height varies between 24m and 26m. The foundation will consist of a typical pad foundation with bolts inside the concrete foundation.

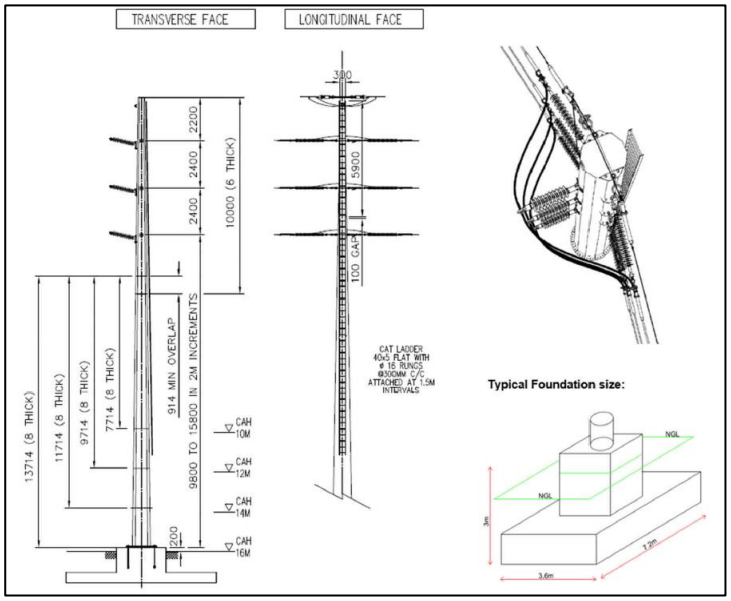



**Figure 5-8: 132kV inline or angle strain self-supporting single circuit monopole with single conductor**

## 5.4.2 STEEL LATTICE TOWERS

Steel lattice-type pylons are typically used where long spans (>500m) across valleys and rivers are required, however may be employed elsewhere depending on terrain specific requirements as informed by detailed design.

### 132KV/275KV POWERLINE DOUBLE CIRCUIT SUSPENSION TOWERS

Consist of a steel framework of individual structural components that are bolted or welded together. Can be designed to carry either one or two electrical circuits, referred to as single-circuit and double-circuit structures. The lattice pylons height varies between 25m and 40m.

**Figure 5-9: 132kV/275kV powerline double circuit suspension towers**

### FOUNDATION

The type of foundation required for each pylon is dependent on the geo-technical conditions. Foundations may be drilled, mechanically excavated, or dug by hand. All foundations are backfilled and stabilised through compaction and capped with concrete at ground level. Below are two examples of monopole foundations for different soil conditions.

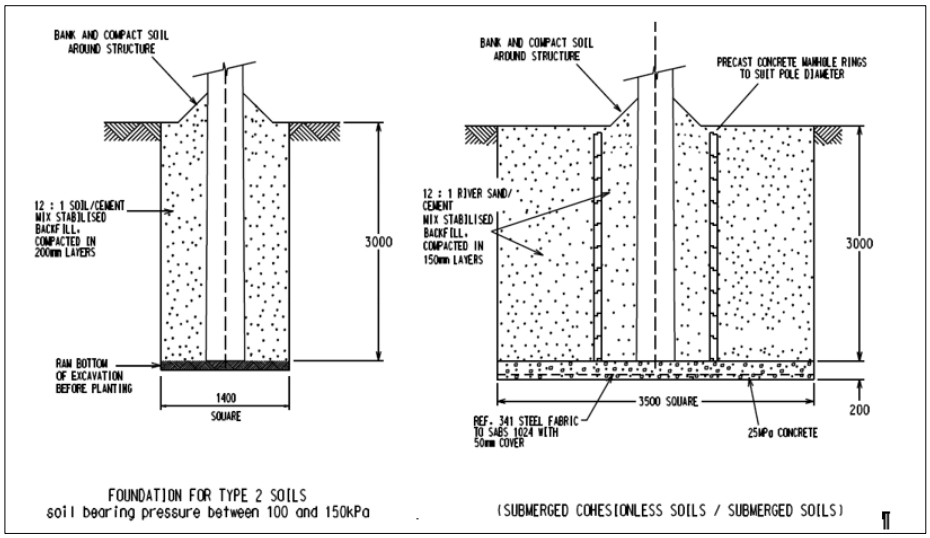



**Figure 5-10: type of foundation required for each pylon**

## 5.5 OPERATIONAL ACTIVITIES

Eskom will be responsible for the operation of the OHPL and the up to 132kV portion of the onsite substation once it has been constructed and commissioned. Eskom will be responsible to implement the operational EMPr along with mitigations proposed as a result of this BAR. For this reason, no further consideration has been given to operational alternatives.

## 5.6 NO-GO ALTERNATIVE

The no-go option will mean the status quo remains. Both the potential positive and negative impacts from the proposed OHPL will not occur. In addition, the associated up to 100MW of Solar PV facility will be unable to connect to the national grid and therefore the production of this facility will not be available to the nation.

The no-go option would represent a lost opportunity for South Africa to improve energy security and supplement its current energy needs with renewable energy given that energy security benefits associated with the proposed Camden Renewable Complex are dependent upon it being able to connect to the national grid via the establishment of grid connection infrastructure. Considering South Africa's current energy security challenges and its position as one of the highest per capita producers of carbon emissions in the world, this would represent a significant socio-economic cost. Accordingly, the no-go option is not deemed viable.

# 6 BASELINE ENVIRONMENT

The following chapter presents an overview of the biophysical and socio-economic environment in which the proposed Project is located. It is important to gain an understanding of the Project area and its surroundings, as it will provide for a better understanding of the receiving environment in which the Project is being considered.

The description of the baseline environment is essential in that it represents the conditions of the environment before the construction of the proposed Project (i.e., the current, or status quo, environment) against which environmental impacts of the proposed Project can be assessed and future changes monitored.

The area has previously been studied to some extent and is recorded in various sources. Consequently, some components of the baseline have been generated based on literature review. However, where appropriate, baseline information has been supplemented or generated by specialists appointed to undertake baseline and impact assessments for the proposed Project.

The following characteristics of the receiving environment for the proposed Project area are described in **Table 6-1** below.

**Table 6-1: Characteristics of the receiving environment**

| RECEIVING ENVIRONMENT | CHARACTERISTICS |
|---|---|
| **Terrestrial Biophysical** | – Climate<br>– Air Quality<br>– Noise<br>– Topography<br>– Agriculture<br>– Geology<br>– Geotechnical<br>– Surface Water<br>– Vegetation<br>– Fauna<br>– Avifauna<br>– Protected Areas<br>– Ecological Processes and Corridors<br>– Habitat<br>– Present Ecological State |
| **Social and Economic** | – Land use<br>– Heritage<br>– Palaeontology<br>– Landscape and Visual<br>– Socio-Economic |

## 6.1 PHYSICAL ENVIRONMENT

### *6.1.1 CLIMATE AND METEOROLOGY*

#### LOCAL METEOROLOGY OVERVIEW

According to the Köppen-Geiger Classification, the Camden/Ermelo area is classified as having a temperate climate with summer rainfall and dry winters. Meteorological variables, including hourly temperature, rainfall, humidity, wind

speed and wind direction, were sourced for the South African Weather Service (SAWS) Ermelo ambient air quality monitoring (AAQM) station as well as Eskom's ambient air quality monitoring station (AQMS)[7] located ~6 km to the northeast. The datasets were analysed for the period January 2018 – December 2020 (i.e., three calendar years as required by the Regulations Regarding Air Dispersion Modelling[8], hereafter referred to as 'the Modelling Regulations'). The Ermelo AAQM station is located approximately 20 km to the northwest of the project site. Station details and data recovery information for the assessed period is given in **Table 6-2.**

**Table 6-2: Details of the Ermelo AAQMI station**

| Station Name | Latitude (ºS) | Longitude (ºE) | Altitude (m) | Data Recovery | | |
|---|---|---|---|---|---|---|
| | | | | Temperature | Rainfall | Wind |
| Ermelo | -26.497000° | 29.983000° | 1752 | 97% | 98% | 98% |
| Camden | -26.622600° | 30.106000° | 1646 | 97% | 97% | 96% |

## TEMPERATURE AND RAINFALL

**Figure 6-1** and **Figure 6-2** presents average monthly temperature, rainfall and humidity as recorded at the Ermelo and Camden stations respectively. Both stations exhibit seasonal trends typical for the eastern half of South Africa (i.e., higher rainfall occurs during the hot summer months, with drier conditions during the cooler winter months). Higher rainfall occurs during the warmer summer months (December, January and February), with drier conditions during cooler winter months (June, July and August). Summer temperatures for Ermelo average at 17.8°C and 18.7°C for Camden. While winter temperatures average at 10.8°C for Ermelo and at 9.4°C for Camden. The average annual rainfall received by Ermelo is 602 mm and 641 mm of Camden (**Table 6-3**).

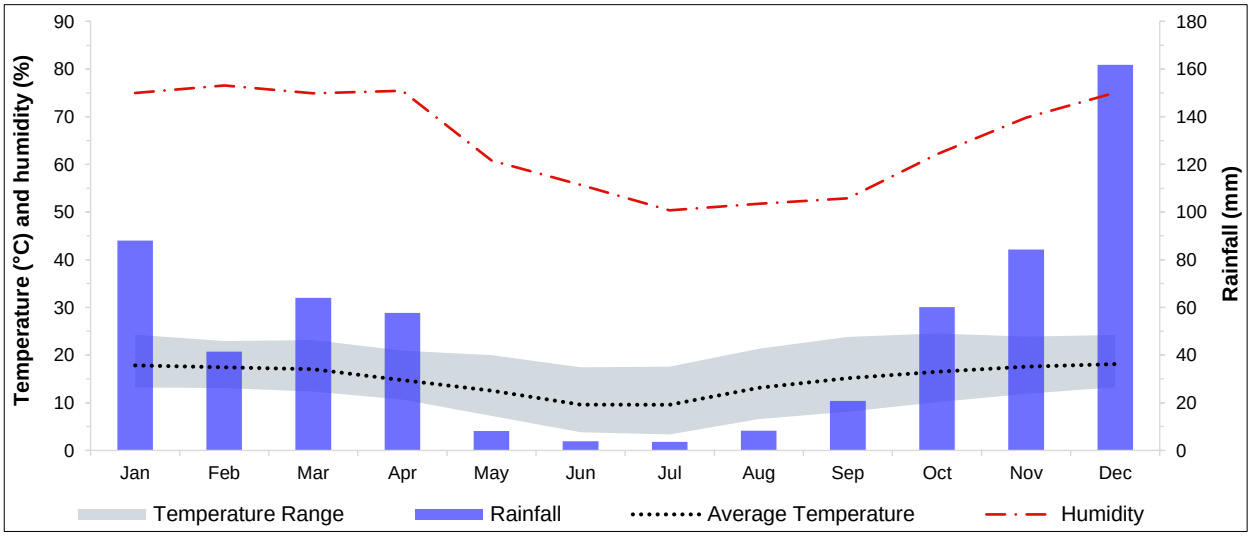



**Figure 6-1: Meteorological summary for Ermelo (January 2018 - December 2020)**

[7] This station's main function is the measurement of ambient air pollution, however, the station also measures an array of meteorological parameters. The nearest standalone SAWS meteorological station is Witbank (over 50 km to the north-northwest of the development site) and thus not representative of site conditions.

[8] Department of Environmental Affairs (2014): Regulations Regarding Air Dispersion Modelling (No. R. 533), Government Gazette, 11 July 2014, (No. 37804).

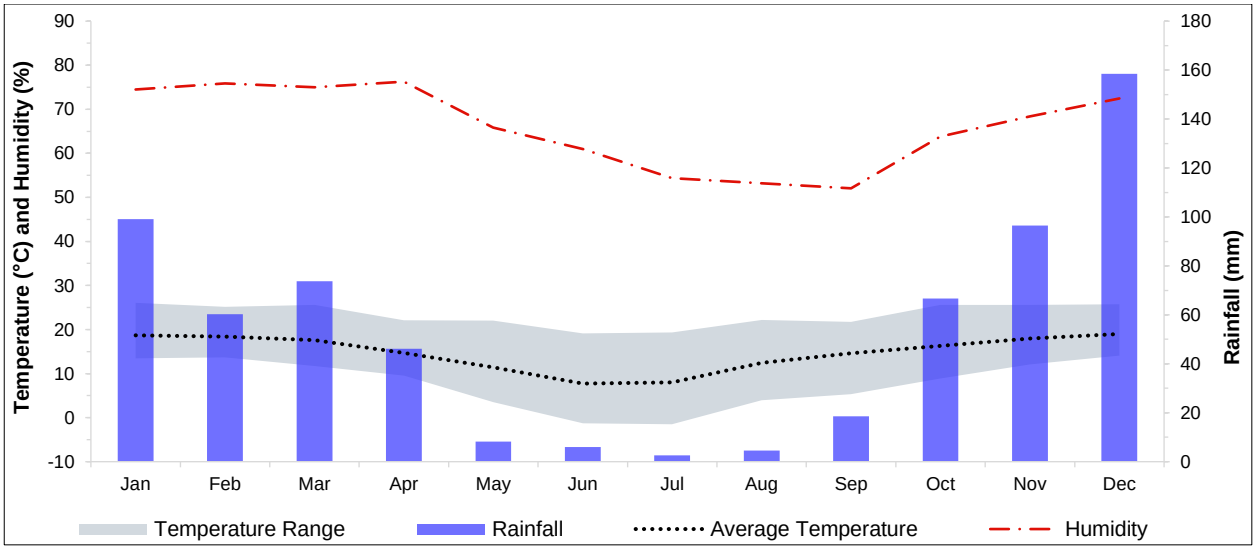



**Figure 6-2: Meteorological summary for Camden (January 2018 - December 2020)**

**Table 6-3: Average meteorology**

| Station name | Summer Average (December, January and February) | | Winter Average (June, July and August) | | Annual Average Rainfall |
|---|---|---|---|---|---|
| | Temperature | Humidity | Temperature | Humidity | |
| Ermelo | 17.8 °C | 76 % | 10.8 °C | 53 % | 602 mm |
| Camden | 18.7 °C | 74 % | 9.4 °C | 56 % | 641 mm |

## WIND

Wind roses summarize wind speed and directional frequency at a location. Calm conditions are defined as wind speeds less than 1.0 m/s (i.e., based on the typical sensitivity of the wind sensor installed at SAWS stations). Each directional branch on a wind rose represents wind originating from that direction. Each directional branch is divided into segments of colour, each representative of different wind speeds.

Typical wind fields are analysed for the full period (January 2018 – December 2020); diurnally for early morning (00h00–06h00), morning (06h00–12h00), afternoon (12h00–18h00) and evening (18h00–00h00); and seasonally for summer (December, January and February), autumn (March, April and May), winter (June, July and August) and Spring (September, October and November). Typical wind fields have been analysed using Lakes Environmental Plot Freeware (Version 7.0.0).

Wind roses for Ermelo are presented in **Figure 6-3**.

- Calm conditions (wind speeds <1.0 m/s) occurred 1.40% of the time;
- Moderate to strong easterlies and east-southeasterlies prevailed in the region;
- Peak (14 m/s) wind speeds occurred from the north-northwest;
- Winds from the east-northeast and north prevailed during the early morning (00h00 – 06h00);
- Easterly winds with components from the north-westerly quadrant prevailed during the morning (06h00 – 12h00);
- Winds from the west, west-northwest, northwest, east-southeast and east prevailed in the afternoon (12h00 – 18h00). Diurnal peak (12.9 m/s) wind speeds occurred during the afternoon;
- Easterlies prevail during the night (18h00 – 00h00);
- Winds from the east prevailed during the spring, summer and autumn months;

- Westerlies and north-north westerlies prevail during winter with higher directional variability noted for this period; and
- Highest average wind speeds of 4.9 m/s were observed during the spring months, with peak seasonal wind speeds of 12.9 m/s observed during winter.

Wind roses for Camden are presented in **Figure 6-4.**

- Highest average wind speeds of 4.9 m/s were observed during the spring months, with peak seasonal wind speeds of 12.9 m/s observed during winter.
- Calm conditions (wind speeds <1 m/s) occurred 14.13% of the time;
- Gentle to strong breezes from the east prevailed in the region;
- Peak (13.8 m/s) and highest average (5.5 m/s) wind speeds occurred from the west;
- Easterly winds prevail throughout the day and night with north-westerly components noted during the early morning (00h00-06h00), morning (06h00-12h00) and night-time (18h00-00h00) hours, as well as westerly components noted during the afternoon (12h00-18h00);
- Diurnal peak (13.3 m/s) and highest average (5.0 m/s) wind speeds occurred during the afternoon;
- Winds from the east prevailed during the spring and autumn months;
- Winds from the northwest, west-northwest, west and east prevailed during winter;
- Winds from the east and northwest prevailed during spring; and
- Seasonal peak (13.3 m/s) wind speeds occur during winter and highest average (4.0 m/s) wind speeds occur during spring

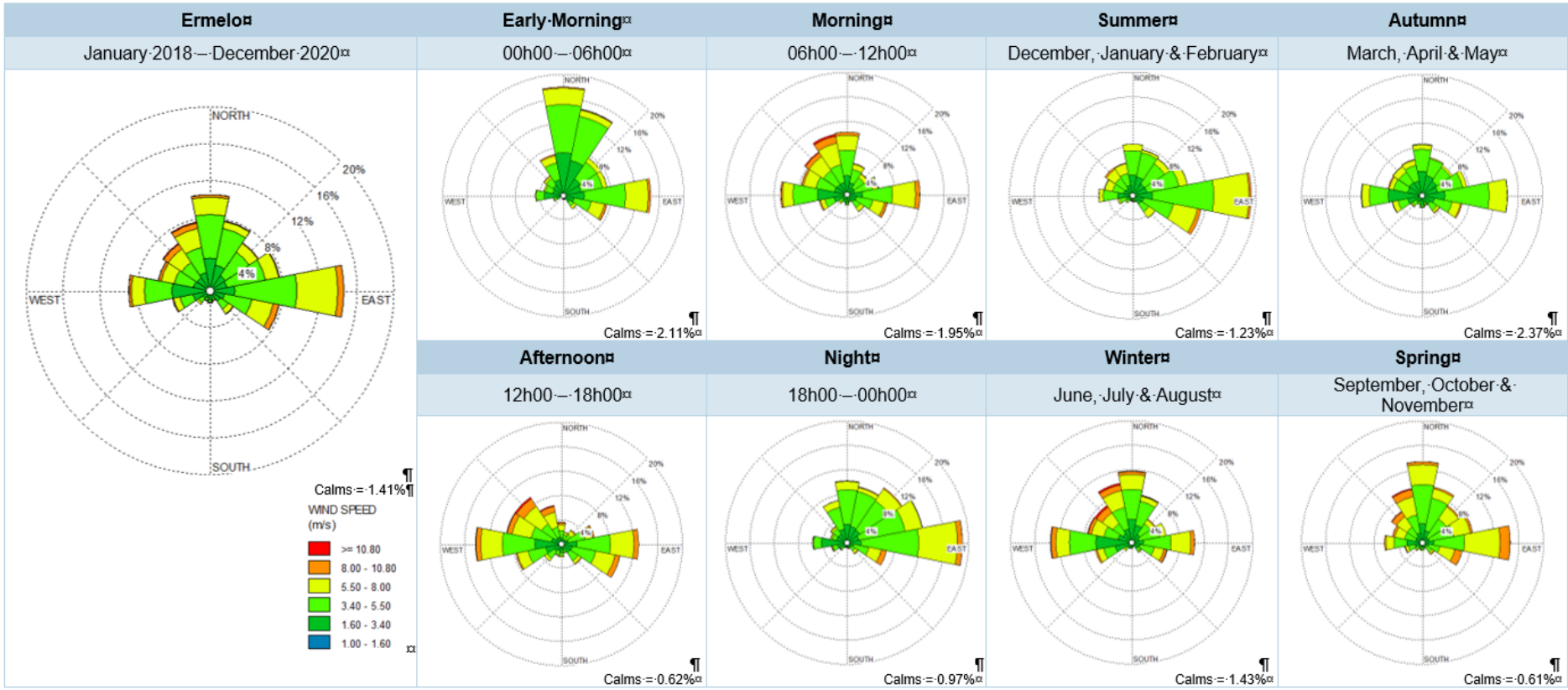



**Figure 6-3: Local Wind Conditions at Ermelo**

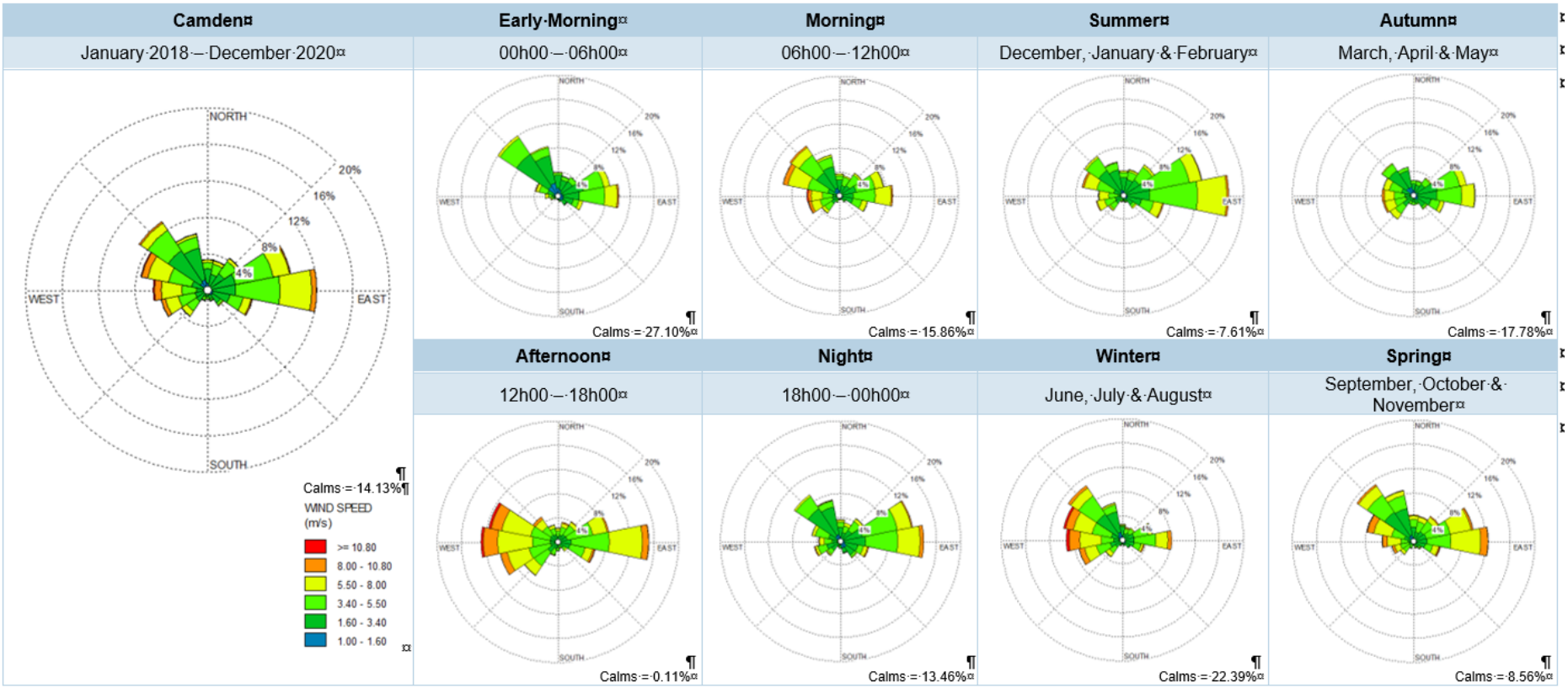



**Figure 6-4: Local Wind Conditions at Camden**

### 6.1.2 TOPOGRAPHY

*The following is extracted from the Visual Impact Assessment, compiled by SLR Consulting (Pty) Ltd (May, 2022) and included as* ***Appendix F-7F-7****.*

The proposed site is largely characterised by a mix of undulating plains and greater relief in the form of higher lying plateaus intersected by river valleys. Slopes across the study area are relatively gentle to moderate, with steeper slopes being largely associated with the more incised river valleys. Slope angles ranging between 0° and 6.5°. Spot heights indicate that the elevation across the site ranges between 1574m and 1692m above mean sea level, with a difference in elevation of approximately 118 m occurring in localised areas. The main water course in the study area is the Vaal River in the south-eastern portion of the study area. Flat to gently undulating terrain prevails across much of the Camden I SEF development site.

Maps showing the topography and slopes within and in the immediate vicinity of the combined assessment area are provided in **Figure 6-5** to **Figure 6-7**.

**Figure 6-5: View south-east from the D260 District Road in the north-western of the study area showing undulating terrain**

**Figure 6-6: Areas of greater relief along the Vaal River to the south of the Camden I SEF project area**

**Figure 6-7: View south-east across the Camden I SEF project area from the D260 District Road showing flat to gently undulating terrain**

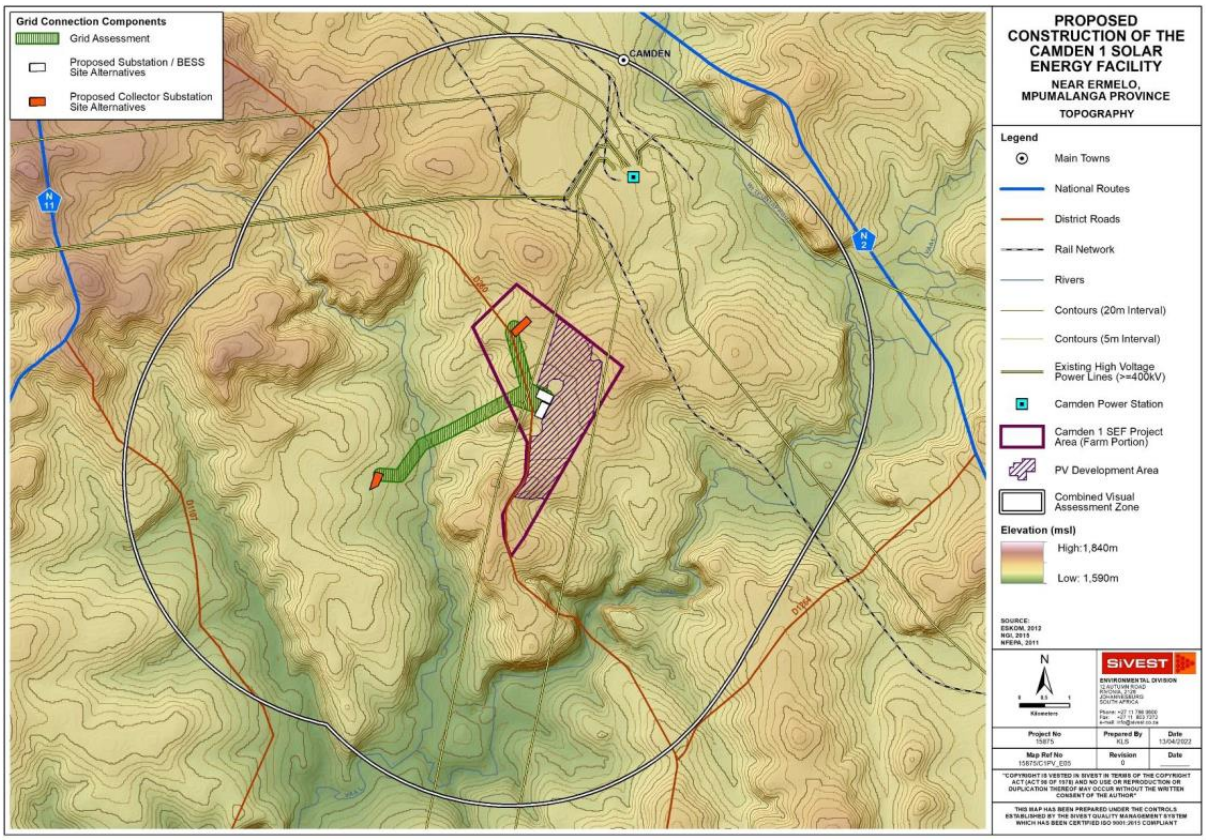



**Figure 6-8: Topographical Map of Project Area, showing grid connection corridors**

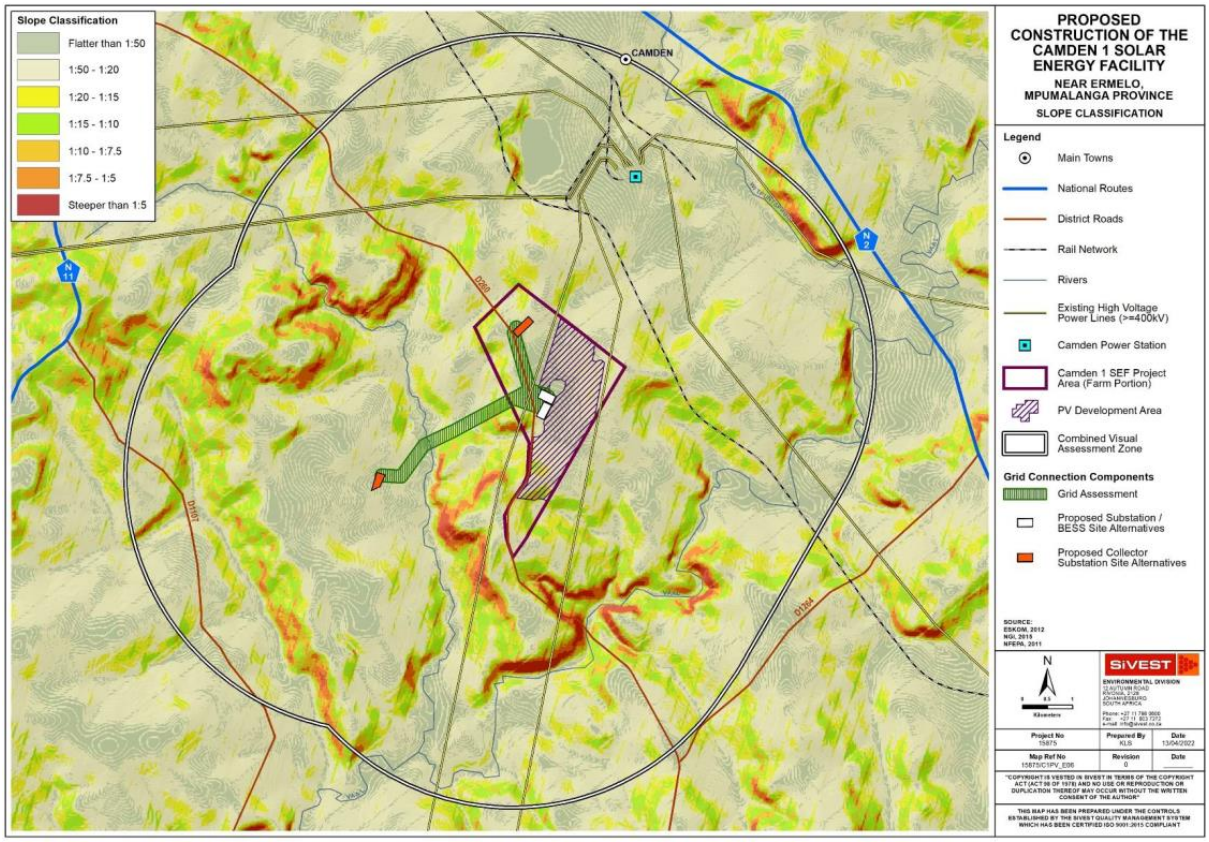



**Figure 6-9: Slope classification of Project Area, showing grid connection corridors**

## 6.1.3 GEOLOGY

*The following is extracted from the Desktop Geotechnical Assessment, compiled by SLR Consulting (South Africa) (Pty) Ltd (April, 2022) and included as* ***Appendix F-9***

A desktop review of the geology indicates the site is underlain predominantly by the Vryheid Formation of the Ecca Group (1:250 000, 2630). The Vryheid Formation consists of sandstone, shale, siltstone and coal seam that underlie the project area. The Vryheid Formation is intruded by late Triassic to Middle Jurassic Karoo dolerite dykes and sills which influence the regional hydrogeology.

### VRYHEID FORMATION, ECCA GROUP

The proposed development area is predominantly underlain by lithological units of the Ecca Group which is represented by sandstones, shales and coal seams of the Vryheid Formation, all deposited in a shallow marine environment. The Vryheid Formation has been extensively intruded by Jurassic aged dolerite, becoming relatively more prevalent further east of the proposed study area.

Sandstones comprise a larger portion of the Karoo sediments and are generally closely intercalated with mudrocks, resulting in alternating bands of arenaceous and argillaceous sediments. The Vryheid Formation sandstones may typically occur as arkosic to greywacke, ranging from a generally coarse grained, poorly sorted material to a fine grained, well sorted material, with an abrupt upward transition.

Of significant economic importance is the presence of coal seams located stratigraphically between the sandstone and mudrock bedding partings, at the base of the Vryheid Formation. The lower coal seams attain thicknesses of approximately 18 m which progressively diminishes upwards through the formation, due to various depositional and post-depositional factors.

### POST-KAROO DOLERITE

Dolerite is an intrusive, hyperbyssal igneous rock of post-Karoo age that has intruded the sedimentary host rocks, mainly in the form of concordant sills and to a lesser extent as discordant dykes. It is a dark grey, crystalline, rock composed mainly of plagioclase feldspar and pyroxene, with accessory amounts of olivine, biotite, amphibole, apatite and iron ore minerals.

Whilst generally of medium grained texture, the dolerite adjacent to the sedimentary contacts is often of a finer texture due to rapid cooling of the magma. The intrusions have also frequently resulted in the formation of an alteration or “baked” zone in the sedimentary rocks adjacent to the contacts. The joints in the dolerite are in most cases filled or coated by secondary calcite and chlorite, deposited by the subsequent circulation of magmatic fluids.

### RECENT DEPOSITS

Transported soils, referred to as recent deposits, are generally un-lithified sediments that have been derived from the slow disintegration of the parent bedrock material, which have been disbursed from their original locations and deposited by geomorphic processes. The transported soils anticipated to occur across the study area are:

– Colluvium

A term that includes all soils on hill slopes that have been displaced under the influence of gravity. In certain cases, the geotechnical characteristics of the colluvial soils may lead to an approximation of the parent bedrock material.

– Alluvium

Deposits that result from the transportation and deposition of sediments by rivers or similar water courses. These deposits are generally present along rivers and floodplains and may contain fine to coarse grain sizes which is dependent on the origin of the sediment as well as through the processes of eluviation and illuviation.

– Pedocretes

Superficial deposits that have formed either as weathering residues or by cementation of pre-existing soils by various authigenic minerals precipitated from the soil water or ground water.

The pedocretes likely to be encountered across the study area are mainly ferricrete with sub-ordinate calcrete which may occur as nodular or hardpan.

— Pebble Marker

The base of the transported soil which is characterised by the presence of a gravel horizon, representing the most recent major geological unconformity in the soil profile. The pebble marker is generally a zone of high permeability due to the abundance of angular, sub-angular and rounded gravel fragments of mixed origin.

A detailed Geological Map of the underlying lithologies occurring across the study area is presented in **Figure 6-10** below.

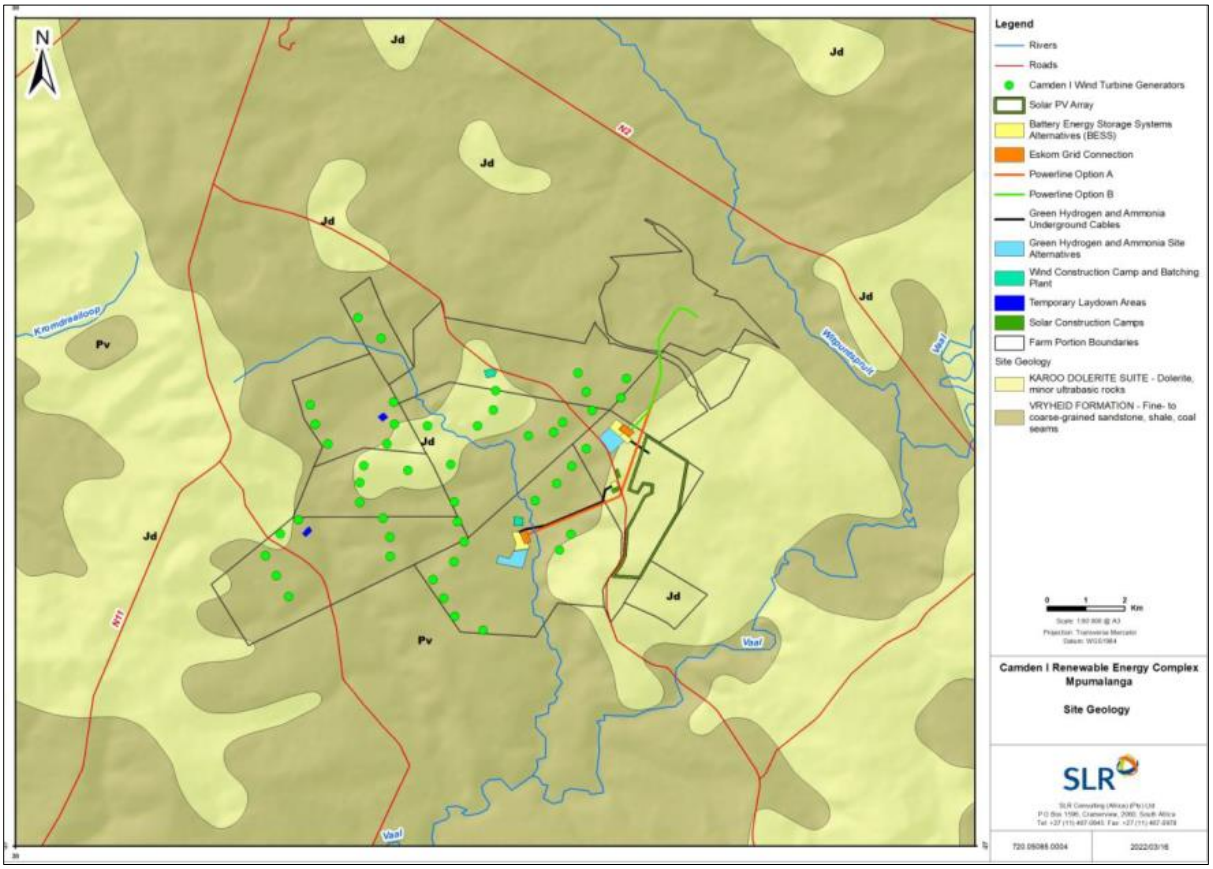



**Figure 6-10: Geological Map of the Proposed Development Area, including the Camden I Solar PV Facility, grid connection and associated infrastructure.**

## 6.1.4 SOILS AND AGRICULTURAL POTENTIAL

*The following is extracted from the site sensitivity verification and agricultural compliance statement, compiled by Johann Lanz (December, 2022) and included as* ***Appendix F-8***

### AGRO-ECOSYSTEM

The site has a summer rainfall with a mean annual rainfall of approximately 740 mm and a mean annual evaporation of approximately 1,210 mm (Schulze, 2009). The site is situated on hilly terrain at an altitude of around 1,650 metres and slopes up to about 7%. The footprint falls across two land types, Ba51 and Ca3. The geology is predominantly shale and sandstone of the Ecca Group of the Karoo Supergroup and includes dolerite. Approximately half of both land types comprise deep, red and yellow, reasonably drained, loamy soils of the Avalon, Hutton, Glencoe, and other soil forms that are good for crop production. The other half comprises other soils that have various limitations for crop production, which are predominantly the result of poor drainage or limited depth due to underlying clay or bedrock. These soils are of the Mispah and Glenrosa soil forms (shallow bedrock) and the Kroonstad, Estcourt Valsrivier, Longlands, and other soil forms (poor drainage and underlying

clay). The soils vary in their suitability for crop production, which is predominantly maize and soya beans. Soil that is not suitable for crop production is used as grazing land.


**Figure 6-11: proposed powerline, substation alternatives and associated cropland data**

*Satellite image map of all proposed alternative powerline routes (light blue lines) and alternative substation sites (dark blue outlines). Note that a 500m wide powerline corridor (250m either side of the centre lines) is the subject of this assessment.*

# 6.2 BIOLOGICAL ENVIRONMENT

## 6.2.1 TERRESTRIAL BIODIVERSITY

*The following is extracted from the Terrestrial Biodiversity Impact Assessment, compiled by David Hoare Consulting (Pty) Ltd (September, 2022) and included as* ***Appendix F-2****.*

The site verification indicated that there is one regional vegetation type occurring in the study area, namely Eastern Highveld Grassland (**Figure 6-12**). The Wakkerstroom Montyane Grassland vegetation type occurs nearby to the south-east of the site. The vegetation types that occur in the study area and nearby areas are briefly described below.

## EASTERN HIGHVELD GRASSLAND

### DISTRIBUTION

Eastern Highveld Grassland is found in Mpumalanga and Gauteng Provinces, on the plains between Belfast in the east and the eastern side of Johannesburg in the west and extending southwards to Bethal, Ermelo and west of Piet Retief. The vegetation type occurs at an altitude of between 1 520 – 1 780 m.

### VEGETATION & LANDSCAPE FEATURES

The vegetation occurs on slightly to moderately undulating plains, including some low hills and pan depressions. The vegetation is short dense grassland dominated by the usual highveld grass composition (Aristida, Digitaria, Eragrostis, Themeda, Tristachya, etc.) with small, scattered rocky outcrops with wiry, sour grasses and some woody species (*Acacia caffra*, *Celtis africana*, *Diospyros lycioides* subsp *lycioides*, *Parinari capensis*, *Protea caffra*, *P. welwitschii* and *Searsia magalismontanum*).


**Figure 6-12: Regional vegetation types of the proposed site**

**Figure 6-12** above, indicates a 250m assessment corridor on either side of the centre lines that was assessed.

### IMPORTANT TAXA

A List of important taxa identified within the Eastern Highveld Grassland is listed in below.

**Table 6-4: List of important taxa identified within the Eastern Highveld Grassland**

| | |
|---|---|
| Low Shrubs | *Anthospermum rigidum subsp. pumilum, Stoebe plumosa* |
| Herbs | *Berkheya setifera (d), Haplocarpha scaposa (d), Justicia anagalloides (d), Pelargonium luridum (d), Acalypha angustata, Chamaecrista mimosoides, Dicoma anomala, Euryops gilfillanii, E. transvaalensis subsp. setilobus, Helichrysum aureonitens, H. caespititium, H. callicomum, H. oreophilum, H. rugulosum, Ipomoea crassipes, Pentanisia prunelloides subsp. latifolia, Selago densiflora, Senecio coronatus, Vernonia oligocephala, Wahlenbergia undulata.* |

| | |
|---|---|
| Geophytic Herbs | *Gladiolus crassifolius, Haemanthus humilis subsp. hirsutus, Hypoxis rigidula var. pilosissima, Ledebouria ovatifolia.* |
| Succulent Herbs | *Aloe ecklonis* |
| Graminoids | *Aristida aequiglumis (d), A. congesta (d), A. junciformis subsp. galpinii (d), Brachiaria serrata (d), Cynodon dactylon (d), Digitaria monodactyla (d), D. tricholaenoides (d), Elionurus muticus (d), Eragrostis chloromelas (d), E. curvula (d), E. plana (d), E. racemosa (d), E. sclerantha (d), Heteropogon contortus (d), Loudetia simplex (d), Microchloa caffra (d), Monocymbium ceresiiforme (d), Setaria sphacelata (d), Sporobolus africanus (d), S. pectinatus (d), Themeda triandra (d), Trachypogon spicatus (d), Tristachya leucothrix (d), T. rehmannii (d), Alloteropsis semialata subsp. eckloniana, Andropogon appendiculatus, A. schirensis, Bewsia biflora, Ctenium concinnum, Diheteropogon amplectens, Eragrostis capensis, E. gummiflua, E. patentissima, Harpochloa falx, Panicum natalense, Rendlia altera, Schizachyrium sanguineum, Setaria nigrirostris, Urelytrum agropyroides.* |

## CONSERVATION STATUS OF THE REGIONAL VEGETATION TYPES

On the basis of a scientific approach used at national level by SANBI (Driver *et al*., 2005), vegetation types can be categorised according to their conservation status which is, in turn, assessed according to the degree of transformation relative to the expected extent of each vegetation type. The status of a habitat or vegetation type is based on how much of its original area still remains intact relative to various thresholds. The original extent of a vegetation type is as presented in the most recent national vegetation map (Mucina, Rutherford & Powrie 2005) and is the extent of the vegetation type in the absence of any historical human impact. On a national scale the thresholds are as depicted in **Figure 6-13,** as determined by best available scientific approaches (Driver *et al*., 2005). The level at which an ecosystem becomes Critically Endangered differs from one ecosystem to another and varies from 16% to 36% .

According to scientific literature (Driver *et al*., 2005; Mucina *et al*., 2006), as shown in **Table 6-5**, Eastern Highvbeld Grassland is listed as Endangered.

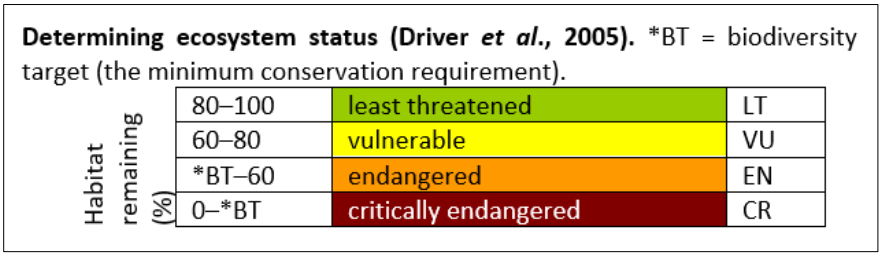



**Figure 6-13: Ecosystem Status (Driver *et al*., 2005)**

**Table 6-5: Conservation status of different vegetation types occurring in the study area**

| VEGETATION TYPE | TARGET (%) | CONSERVED (%) | TRANSFORMED (%) | CONSERVATION STATUS | |
|---|---|---|---|---|---|
| | | | | DRIVER *ET AL*. 2005; MUCINA *ET AL*., 2006 | NATIONAL ECOSYSTEM LIST (NEM:BA) |
| Eastern Highveld Grassland | 24 | 0.3 | 44 | Endangered | Vulnerable |
| Chrissiesmeer Panveld | | | | | Endangered |

Eastern Highveld Grassland is listed as Vulnerable in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011). There is an additional listed ecosystem defined under the National Ecosystem List, called Chrissiesmeer Panveld, which is listed as Endangered. This covers the entire site (**Figure 6-14**). It spatially co-incides partially with Eastern Highveld Grassland, but is defined on different criteria.

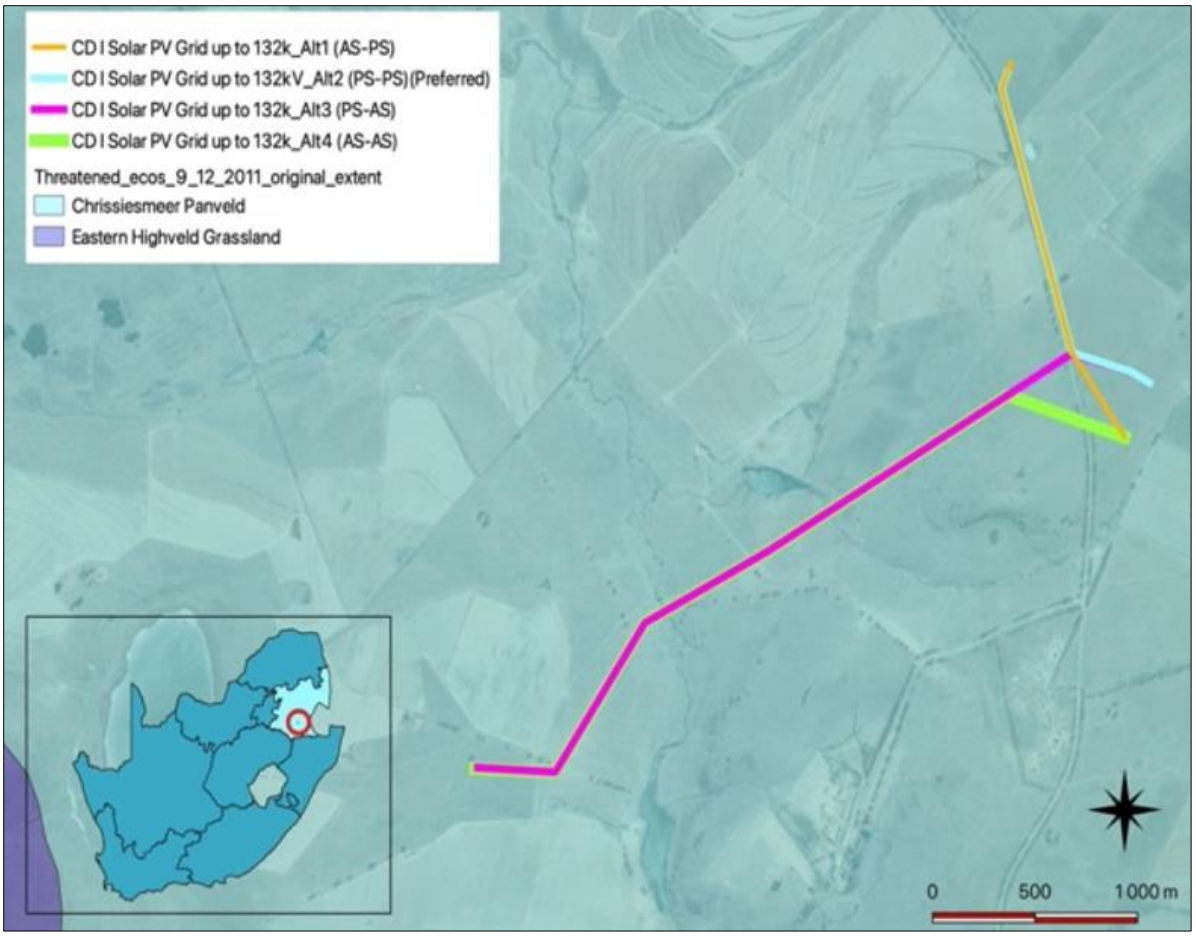



**Figure 6-14: Distribution of listed ecosystems relative to the site (David Hoare Consulting (Pty) Ltd, 2022)**

## BIODIVERSITY CONSERVATION PLANS

*The following is extracted from the Terrestrial Biodiversity Impact Assessment, compiled by David Hoare Consulting (Pty) Ltd (September, 2022) and included as* ***Appendix F-2****.*

The Mpumalanga Biodiversity Sector Plan (MBSP) (Mpumalanga Parks and Tourism Agency 2014) classifies the natural vegetation of the province according to the following categories:

- Protected Areas (sub-divided into three categories);
- Critical Biodiversity Areas (sub-divided into "Irreplaceable" and "Optimal");
- Other natural areas;
- Ecological Support Area (sub-divided into four categories); and
- Modified (sub-divided into Heavily or Moderately modified

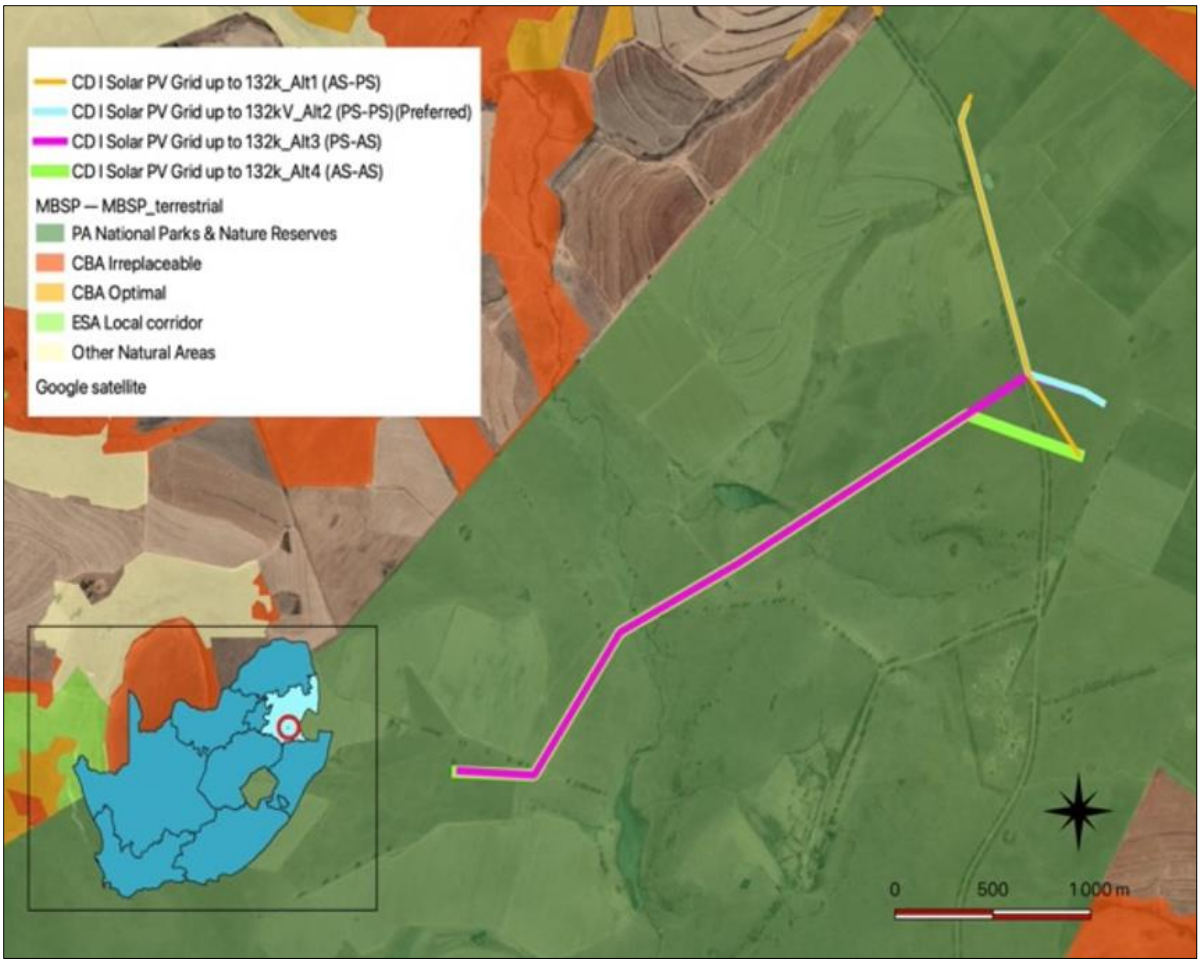



**Figure 6-15: Mpumalanga Critical Biodiversity Areas associated with the proposed project**

**Figure 6-15** shows the features in the study area within five of the classes listed above:

- **Protected Areas (National Parks and Nature Reserves):**
  - Approximately a third of the site on the south-eastern side is shown as a protected area. This is, however, incorrect. The part of the site shown as a Protected Area occupies the parts of the site on the Farm Welgelegen 322 IT. According to the land owner (Mr L. Reyneke), the farm is NOT a protected area and he is not aware of it ever being so. The 1:50 000 topocadastral maps do not indicate the farm as a protected area. A map of National (formal and informal) protected areas obtained from the SANBI BGIS website does not indicate the area to be a protected area. A GIS spatial layer indicating proposed protected area expansion areas (the National Parks Area Expansion Strategy layer) does not indicate the area as protected and nor does it indicate proposed expansion of the protected area network into this area. On the basis of these various data sources, it is assumed that the designation of the area as protected in the Mpumalanga Biodiversity Sector Plan (MBSP) is an error.
- **Critical Biodiversity Areas (CBA):**
  - Irreplaceable: A significant area in the south-eastern part of the site is within a "CBA: Irreplaceable" area. These categorized areas are associated with the Olifants River and all natural areas linked to it.
  - Optimal: A significant area in the southern part of the site is within a "CBA: Optimal" area. These categorized areas are associated with the Olifants River and all natural areas adjacent to it.
- **Ecological Support Area (ESA):**
  - Protected Area Buffer: There is a 1 km buffer around the designated protected area, shown only as a line in **Figure 6-15** in order to show the underlying categories.
- **Other Natural Areas (ONA):**
  - There are patches throughout the site mapped as ONA

- **Heavily or moderately modified:**
  - Remaining areas on site, associated primarily with cultivation or the Camden Power Station.

According to the National Parks Area Expansion Strategy (NPAES), there are no areas within the study area that have been identified as priority areas for inclusion in future protected areas. The study area is therefore **outside the NPAES focus area**.

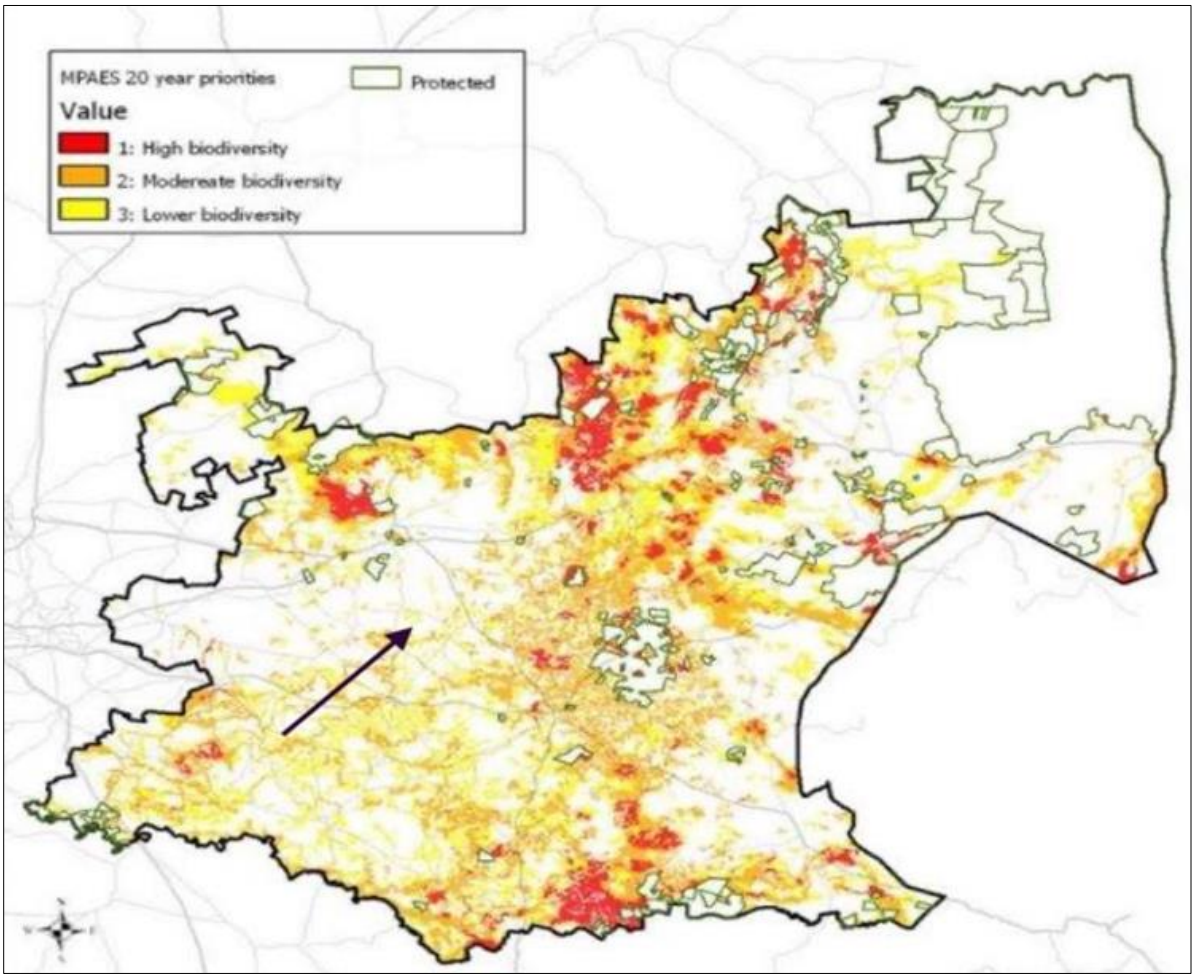



**Figure 6-16: Mpumalanga Protected Area Expansion Strategy (arrow points proposed site) (David Hoare Consulting (Pty) Ltd, 2022)**

## HABITATS ON SITE

A map of habitats within the study area is provided in **Figure 6-17**. The site is within an area of natural grassland but degraded (from heavily to light). The grassland contains variation due to changes in topography, slope inclination, surface rockiness and the influence of water-flow and water retention in the landscape.

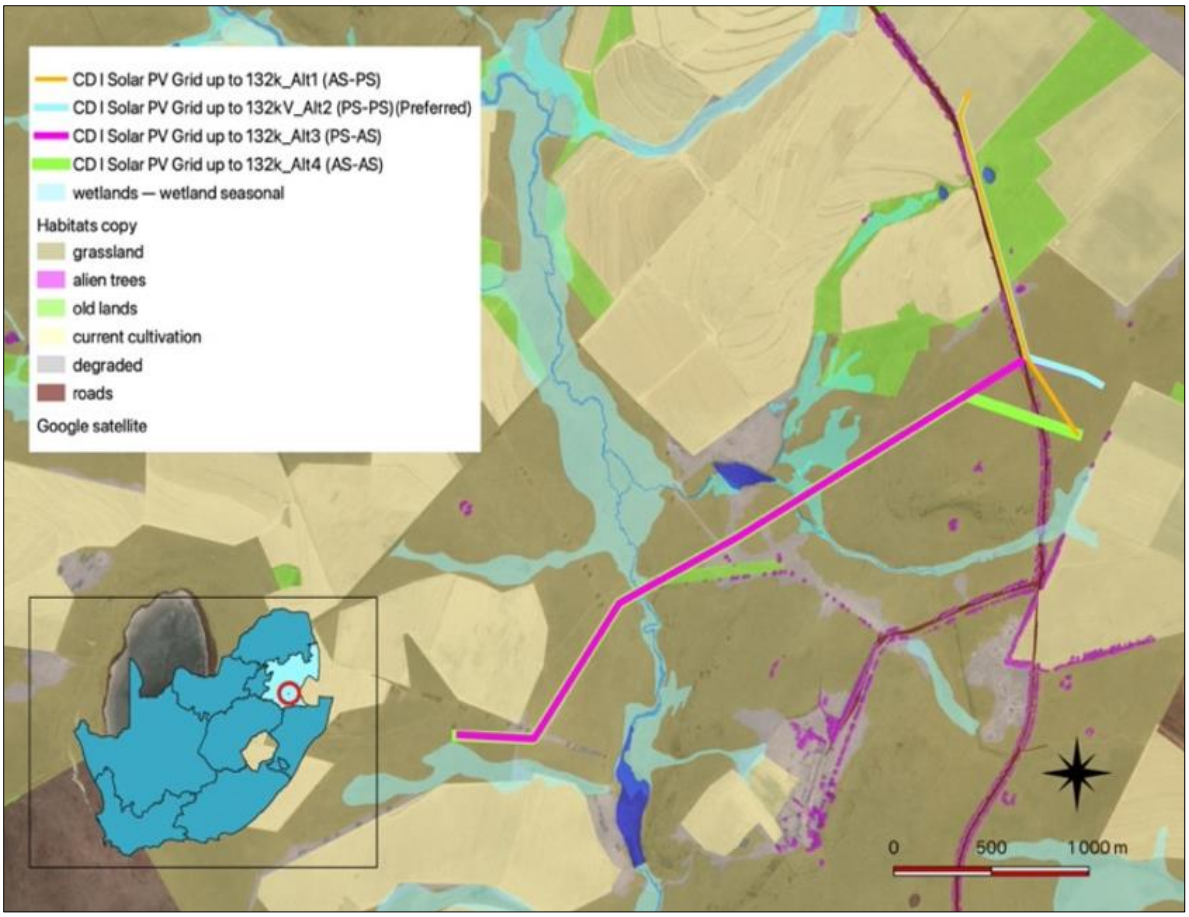



**Figure 6-17: Main habitats of the study area**

– **Grassland:**

The general study area is characterised by an open grassland on the undulating hills and plains. It is generally a short to moderate height tussock grassland with closed canopy cover. The soil depth varies, as does the amount of surface rock cover, but tends to have shallow soil.

The general floristic character of this vegetation on site is fairly uniform across wide areas, often dominated by the same suite of species, including the grasses, *Alloteropsis semialata, Aristida diffusa, Aristida junciformis, Bewsia biflora, Brachiaria serrata, Diheteropogon amplectens, Elionurus muticus, Eragrostis capensis, Eragrostis chloromelas, Eragrostis plana, Eragrostis racemosa, Harpochloa falx, Heteropogon contortus, Microchloa caffra, Panicum natalense, Setaria sphacelata var. torta, Themeda triandra, and Tristachya leucothrix, and the forbs, Acalypha angustata, Anthospermum rigidum subsp. rigidum, Berkheya setifera, Chaetacanthus costatus, Commelina africana, Crabbea acaulis, Cucumis hirsutus, Cucumis zeyheri, Cyanotis speciosa, Gerbera viridifolia, Haplocarpha scaposa, Helichrysum rugulosum, Hemizygia pretoriae, Hermannia transvaalensis, Hibiscus aethiopicus, Hypoxis obtusa, Hypoxis rigidula, Indigofera comosa, Ipomoea ommaneyi, Justicia anagalloides, Kohautia amatymbica, Ledebouria ovatifolia, Monsonia attenuata, Nidorella hottentotta, Pentanisia angustifolia, Pollichia campestris, Scabiosa columbaria, Selago densiflora, Seriphium plumosum, Vernonia galpinii, Vernonia oligocephala,* and *Zornia milneana*. Overall diversity in this unit was high and included a full list of over 100 species. Local species richness was also high at 56 species per 400m$^2$ sampling area. This rivals the local richness of some of the most species-rich grasslands anywhere in the country.

– **Wetlands:**

Wetlands were mapped from Google Earth imagery dated 28/03/2019, a date which shows the wetness signal very well as darker green areas. This also corresponds well to black and white historical aerial photographs from 1955, where wetlands appear as darker areas.

Valley bottom wetlands in this general area around Ermelo, such as this one, are generally dominated by a variety of grasses, sedges and herbaceous plants, including the graminoids, *Kyllinga erecta, Leersia hexandra, Agrostis*

*lachnantha, Andropogon appendiculatus, Helictotrichon turgidulum, Scirpoides burkei, Cyperus teneristolon, Cyperus macranthus, Typha capensis, Agrostis erianthe, Hemarthria altissima, Panicum schinzii, Cyperus rigidifolius and Arundinella nepalensis, the herbs, Centella asiatica, Senecio polyodon, Senecio erubescens, Haplocarpha scaposa, Pelargonium luridum, Commelina africana, Lobelia flaccida, Monopsis decipiens,* and *Helichrysum aureonitens*. The species composition depends entirely on the hydrological characteristics of the site, with a greater number of obligate wetland species occurring in more permanently damp areas, whereas dryer areas more closely resembling terrestrial grassland in species composition.

– **Current cultivation:**

These are areas that, according to recent satellite imagery, are currently being cultivated, or were recently cultivated (within the last 5 years). If not under crops, they would be a ploughed land, or a fallow land with either weeds or a cover crop. From an ecological or biodiversity perspective, these areas have no natural habitat and have no plant or vegetation biodiversity value. The soil profile has been completely disturbed, removing all original vegetation, including geophytic and resprouting plant species. In the Grassland Biome of South Africa, a large proportion of the indigenous biodiversity consists of herbaceous and low shrubby species that re-sprout seasonally, after fire, or after defoliation from grazing animals, and can persist under these conditions. In cultivated areas, it is possible through natural succession, or through active rehabilitation, to restore a perennial cover of grasses, but the original biodiversity is permanently lost. They also have little value for animal biodiversity, except for species that forage in cultivated areas.

– **Old lands:**

These are areas that were previously ploughed for cultivation but have been left for an extended period without ploughing. Through natural succession processes, they generally develop a perennial cover of grasses, but these secondary grasslands are species poor and the original diversity of resprouting species is usually entirely absent. Non-grass species diversity usually consists of re-seeding and weedy species, and sometimes animal- and/or bird-dispersed woody species.

On aerial photographs and satellite images with adequate resolution, these areas are often recognisable by the presence of residual plough lines and other structural features often present in cultivated fields.

– **Exotic trees:**

There are planted windrows on the roadsides in various parts of the site, as well as within homestead complex areas. These are mostly deliberately planted some decades ago and are not alien invasive species. There are, however, various places on site where alien invasive species have become established in previously disturbed areas. In both cases, the underlying natural grassland is lost.

– **Degraded areas:**

Any areas where the original vegetation is lost due to continuous degradation, such as trampling, severe overgrazing, or some other factor, it is mapped as degraded. These areas are unlikely to restore to natural grassland, even with removal of the drivers of the degradation.

– **Transformed areas:**

Areas where natural habitat no longer exists due to development of infrastructure, such as roads, buildings, and other hard surfaces. Current cultivation is also transformed, but has not been replaced by built infrastructure, therefore the soil surface can be colonized by plants, if cultivation is stopped.

## HABITAT SENSITIVITY

At a regional level, the CBA map for Mpumalanga indicates various parts of the study area as being important for conservation. However, no parts of the site fall within CBAs (**Figure 6-15**).

A summary of sensitivities that occur on site and that may be vulnerable to damage from the proposed project are as follows:

– Wetlands: These are described here only in terms of being a unique botanical habitat and not in the sense of a formal wetland delineation, which is normally assessed in a separate specialist study. The wetlands must be delineated according to "DWAF, 2003: A Practical Guideline Procedure for the Identification and Delineation of Wetlands and Riparian Zones". **Restrictions in terms of infrastructure within these areas should be according to the National Water Act (Act 36 of 1998).**

- Listed ecosystems: Chrissiesmeer Panveld is listed as Endangered, and Eastern Highveld Grassland and Eastern Temperate Freshwater Wetlands are both listed as Vulnerable in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011).
- Grasslands: Grassland vegetation, in a general sense has been identified as threatened nationally as a habitat type. Indications are that loss of any grassland habitat is permanent in an ecological and biodiversity sense, and it is not possible to restore grassland to a natural state after they have been disturbed. They should therefore be treated as sensitive, and all efforts made to minimize impacts on any area of grassland. **If possible, the footprint of any proposed infrastructure should be kept to a minimum within any undisturbed, natural grasslands, especially those in a moderate to good condition.**

This information was used in conjunction with methodology to calculate Site Ecological Importance, described below. A map of habitat sensitivity on site is provided in **Figure 6-18**.

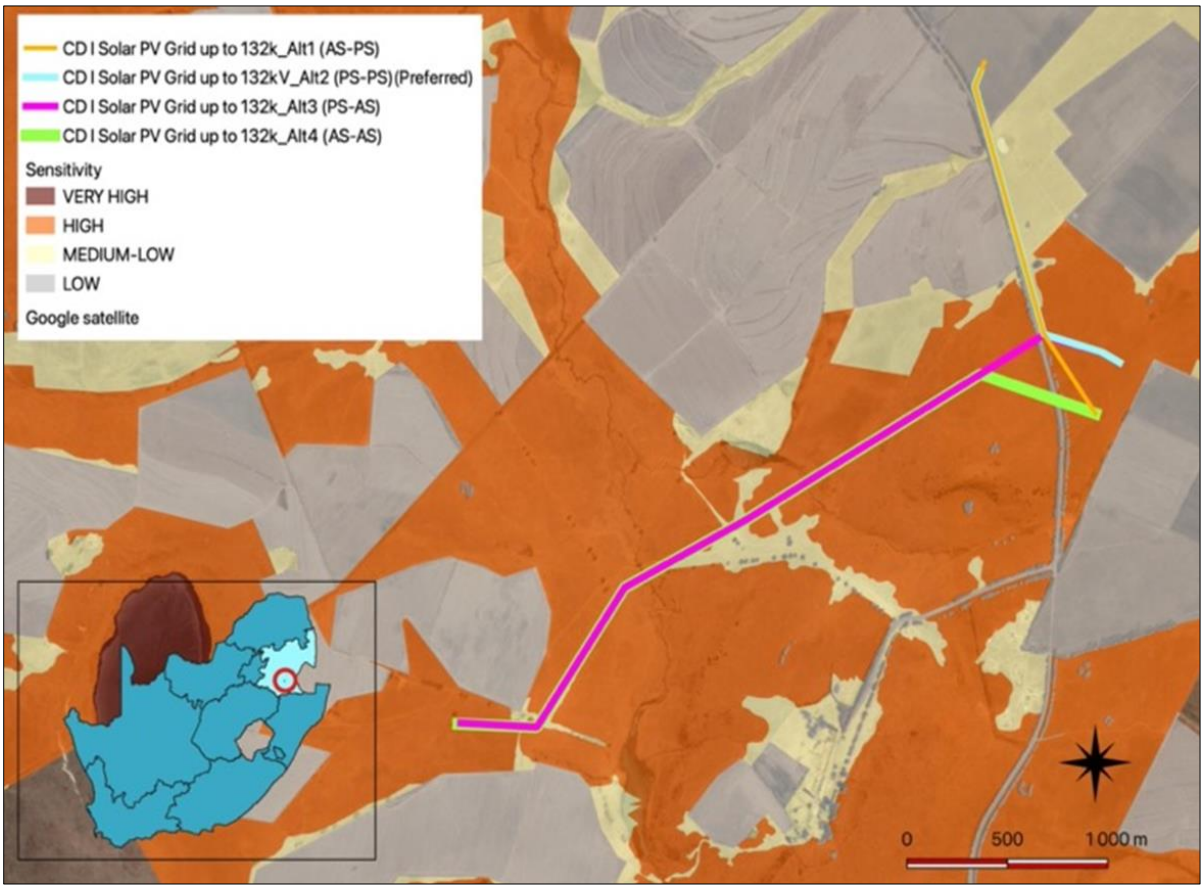



**Figure 6-18: Habitat sensitivity of the study area, including consideration of CBAs**

## 6.2.2 TERRESTRIAL PLANT SPECIES

*The following is extracted from the Plant Species Assessment, compiled by David Hoare Consulting (Pty) Ltd (September, 2022) and included as **Appendix F-2**.*

### PLANT SPECIES OF CONCERN

According to the DFFE online environmental screening tool, four plant species have been flagged as of concern for the area the current project is in. A description of each species is provided.

- **Sensitive species 1201:**

Occurs on dolerite outcrops in grasslands at about 2000m altitude, from Dullstroom in the north to Vryheid in the south. This geophyte is fairly restricted and threatened by alien invasive plants and is therefore listed as Vulnerable on the national Red List. This species is conspicuous when flowering, with attractive pale white flowers in

summer. The closest locality at which this species has been observed is Hartebeespruit due south of Campden. It therefore has Moderate chance of occurring on the site.

– **Sensitive species 41:**

A common and widespread geophyte that is very similar to *Gladiolus crassifolius*, also a widespread and common species with a similar distribution. The main distribution area is Witbank to Lydenburg, and southwards to Piet Retief and Wakkerstroom. It occurs in wetlands or marshes in high altitude grassland that remain wet throughout the year or dry out for only a short period. This species is listed on the South African Red List with a national assessment of Vulnerable but is currently not recognized by the IUCN as it is regarded as a synonym of *G. crassifolius*. Whereas this species is confined more to wetland habitats, *G. crassofolius* has larger leaves, longer spikes and smaller flowers, and is found in drier, more stony habitats. It flowers from October to January and has a high probability of occurring in wetland areas on the study site. Without flowers, the plant can be recognized as a *Gladiolus*. The closest historical record is approximately 30km from the study site. This species has a Moderate chance of occurring on the site.

– **Sensitive species 691:**

A widespread geophyte distributed in Free State, North West, Gauteng, and in Mpumalanga from Belfast and Ermelo to Wolmaransstad. It is found in wetlands in undulating grasslands. The species is currently listed as Vulnerable. It flowers from January to March but its peak flowering month is February. It could feasibly be found in wet areas on the site but is quite conspicuous in February when if flowers. The closest historical record is approximately 40km from the site. It has a Moderate chance of occurring on the site.

– **Sensitive species 851:**

A small succulent perennial herb with white flowers, growing in marshy areas or shallow vleis. This species is listed as Vulnerable but the confidence in this assessment is low (according to the Red List). Its distribution is uncertain because of its taxonomic confusion with the very similar *Crassula inanis*, but it appears to be restricted to the area between Ermelo and Maseru. The closest known record to the site of the Project is in the Bethal area. It has a Moderate chance of occurring on the site.

## ADDITIONAL LISTED PLANT SPECIES FOR THE STUDY AREA

A database search identified several additional plant species of conservation concern that could also occur on site that are not flagged in the Screening Tool output. These include the following:

**Table 6-6: Additional listed plant species**

| TAXON | RED LIST STATUS | HABITAT AND DISTRIBUTION | FLOWERING TIME | PROBABILITY OF OCCURRENCE |
|---|---|---|---|---|
| *Alepidea cordifolia* APIACEAE | Endangered (SA) | Widespread and extremely common across the eastern highveld of Mpumalanga, the eastern Free State, and north-western KwaZulu-Natal. It occurs along the north and north-eastern borders of Lesotho and is also found in Eswatini, on the Eastern Highlands of Zimbabwe and the Chimanimani Mountains of Mozambique. Forest margins, west and south facing mountain slopes and near drainage lines or islands within wetlands. Open grassland or on forest margins, often amongst rocks and/or along streams. | Summer, mostly February to March | **MODERATE** (within known overall distribution) |
| *Alepidea longeciliata* APIACEAE | Endangered | Between Breyten, Lothair, Middelburg and Stoffberg. Recorded from 2 neighbouring grids. Eastern Highveld Grassland. Grassland, Karoo Sandstone, above 1600 m. Possibly associated with edges of pans. | Summer | **MODERATE** (within known overall distribution) |

| TAXON | RED LIST STATUS | HABITAT AND DISTRIBUTION | FLOWERING TIME | PROBABILITY OF OCCURRENCE |
|---|---|---|---|---|
| *Aspidoglossum xanthosphaerum* APOCYNACEAE | Vulnerable | Mpumalanga, Groenvlei and Ermelo. Closest known record is from Breyten and just to the west of Ermelo. Montane grassland, marshy sites, 1800 m. | Unknown | **HIGH** |
| *Bowiea volubilis* subsp. *volubilis* HYACINTHACEAE | Vulnerable (national) | Eastern Cape to Limpopo Province. Widespread elsewhere in southern and eastern Africa. Low and medium altitudes, usually along mountain ranges and in thickly vegetated river valleys, often under bush clumps and in boulder screes, sometimes found scrambling at the margins of karroid, succulent bush in the Eastern Cape. Occurs in bushy kloofs at the coast and inland in KwaZulu-Natal. In Gauteng, Mpumalanga and North West Province it is often found in open woodland or on steep rocky hills usually in well-shaded situations. Tolerates wet and dry conditions, growing predominantly in summer rainfall areas with an annual rainfall of 200-800 mm. | | LOW (site within gap in distribution, habitat not suitable) |
| *Brachystelma gerrardii* APOCYNACEAE | Endangered | KwaZulu-Natal, Waterberg, Wolkberg and Eswatini. Open grassland, 400-1800 m. Site is within overall distribution range, but plant absent from Mpumalanga highveld. | | LOW |
| *Eucomis pallidiflora subsp. polevansii* HYACINTHACEAE | Near Threatened | Pilgrim's Rest and Lydenburg to Eswatini to southern Mpumalanga. Wetlands in grassland, often in standing water up to 300 mm deep. Recorded at Ermelo in similar habitat as that found on site. | | **HIGH** |
| *Gladiolus robertsoniae* IRIDACEAE | Near Threatened | South-eastern Gauteng, northern Free State and south-western Mpumalanga. Moist highveld grasslands, found in wet, rocky sites, mostly dolerite outcrops, wedged in rock crevices. | | **HIGH** |
| *Habenaria barbertonii* ORCHIDACEAE | Near Threatened | Gauteng and Mpumalanga. Rocky hillsides, in bushveld in association with acacias, 1000-1500 m. | February to March | **MODERATE** (habitat may not be suitable) |
| *Khadia carolinensis* AIZOACEAE | Vulnerable | Carolina and Belfast. Eastern Highveld Grassland, Lydenburg Montane Grassland, Rand Highveld Grassland. Well-drained, sandy loam soils among rocky outcrops, or at the edges of sandstone sheets, Highveld Grassland, 1700 m. | | HIGH |

| TAXON | RED LIST STATUS | HABITAT AND DISTRIBUTION | FLOWERING TIME | PROBABILITY OF OCCURRENCE |
|---|---|---|---|---|
| *Kniphofia typhoides* ASPHODELACEAE | Near Threatened | Gauteng, Limpopo, Mpumalanga, North West, Parys to Lydenburg to Paulpietersburg to Newcastle. Low lying wetlands and seasonally wet areas in climax Themeda triandra grasslands on heavy black clay soils, tends to disappear from degraded grasslands. | | **MODERATE** (habitat may not be suitable) |
| *Merwilla plumbea* HYACINTHACEAE | Near Threatened | Widespread in eastern half of South Africa. Also in Eswatini and Lesotho. Montane mistbelt and Ngongoni grassland, rocky areas on steep, well drained slopes. 300-2500 m. | | **HIGH** |
| *Miraglossum davyi* APOCYNACEAE | Vulnerable | Dullstroom, Middelburg and Standerton. Grassland (Lydenburg Montane Grassland, Soweto Highveld Grassland, Eastern Highveld Grassland). | | **HIGH** |
| *Pachycarpus suaveolens* APOCYNACEAE | Vulnerable | Gauteng and Mpumalanga to Eswatini. Lydenburg Montane Grassland, Eastern Highveld Grassland, Soweto Highveld Grassland. Short or annually burnt grasslands, 1400-2000 m. | | **HIGH** |
| *Riocreuxia aberrans* APOCYNACEAE | Near Threatened | Dullstroom to Ermelo. Grassland. Wedged in cracks among rocks on exposed quartzite ridges. | | LOW (habitat not suitable) |

### PROTECTED SPECIES RECORDED IN THE STUDY AREA

None of the three species protected under the National Forests Act (Appendix 1 of the Plant Species Assessment) have been previously recorded in the area in which the site is located. A full list of plants that could occur on site, as well as those recorded (Appendix 2 of the Plant Species Assessment).

There are several species recorded on site that are protected under the Mpumalanga Nature Conservation Act No. 10 of 1998 (Appendix 3 the Plant Species Assessment). It is a legal requirement to obtain a permit from the provincial authorities for the destruction of any of these species. A comprehensive walk-through survey of the final footprint is required to compile a complete list of these protected species.

## 6.2.3 TERRESTRIAL ANIMAL SPECIES

*The following is extracted from the Terrestrial Animal Species Assessment, compiled by David Hoare Consulting (Pty) Ltd (September, 2022) and included as* ***Appendix F-2.***

### ANIMAL SPECIES FLAGGED FOR THE STUDY AREA

– **Sensitive species 2:**

This is a large bird listed as Vulnerable. They are usually found in grasslands close to bodies of water or vleis. They prefer to nest near bodies of water that provide cover, but often feed in open savannas and grasslands. They can also be found in agricultural lands such as pastures, cropland, or fallow fields. They also often select habitats that include some trees, as they are able to roost in trees. A detailed avifaunal assessment has been undertaken for this project where additional information can be obtained regarding this species.

– **Geronticus calvus:**

The Southern Bald Ibis, listed as Vulnerable, is restricted to Lesotho, north-east South Africa and west Eswatini. The core range lies in the north-eastern Free State, Mpumalanga and the KwaZulu-Natal Drakensberg. The site is therefore near to the centre of its relatively restricted global distribution. It prefers high rainfall (>700 mm p.a.), sour and alpine grasslands, characterised by an absence of trees and a short, dense grass sward. It also occurs in lightly wooded and relatively arid country. It forages preferentially on recently burned ground, also using unburnt natural grassland, cultivated pastures, reaped maize fields and ploughed areas (Birdlife International 2022). A detailed avifaunal assessment has been undertaken for this project where additional information can be obtained regarding this species.

– **Tyto capensis:**

The African Grass Owl is listed as Vulnerable. It is confined to the higher rainfall areas in the eastern half of South Africa, where it typically roosts and breeds in tall, rank grass or sedges associated with damp substrates, such as permanent and non-perennial wetlands and streams. The Olifants River is an important corridor for the species. A detailed avifaunal assessment has been undertaken for this project where additional information can be obtained regarding this species.

– **Sagittarius serpentarius:**

The Secretarybird, listed as Endangered, inhabits open landscapes, ranging from open plains and grasslands to lightly wooded savanna, but is also found in agricultural areas and sub-desert. It is nomadic, but birds living in the moist grassland biome are less likely to be nomadic, although they will travel on average 20-30 km per day while foraging. There are various threats to this species, one of which is that overgrazing degrades favourable habitat. A detailed avifaunal assessment has been undertaken for this project where additional information can be obtained regarding this species.

– **Crocidura maquassiensis:**

The Maquassie Musk Shrew (*Crocidura maquassiensis*), listed as Vulnerable, is endemic to South Africa, Eswatini and Zimbabwe, where it is found in moist grassland habitats in Savannah and Grassland Biomes. It appears to tolerate a wide range of habitats, although threats to the species have been inferred as being related to loss or degradation of moist, productive areas, such as rank grassland and wetlands. The species is patchily distributed within the north-eastern part of South Africa. The study area is within the known distribution of this species in the sense that there are records in quarter degree grids throughout the Highveld, although not from the current grid or any nearby grids. It is, however, flagged in the DFFE Online Screening Tool as potentially occurring on site. It is therefore considered possible that it could occur on site and individuals could therefore possibly be affected by construction activities.

– **Ourebia ourebi ourebi:**

The Oribi (*Ourebia ourebi*), listed as Endangered in South Africa and Least Concern globally, has a geographical distribution that includes the study area. It is widely distributed in Africa, but the subspecies found in South Africa has a more limited distribution that includes South Africa and Mozambique. The species inhabits savanna woodlands, floodplains and other open grasslands from sea level to 2200 m asl (in Mpumalanga). They reach their highest density on floodplains and moist tropical grasslands. They prefer open grassland in good condition containing a mosaic of short grass for feeding and tall grass for feeding and shelter. It has not been recorded in the grid in which the site is located, which is one of a group of grids in south-western Mpumalanga where the species does not appear to occur. Nevertheless, the area is within the overall distribution range of the species. Based on the gap in the distribution of the species, there is a low likelihood that it could occur on site within any suitable habitat, although it is flagged for the project in the Screening Tool.

Since a separate Avifaunal Specialist Assessment is undertaken for this project, the assessment here is a more general one in which favourable habitat for mostly terrestrial species is considered, primarily Oribi and Maquassie Musk Shrew, as well as the additional species listed below.

## OTHER LISTED SPECIES FOR THE STUDY AREA

Vertebrate species (mammals, reptiles, amphibians) with a geographical distribution that includes the study area are listed in Appendix 1 of the study. All threatened (Critically Endangered, Endangered or Vulnerable) or near threatened vertebrate animals that could occur in the study area and have habitat preference that includes habitats available in the study area are discussed further.

– **Grey Rhebok:**

The Grey Rhebok (*Pelea capreolus*), listed as Near Threatened, is endemic to South Africa, Lesotho and parts of Eswatini. They are predominantly browsers, feeding on ground-hugging forbs, and largely water independent, obtaining most of their water requirements from their food. Local declines in their population have been attributed to increased densities of natural predators, such as Black-backed Jackal, Caracals and Leopards. It has not been recorded in the grid in which the site is located but has been recorded in grids to the north-east and many grids further to the south, so the site is within the overall distribution range of the species. There is therefore a moderate likelihood that it could occur on site within any suitable habitat. However, it is a relatively mobile species and not necessarily dependent on any particular habitat. It is likely to move away from the path of any construction and development of parts of the study area.

– **Black-footed Cat:**

The Black-footed Cat (*Felis nigripes*), listed as Vulnerable, has been previously recorded in the grid in which the project is located, as well as in four surrounding grids. It's known distribution is on the inland part of most of South Africa, but seemingly not within the winter-rainfall part of the country. It also occurs in Botswana and Namibia. The current project area is towards the edge of the distribution range of the species, but the species is highly likely to occur in the area. The species is nocturnal and carnivorous, favouring any vegetation cover that is low and not too dense. They make use of dens in the daytime, which can be abandoned termite mounds, or dens dug by other animals, such as aardvark, springhares or cape ground squirrels. Local declines in their population have been attributed to increased densities of natural predators, such as Black-backed Jackal, Caracals and Leopards. They are highly vulnerable to domestic carnivores. The study area is suited to this species, and it probably occurs there.

– **Leopard:**

The Leopard (*Panthera pardus*), listed as Vulnerable, has a wide habitat tolerance, but with a preference for densely wooded areas and rocky areas. They have large home ranges, but do not migrate easily, males having ranges of about 100 $km^2$ and females 20 $km^2$. It has not been recorded in any of the adjacent or nearby grids and the overall distribution shows a gap in its distribution that includes the current study area. There is therefore a low probability of this species occurring on site, and if it did occur there it would probably be at very low densities.

– **African Marsh Rat:**

The African Marsh Rat (*Dasymys robertsii*), listed as Vulnerable, is patchily distributed in northern South Africa and Zimbabwe. Within South Africa it is found primarily in savanna and lowveld areas, where it is dependent on river and wetland systems. Its distribution coincides with the Limpopo watershed, of which the Olifants River is a tributary. Distribution records suggest that the species is not likely to occur in the study area.

– **Spotted-necked Otter:**

The Spotted-necked Otter (*Hydrictus maculicollis*), listed as Vulnerable, is widely but patchily distributed in the higher parts of the eastern half of South Africa. It is also found in lakes and large rivers throughout much of Africa south of 10oN. They are restricted to areas of permanent fresh water where there is good shoreline cover and an abundant prey base (small fishes). They prefer water that is not silt-laden and is unpolluted, but are known to occur in relatively polluted rivers, such as the Braamfonteinspruit, Jukskei and Blesbokspruit in Gauteng. The site is within the known distribution of this species and there are historical records for one nearby grid to the north-east, although not from the current grid. There is potentially suitable habitat for this species on site within the small dams.

– **Cape Clawless Otter:**

The Cape Clawless Otter (*Aonyx capensis*), listed as Near Threatened, is widely but patchily distributed throughout South Africa, and is also the most widely found otter in Africa. It is aquatic and seldom found far from permanent water, which needs to be fresh. The site is within the known distribution of this species and there are historical records for one adjacent grid to the north-east, although not from the current grid. There is potentially suitable habitat for this species on site, although water quality may be an issue. It is therefore considered possible that it occurs on site.

– **African Striped Weasel:**

The African Striped Weasel (*Poecilogale albinucha*), listed as Near Threatened, is found throughout most of South Africa, except for the arid interior, and into central Africa. It has not been recorded in the grid in which the site is located, but has been recorded in two adjacent grids, and the site is within the overall distribution range for

the species. It is found primarily in moist grasslands and fynbos, where adequate numbers of prey may be found. It is considered likely that it could occur on site.

– **Brown Hyaena:**

The Brown Hyaena (*Parahyaena brunnea*), listed as Near Threatened, is found in a band running down the centre of the country, expanding into the entire northern parts of the country. There is a gap in the distribution around the current study area, but there is a possibility that vagrant individuals could extend into this area. The species is found in desert areas, particularly along the west coast, semi-desert, open scrub and open woodland savannah (Mills & Hes 1997). It is a solitary scavenger that travels vast distances every day in search of food. It has a medium chance of occurring in the study area since the distribution range includes the study area, however there are no historical records from nearby. It is a mobile animal that is likely to move away from the path of any construction and development of parts of the site is therefore highly unlikely to have any negative effect on the species. It is considered that there is a low likelihood of it occurring on site.

– **South African Hedgehog:**

The South African Hedgehog (*Atelerix frontalis*), listed as Near Threatened, is found in a large part of the central part of South Africa, extending down to the south-eastern coast, and is also found in Namibia, Botswana, Zimbabwe, Lesotho and Eswatini. It requires ample ground cover for cover, nesting and foraging and prefers dense vegetation and rocky outcrops. The site is well-within the known distribution of this species and there are historical records for nearby grids in all directions, and it has been recorded from the current grid. There is therefore a high probability of the study area being suitable for this species. It is considered likely that it could occur on site.

– **Swamp Musk Shrew:**

The Swamp Musk Shrew (*Crocidura mariquensis*), listed as Near Threatened, is found in a large part of the north-eastern part of South Africa, extending down to the south-eastern coast. It occurs in wetlands and waterlogged grasslands, predominantly in KwaZulu-Natal, Mpumalanga, Limpopo, Gauteng and eastern North-West Provinces. The site is well-within the known distribution of this species and there are historical records for nearby grids in all directions, and it has been recorded from the current grid. There is therefore a high probability of the study area being suitable for this species. It is considered likely that it could occur on site.

– **Highveld Golden Mole:**

The Highveld Golden Mole (*Amblysomus septentrionalis*), listed as Near Threatened, is found across the Mpumalanga Highveld from Wakkerstroom northwards to Ermelo and Barberton and westwards through Standerton to north-eastern Free State. It occurs within meadows and edges of marshes in high-altitude grassland in Mpumalanga. They are restricted to friable soils in valleys and on mountainsides. The site is within the known distribution of this species, although higher densities of records occur further east. There are historical records for an adjacent grid to the south-west, but it has not been recorded from the current grid. There is therefore a medium probability of the study area being suitable for this species. It is considered possible that it could occur on site and individuals could be affected by construction activities, if suitable habitat is damaged.

– **White-tailed Rat:**

The White-tailed Rat (*Mystromys albicaudatus*), listed as Vulnerable, is endemic to South Africa and Lesotho, where it is found primarily in Highveld grasslands, but extending into adjacent Fynbos and Karoo areas. It is terrestrial, but never found in soft, sandy substrates, rocks, wetlands or riverbanks, and do not occur in transformed habitat. The study area is on the edge of the known distribution of this species, with most of Mpumalanga appearing to be a “hole” in the occurrence of the species. There is therefore a low probability of the study area being suitable for this species. It is considered unlikely that it would occur on site.

– **Vlei Rat:**

The Vlei Rat (Grassland-type) (*Otomys auratus*), listed as Near Threatened, is near-endemic to South Africa, occurring in the north-eastern half of the country, associated with mesic grasslands and wetlands within alpine, montane and sub-montane regions. It is likely to be associated with sedges and grasses in densely vegetated wetlands with wet soils. The study area is well within the known distribution of this species and there are historical records for the grid in which the study area is located, as well as two adjacent grids. There is therefore a high probability of the study area being suitable for this species. It is considered likely that it occurs on site and the proposed development could therefore affect this species.

– **Coppery grass lizard:**

The Coppery Grass Lizard (*Chamaesaura aenea*), listed as Near Threatened, is endemic to South Africa, where it is found in western Eswatini, Limpopo, Mpumalanga, Gauteng, KwaZulu-Natal, north-eastern Free State and Eastern Cape. It is found on grassy slopes and plateau of the eastern escarpment and Highveld, where it probably shelters in the base of grass tussocks. The study area is within the known distribution of this species and there are historical records for two adjacent grids to the north and south, although not from the current grid. There is therefore a moderate probability of the study area being suitable for this species, including suitable habitat within the project area.

- **Large-scaled grass lizard:**

The Large-scaled Grass Lizard (*Chamaesaura macrolepis*), listed as Near Threatened, is endemic to South Africa, Eswatini and Zimbabwe. In South Africa it is found in Limpopo, Mpumalanga, and KwaZulu-Natal. It is found in grassland, especially rocky, grassy hillsides. Its main distribution is within the Indian Ocean Coastal Belt part of KwaZulu-Natal, but there are scattered records on the Highveld. The study area is marginally within the known distribution of this species in the sense that there are records in quarter degree grids up to Gauteng and there are historical records for one nearby grid to the nort-east, although not from the current grid. There is therefore a moderate to low probability of the study area being suitable for this species, including suitable habitat within the project area. It is considered a low likelihood that it could occur on site.

- **Breyer's Long-tailed Seps**

The Breyer's Long-tailed Seps (*Tetradactylus breyeri*), listed as Vulnerable, is endemic to South Africa, where it is found in Free State, Mpumalanga, and KwaZulu-Natal. It is found in montane and Highveld grassland. The study area is marginally within the known distribution of this species in the sense that there are records in quarter degree grids throughout the Highveld, extending from Blyde River Canyon to the Drakensberg, although not from the current grid or any nearby grids. There is therefore a low probability of the study area being suitable for this species, including suitable habitat within the project area. It is considered unlikely that it would occur on site.

- **Striped Harlequin Snake**

The Striped Harlequin Snake (*Homoroselaps dorsalis*), listed as Near Threatened, is endemic to South Africa, where it is found in western Eswatini, Limpopo, Mpumalanga, Gauteng, KwaZulu-Natal, and Free State. It is partly fossorial and known to inhabit old termitaria in grassland habitat. Most of its range is at moderately high elevations, but it also occurs close to sea level in KwaZulu-Natal. The study area is within the known distribution of this species and there are historical records for one adjacent grid to the north, although not from the current grid. There is therefore a moderate probability of the study area being suitable for this species, including suitable habitat within the project area. It is considered likely that it could occur on site.

- **The Giant Bull Frog**

The Giant Bull Frog (*Pyxicephalus adspersus*) previously listed as Near Threatened, is found in seasonal shallow grassy pans, vleis and other rain-filled depressions in open flat areas of grassland or savanna and, at the limits of its distribution, in Nama Karoo and thicket. For most of the year the species remains buried up to 1 m underground. They emerge only during the peak of the rainy season to forage and breed. If conditions are extremely dry, they may remain cocooned underground for several years. Long distances often separate suitable breeding sites. In order to breed, they require shallow, rain-filled depressions that retain water long enough for the tadpoles to metamorphose. Before and after breeding, bullfrogs forage in open grassland, feeding mostly on insects, but also on other frogs, lizards, snakes, small birds and rodents. After breeding males generally bury themselves within 100 m of the breeding site, but females may disperse up to 1 km away. Based on habitat requirements, there is a medium probability that this species occurs in the study area.

## PROTECTED ANIMALS

Species protected according to the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) that have a geographical distribution that includes the site are listed in Appendix 3 of the study, marked with the letter "N". This includes the following species:

- Black Wildebeest (does not occur on site),
- Oribi (unlikely to occur on site),
- White Rhinoceros (doesn't occur on site),
- Black-footed Cat,

- Serval,
- Leopard (probably does not occur on site),
- Cape Clawless Otter,
- Spotted-necked Otter,
- Cape Fox,
- Honey Badger,
- South African Hedgehog,
- Brown Hyena, and
- Giant Bullfrog.

There are additional species protected under the Mpumalanga Nature Conservation Act (Act No. 10 of 1998) (see Appendix 2 of the study). These include the following that have a geographical distribution that includes the site:

- Giant Bullfrog,
- South African Hedgehog,
- Honey Badger,
- Aardwolf,
- Brown Hyaena,
- Mountain Reedbuck,
- Black Wildebeest,
- Klipspringer,
- Orbi,
- Steenbok,
- Eland,
- Cape Clawless Otter
- Spotted-necked Otter,

All species of reptiles, except the water leguaan, rock leguaan and all species of snakes, of which the following have a geographical distribution that includes the site:

- Marsh terrapin
- Leopard tortoise
- Common dwarf gecko
- Spotted dwarf gecko
- Van Son's gecko
- Delalande's sandveld lizard
- Burchell's sand lizard
- (Spotted sand lizard)
- Coppery grass lizard
- Cape grass lizard
- Large-scaled grass lizard
- Common girdled lizard

- Common crag lizard
- Yellow-throated plated lizard
- Breyer's long-tailed seps
- Short-headed legless skink
- Thin-tailed legless skink
- Wahlberg's snake-eyed skink
- Cape skink
- Red-sided skink
- Speckled rock skink
- Variable skink
- Montane dwarf burrowing skink
- Common flap-necked chameleon
- Eastern ground agama
- Southern rock agama

### 6.2.4 AQUATIC

*The following is extracted from the Aquatic Impact Assessment, compiled by EnviroSci (Pty) Ltd (June, 2022) and included as **Appendix F-3**.*

In terms of surface water, the study area is located within the western portion of C11B Quaternary Catchment (Vaal River) of the Highveld Ecoregion in the Vaal Water Management Area (WMA). Most of the aquatic features and unknown tributary of the Vaal River within the study area are located within the riverine valleys and upper catchment areas of this quaternary catchment (**Figure 6-19**).

**Table 6-7** provides a summary of the aquatic ecoregion and subregion of the Project area.

**Table 6-7: Aquatic Ecoregion and Subregion of the Project Area**

| AQUATIC ECOREGION AND SUB-REGIONS IN WHICH THE PROPOSED POWERLINE IS LOCATED | |
|---|---|
| Ecoregion | Highveld |
| Catchment | Vaal River |
| Quaternary Catchment | C11B |
| WMA | Vaal |

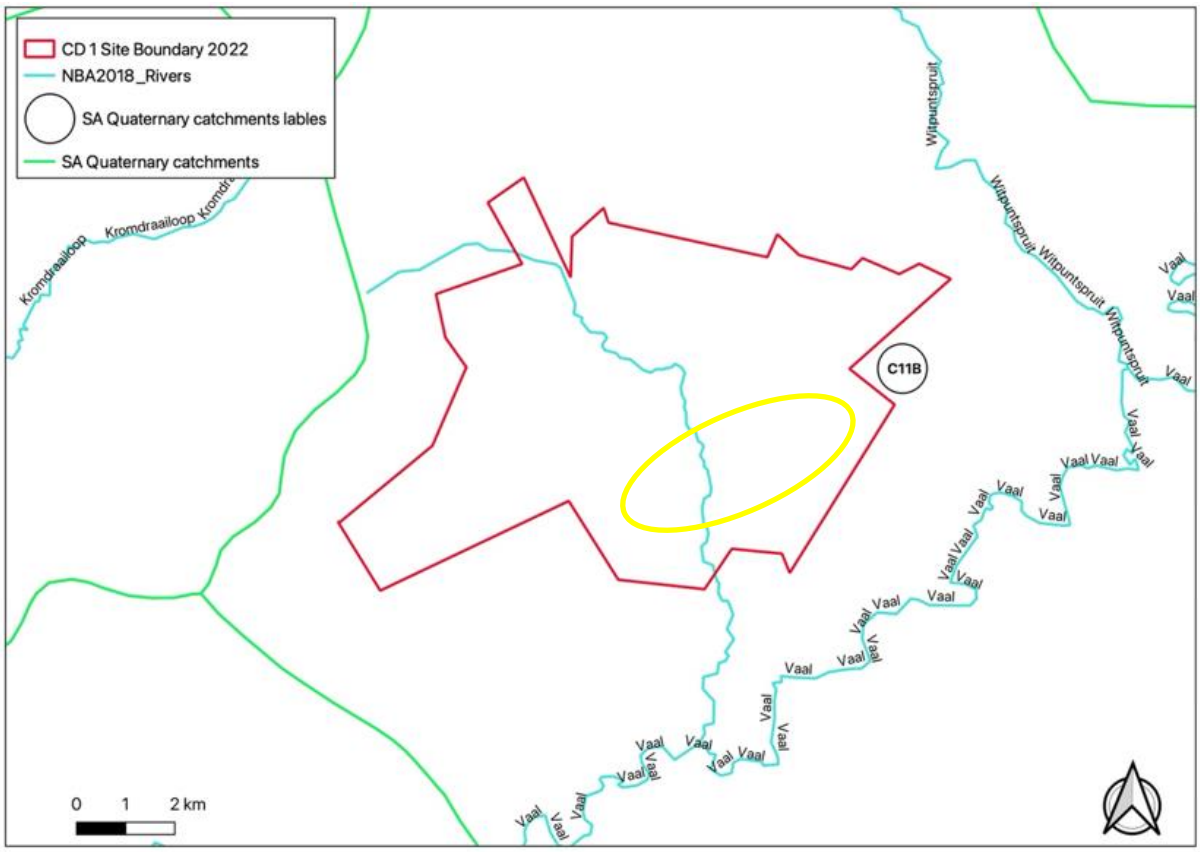



**Figure 6-19: Mainstream rivers and quaternary catchment associated with the proposed site (Approximate location of Grid Connection indicated by Yellow Oval)**

The study area was dominated by a variety of aquatic features associated with catchments and rivers, and were characterised as follows as per their respective Hydrogeomorphic classes:

Mainstem Rivers Floodplain dominated systems with oxbow wetlands (**Figure 6-20**). A few reaches did contain very narrow riparian zones, consisting mostly of a single row of willow trees associated with the unknown tributary of the Vaal River.

- Valley Bottom Wetlands (Channelled and Unchannelled) (**Figure 6-21**)
- Endorheic pans (**Figure 6-22**)
- Seep wetlands (**Figure 6-23**)
- One minor watercourses (**Figure 6-24**), that was previously part of a wetland systems, but now contains severe head cut and has eroded into a channel / watercourse.
- Most of the aquatic features and unknown tributary of the Vaal River within the study area are located within the riverine valleys and upper catchment areas (pans) within the C11B Quinary Catchment (Vaal River) of the Highveld Ecoregion in the Vaal Water Management Area (**Figure 6-19**).

The Department of Environment Fisheries and Forestry identified the aquatic environment for the study area as having a Very High Sensitivity and was established during the field assessment. However, is not located within an International Bird Area (IBA) or a Strategic Water Resource Area.

The following criteria are present within the site or the associated catchment and was used to determine the sensitivity of the site:

- Presence of Wetlands;
- Aquatic Critical Biodiversity Areas (CBA);
- Freshwater Ecosystem Priority Area quinary catchments (NFEPA);
- Wetland clusters; and

– Eastern Highveld Grassland a listed Threatened Ecosystem under NEMA.

**Figure 6-20: Wetlands associated with the unknown tributary that bisects the broader study area**

**Figure 6-21: Channelled Valley Bottom wetland within the broader study area**

**Figure 6-22: Endorheic Pan, one of three such large systems within the broader study area**

The broader study area is dominated by a variety of aquatic features, characterised as follows:

- Mainstem Rivers - Floodplain dominated systems with oxbow wetlands (**Figure 6-19**). A few reaches did contain very narrow riparian zones, consisting mostly of a single row of willow trees associated with the unknown tributary of the Vaal River
- Valley Bottom Wetlands (Channelled and Unchannelled) (**Figure 6-23**)
- Endorheic pans (**Figure 6-24**)
- Seep wetlands (**Figure 6-25**)
- One minor watercourse (**Figure 6-26**), that was previously part of a wetland systems, but now contains severe head cut and has eroded into a channel / watercourse.

**It is noted that only the Seep wetlands and some artificial dams are specific to the Camden I SEF project area, and therefore also to that of this application relating to the grid connection and associated infrastructure.**

**Figure 6-23: Wetlands associated with the unknown tributary that bisects the broader study area (west of the project footprint)**

**Figure 6-24: Channelled Valley Bottom wetland (north-west of the project footprint)**

**Figure 6-25: Endorheic Pan, one of three such large systems within the study area (north-west of the project footprint)**

**Figure 6-26: A medium sized seep wetland within the central portion of the site (immediately south-west of the Camden I SEF footprint)**

**Figure 6-27: A view of a minor water course, with a view of an earth wall farm dam upstream (west of the project footprint)**

The DFFE identified the aquatic environment for the study area as having a Very High Sensitivity, based on the fact the following criteria are present within the site or the associated catchment, namely:

- Presence of Wetlands to the north and west of the footprint;
- Aquatic Ecological Support Areas (ESA);
- Freshwater Ecosystem Priority Area quinary catchments (NFEPA); and
- Eastern Highveld Grassland a listed Threatened Ecosystem under NEMA.

The presence of these Very High Sensitivity features, although to a finer mapping scale were confirmed during this assessment. The study area is however not located within an International Bird Area (IBA) or a Strategic Water Resource Area.

This ground-truthed delineations were then compared to current wetland inventories (**Figure 6-28**), 1: 50 000 top cadastral surveys mapping and the site. These inventories include wetland spatial data based on landcover 2007 data, previous assessments and wetland information retained by the Provincial authorities, combined into one database that formed part of the updated National Spatial Biodiversity Assessment, 2018.

A baseline map was then developed and refined using the August 2020 survey data, noting that due to the complex nature of the topography and geology, the features were digitised at a scale of 1:4000 (**Figure 6-29**).

Coupled to the aquatic delineations, information was collected on potential species that could occur within the wetlands and water courses, especially any areas that would contain open water for long periods and or conservation worthy species (Listed or Protected).

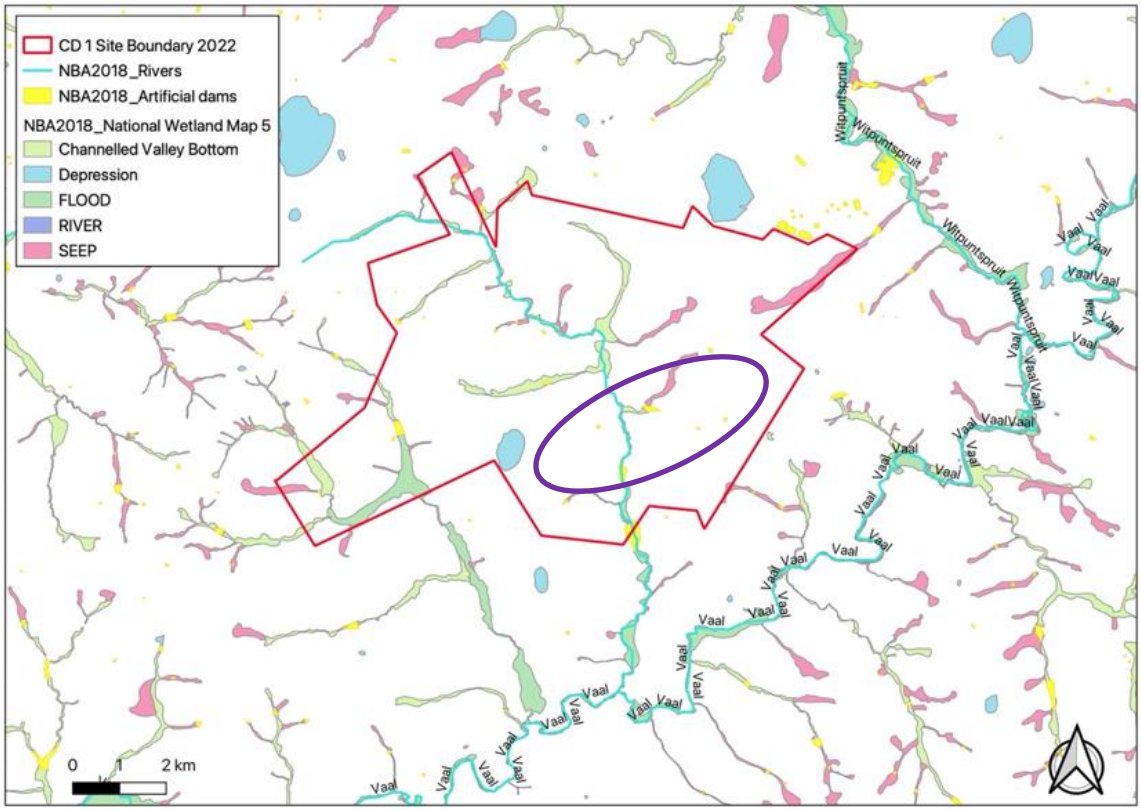



**Figure 6-28: National Wetland Inventory wetlands and waterbodies (Approximate location of Grid Connection indicated by Purple Oval)**

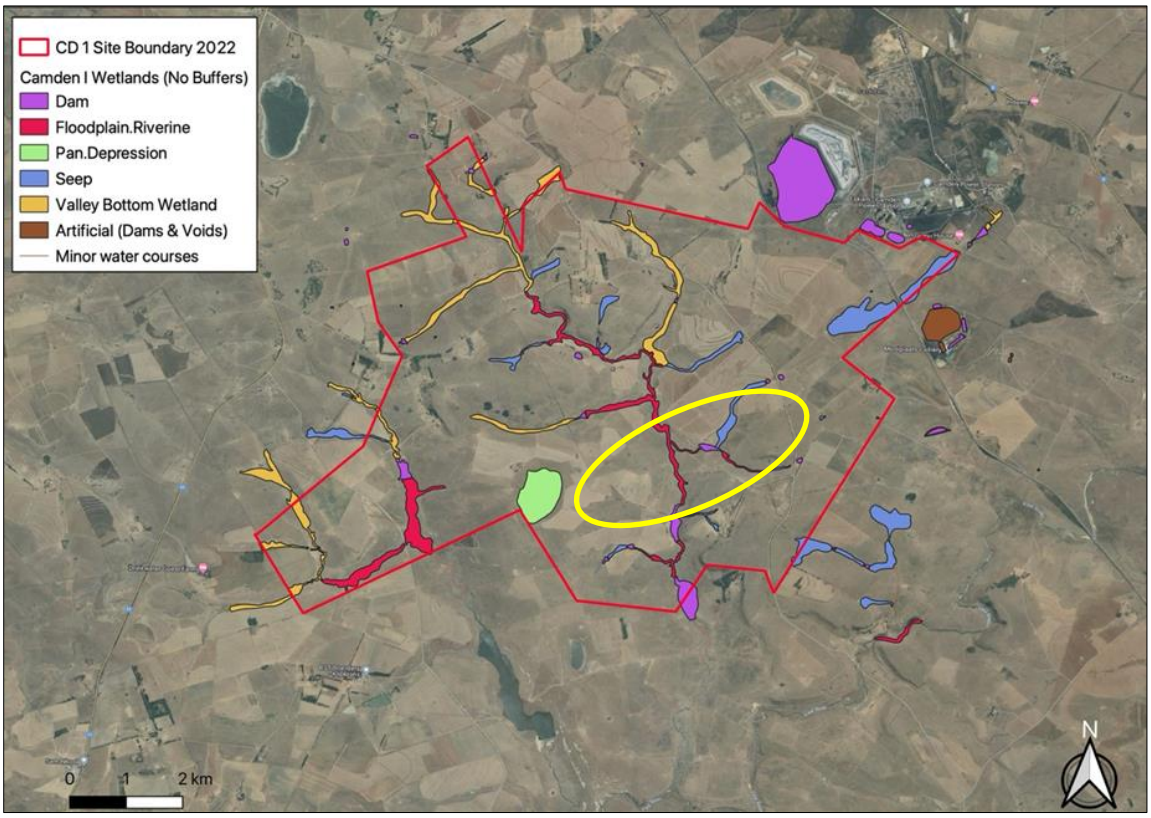



**Figure 6-29: Wetlands delineated in this assessment based on ground truthing information collected (Approximate location of Grid Connection indicated by Yellow Oval)**

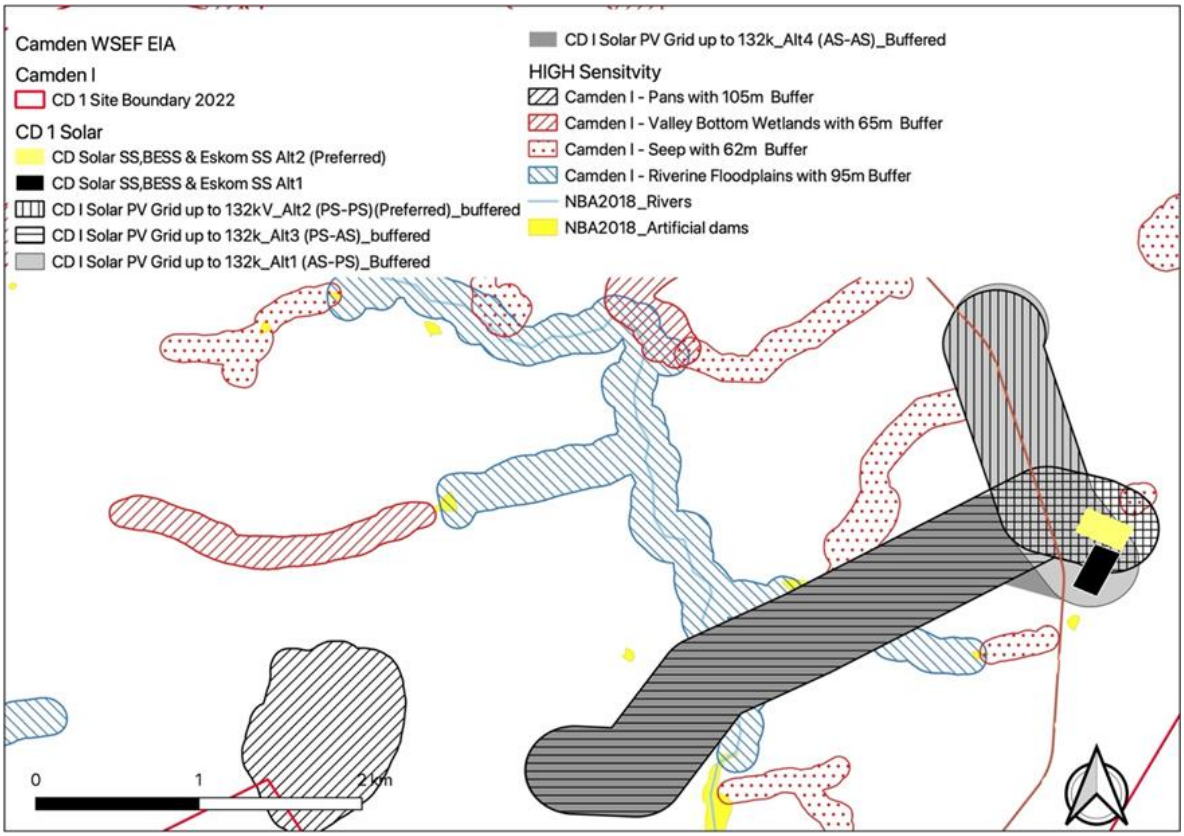



**Figure 6-30: Camden 1 Solar Energy Facility, associated 132kV Grid and Eskom portion of substation including alternatives in relation to buffered aquatic systems delineated in this assessment**

## PRESENT ECOLOGICAL STATE AND CONSERVATION IMPORTANCE

Based on the information collected during the field investigations, these ratings are verified and upheld for the riverine / wetland systems. The natural wetlands were however rated independently and achieved PES scores of C and D, while the EIS was rated as HIGH. The High EIS rating for both natural water courses and wetlands, is further substantiated by the fact that the affected catchments are included in both the National Freshwater Priority Atlas and the provincial Biodiversity Spatial Plan Critical Biodiversity Area spatial layers (**Figure 6-31** and **Figure 6-32)**These areas are also highlighted as important ecological support areas along the Vaal River.

Overall, these catchment areas and subsequent rivers / watercourses are largely in a natural state with localised impacts in some areas, which include the following:

- Erosion and sedimentation associated with road crossings;
- Impeded water flow due to several in channel farm dams; and
- Sedimentation and scour of channels due to undersized culverts within present day road crossings.

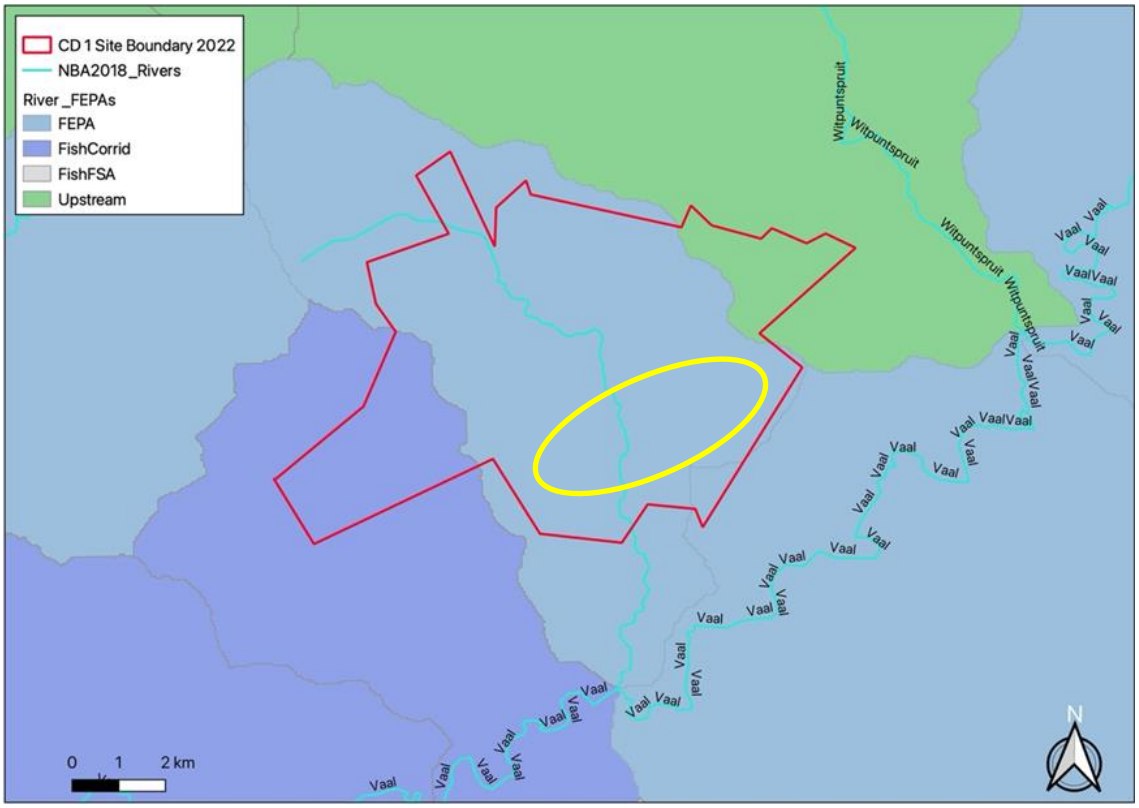



**Figure 6-31: The Freshwater Ecosystem Priority Areas for the broader study area (Approximate location of Grid Connection indicated by Yellow Oval)**

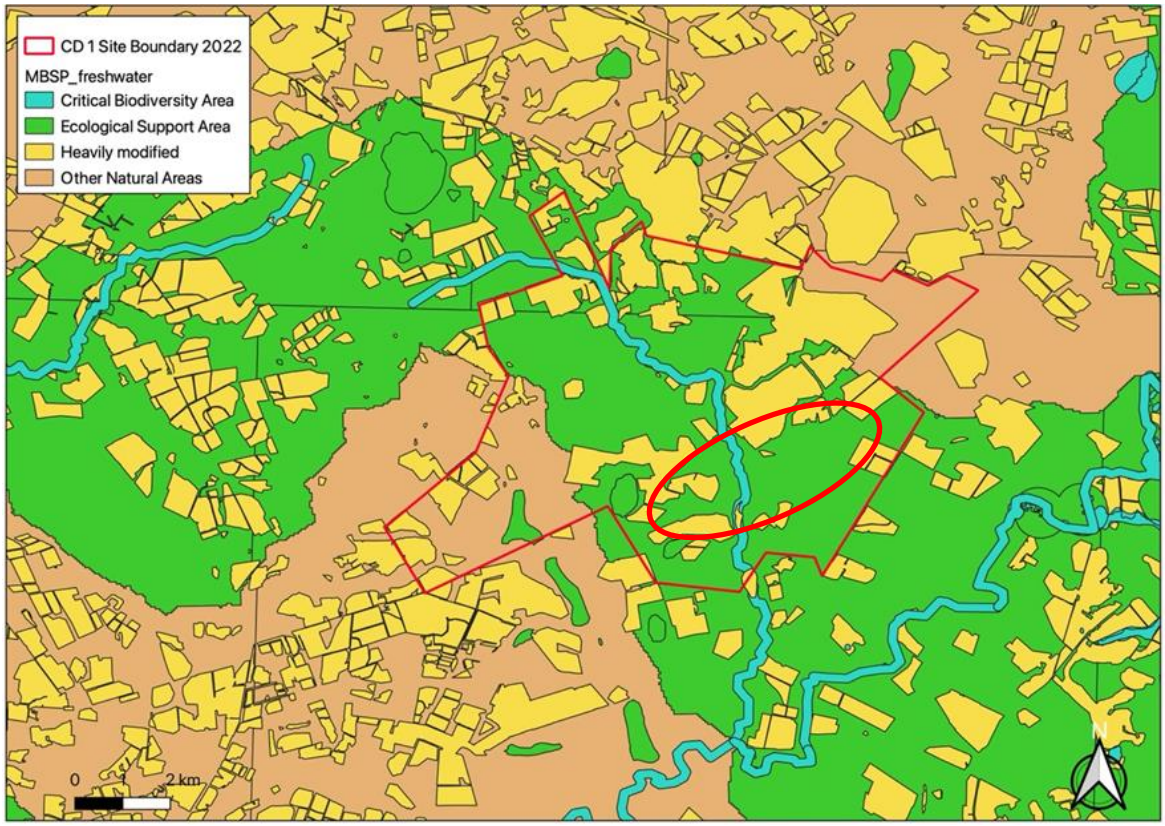



**Figure 6-32: The Critical Biodiversity Areas as per the Mpumalanga Biodiversity Spatial Plan for the broader study area (Approximate location of Grid Connection indicated by Red Oval)**

## SITE SENSITIVITY

Using the baseline description and field data while considering the current disturbances and site characteristics, the following features were identified, then categorised into one of number pre-determined sensitivity categories to provide protect and/or guide the layout planning and design processes of the corridor and a suitable alignment for the grid within. **Table 6-8** outlines the Aquatic sensitivity mapping categories used to categorise features or areas (with their buffers).

**Table 6-8: Sensitivity Categories**

| | |
|---|---|
| **No Go** | Legislated "no go" areas or setbacks and areas or features that are considered of such significance that impacting them may be regarded as fatal flaw or strongly influence the project impact significance profile Therefore areas or features that are considered to have a high sensitivity or where project infrastructure would be highly constrained and should be avoided as far as possible. Infrastructure located in these areas are likely to drive up impact significance ratings and mitigations |
| **Medium** | Buffer areas and or areas that are deemed to be of medium sensitivity but should still be avoid as this would minimise impacts and or the need for additional Water Use Authorisation |
| **Low** | Areas of low sensitivity or constraints, such as artificial systems |
| **Neutral** | Unconstrained areas (left blank in mapping) |

**Table 6-9**Table 6-9 below provides an overview of the sensitivity of various aquatic features (with buffers distances included) as it relates to the main project component types for the project. The features are shown spatially in **Figure 6-33**. The sensitivity ratings of No go, Medium and Low were determined through an assessment of the aquatic habitat sensitivity and related constraints. However, these No-Go areas (with buffers) relate in general terms to the project and there are areas where encroachment on these areas would occur (i.e. existing road crossings within wetlands) but this is considered acceptable since these areas have already been impacted.

These proposed constraints / buffers do not include bird and or bat specialist buffers / constraints as theirs buffers along aquatic features are at times far larger around aquatic features, than those required for the known aquatic species within this region.

**Table 6-9: Results of the sensitivity rating / constraints assessment**

| DEVELOPMENT COMPONENT | WATERBODY TYPE | SENSITIVITY RATING OF THE RESPECTIVE WATERBODY TYPE AGAINST THE DEVELOPMENT TYPE AND THE REQUIRED BUFFER | SENSITIVITY RATING OVERRIDE, IF AN IMPACT SUCH AS A ROAD ALREADY OCCURS WITHIN THE PROPOSED FOOTPRINT |
|---|---|---|---|
| | Seepage Wetlands | No-Go with 62 m buffer | |
| | Artificial dams or mine works | | |
| **Buildings / Substations & BESS** | Riverine Floodplains with Riparian Vegetation or wetland areas | No-Go with 95 m buffer | |
| | Seepage Wetlands | No-Go with 62m buffer | |
| | Artificial dams or mine works | | |
| **Roads & Hardstands** | Riverine Floodplains with Riparian Vegetation or wetland areas | No-Go with 95 m buffer | Moderate if an existing crossing / road or impact is already present, that must then be included in the potential road network. However, if the road network can't be aligned with existing impacted areas, then any such crossings must be evaluated on a case-by-case basis, by the aquatic |
| | Seepage Wetlands | No-Go with 62 m buffer | |

| DEVELOPMENT COMPONENT | WATERBODY TYPE | SENSITIVITY RATING OF THE RESPECTIVE WATERBODY TYPE AGAINST THE DEVELOPMENT TYPE AND THE REQUIRED BUFFER | SENSITIVITY RATING OVERRIDE, IF AN IMPACT SUCH AS A ROAD ALREADY OCCURS WITHIN THE PROPOSED FOOTPRINT |
|---|---|---|---|
| | | | specialist, preferably with the engineers and a site visit |
| | Artificial dams or mine works | | |
| **Overhead Lines** | Riverine Floodplains with Riparian Vegetation or wetland areas | Assumption is that the overhead lines could span these areas, but the towers/pylons should adhere to the buffer distances as indicated as far as possible but where areas are too large to span (buffers) then these tower positions must be evaluated on a case-by-case basis. | |
| | Seepage Wetlands | | |
| | Artificial dams or mine works | | |

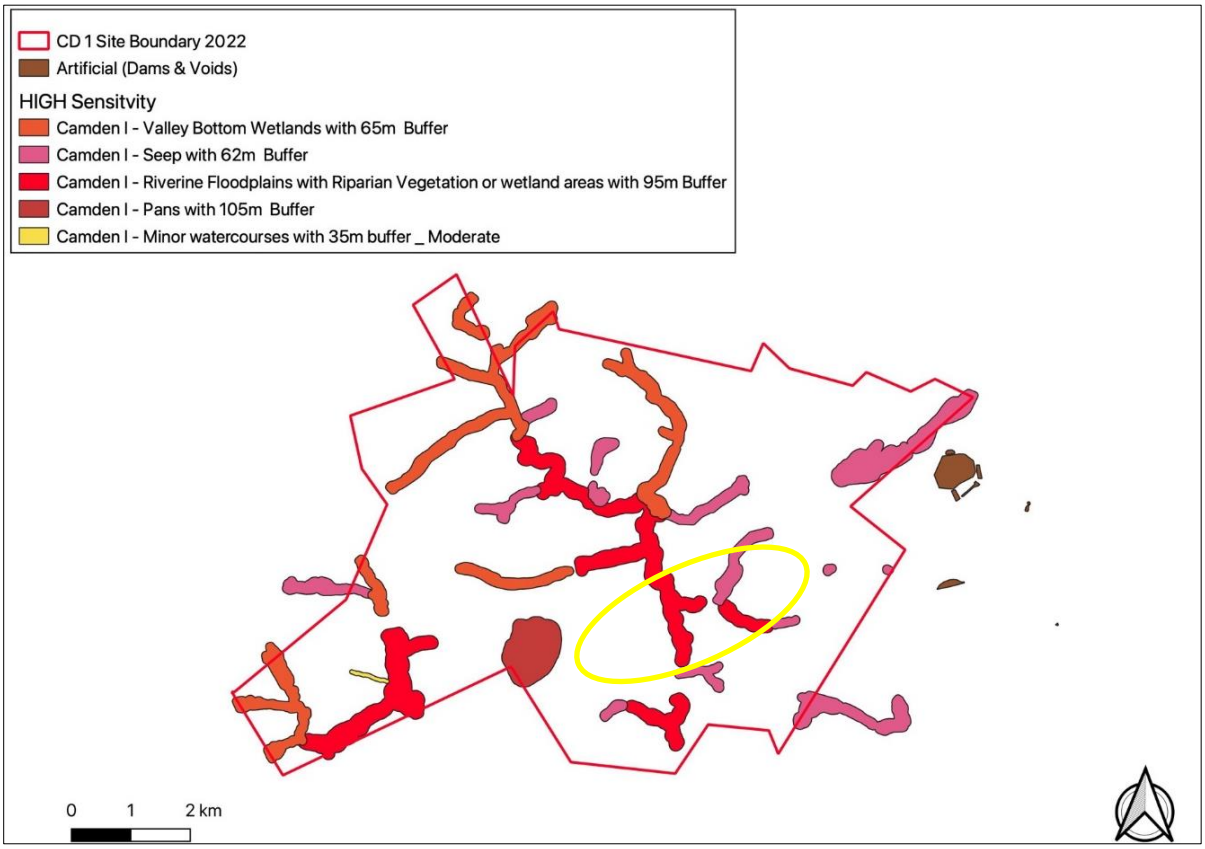



**Figure 6-33: The delineated waterbodies inclusive of the respective buffer distances of the broader study area (Approximate location of Grid Connection indicated by Yellow Oval)**

## 6.2.5 AVIFAUNA

*The following is extracted from the Aquatic Impact Assessment, compiled by Chris van Rooyen Consulting (Pty) Ltd (June, 2022) and included as* ***Appendix F-1****.*

### IMPORTANT BIRD AREAS

The study area is not located in an Important Bird Area (IBA), but it is located between three IBAs. The closest IBA to the study area is the Amersfoort-Bethal-Carolina IBA SA018, which is located within 5 km from the site to the west. The Grasslands IBA SA020 is located 6-7 km to the east of the site. The Chrissies Pans IBA SA019 is located 16-17 km to the north-east of the site. Due to the close proximity of the site to the IBAs, it is possible

that some highly mobile priority species which are also IBA trigger species, and which occur either permanently or sporadically in the IBAs, might be impacted by the project when they leave to forage or breed beyond the borders of the IBA. Species that were recorded in the broader areas and fall within this category are the following:

- Secretarybird
- Denham's Bustard
- Blue Crane
- Grey Crowned Crane
- Wattled Crane
- White-backed Duck
- Yellow-billed Duck
- Martial Eagle
- Lanner Falcon
- Greater Flamingo
- Lesser Flamingo
- Black-necked Grebe
- Little Grebe
- African Marsh Harrier
- Black Harrier
- Southern Bald Ibis
- African Grass Owl
- Southern Pochard
- Cape Shoveler

## BIRD HABITAT

Whilst much of the distribution and abundance of the bird species in the study area can be explained by the dominant biomes and vegetation types, it is also important to examine the modifications which have changed the natural landscape, and which may have an effect on the distribution of avifauna. These are sometimes evident at a much smaller spatial scale than the biome or vegetation types, and are determined by a host of factors such as topography, land use and man-made infrastructure.

The following bird habitat classes were identified in the project site:

**Grassland:**

The majority of the habitat in the project site comprises natural grassland. The grassland varies from dense stands of relatively high grass to areas of heavily grazed short grass. The priority species which could potentially use the natural grassland in the project site on a regular basis are the following:

- Secretary bird
- White-bellied Bustard
- Common Buzzard
- Jackal Buzzard
- Buff-streaked Chat
- Blue Crane
- Grey Crowned Crane
- Black-chested Snake Eagle
- Long-crested Eagle
- Spotted Eagle-Owl
- Amur Falcon
- Lanner Falcon

- Grey-winged Francolin
- African Harrier-Hawk
- Southern Bald Ibis
- Black-winged Kite
- Blue Korhaan
- Black-winged Lapwing
- African Grass Owl
- Marsh Owl
- Black Sparrowhawk
- White Stork

The priority species which could occasionally use the natural grassland in the project site are the following:

- Black-bellied Bustard
- Denham's Bustard
- Brown Snake Eagle
- Martial Eagle
- Peregrine Falcon
- African Marsh Harrier
- Black Harrier
- Montagu's Harrier
- Northern Black Korhaan
- Cape Vulture

**Drainage lines and wetlands:**

There are a number of wetlands in the project site, most of which are associated with drainage lines. The priority species which could potentially use the wetlands in the project site on a regular basis are the following:

- Blue Crane
- Grey Crowned Crane
- Hadada Ibis
- African Grass Owl
- Marsh Owl

The priority species which could occasionally use the wetlands in the project site are the following:

- African Marsh Harrier
- Wattled Crane

**Agricultural lands:**

The project site contains a patchwork of agricultural fields, where maize, soya beans and pastures are cultivated. Some fields are lying fallow or are in the process of being re-vegetated by grass. The priority species which could potentially use the agricultural fields in the project site on a regular basis are the following:

- Blue Crane
- Egyptian Goose
- Spur-winged Goose
- Helmeted Guineafowl
- Southern Bald Ibis

The priority species which could occasionally use the agricultural lands in the project site are the following:

- Amur Falcon

- Lanner Falcon
- Grey Crowned Crane

**Alien trees:**

The project site contains few trees. Most trees are alien species, particularly Eucalyptus, Australian Acacia (Wattle), and Salix (Willow) species. Trees are often planted as wind breaks next to agricultural lands and around homesteads. Some of the drainage lines also have trees growing in them.

The priority species which could potentially use the alien trees in the project site on a regular basis are the following:

- Secretarybird
- Common Buzzard
- Jackal Buzzard
- Reed Cormorant
- White-breasted Cormorant
- Cape Crow
- Pied Crow
- African Darter
- African Fish Eagle
- Black-chested Snake Eagle
- Long-crested Eagle
- Spotted Eagle-Owl
- Western Cattle Egret
- Amur Falcon
- Lanner Falcon
- Helmeted Guineafowl
- African Harrier-Hawk
- African Sacred Ibis
- Hadada Ibis
- Southern Bald Ibis
- Rock Kestrel
- Black-winged Kite
- Western Barn Owl
- Black Sparrowhawk

The priority species which could occasionally use the alien trees in the project site are the following:

- Peregrine Falcon
- Brown Snake Eagle
- Martial Eagle
- Cape Vulture
- Grey Crowned Crane
- Western Osprey

**Dams:**

There are numerous ground dams at the project site, located in drainage lines. The priority species which could potentially use the dams in the project site on a regular basis are the following:

- Hamerkop
- Red-knobbed Coot

- Reed Cormorant
- White-breasted Cormorant
- African Darter
- Great Egret
- Intermediate Egret
- Little Egret
- Egyptian Goose
- Spur-winged Goose
- Little Grebe
- Grey Heron
- Purple Heron
- African Sacred Ibis
- Common Moorhen
- Southern Pochard
- South African Shelduck
- White Stork
- African Swamphen
- Red-billed Teal

The priority species which could occasionally use the dams in the project site are the following:

- Mallard
- Black-necked Grebe
- Black Heron
- Black-crowned Night Heron
- Goliath Heron
- Squacco Heron
- Western Osprey
- Blue-billed Teal
- Cape Teal

**Pans:**

The project site contains one large pan, and another large pan is located approximately one kilometre south of the site. These pans are a potential drawcard for many priority species. Lesser and Greater Flamingos could use these pans for foraging and roosting. Large raptors and vultures could use the pans for bathing and drinking, and Blue Cranes could roost there on occasion. The priority species which could potentially use the pans in the project site on a regular basis are the following:

- Hamerkop
- Secretary bird
- Red-knobbed Coot
- Blue Crane
- Grey Crowned Crane
- Black-chested Snake Eagle
- Lanner Falcon
- Greater Flamingo
- Lesser Flamingo
- Egyptian Goose
- South African Shelduck

The priority species which could occasionally use the pans in the study area are the following:

- Mallard
- Brown Snake Eagle
- Martial Eagle
- Peregrine Falcon
- Yellow-billed Kite
- Cape Teal
- Cape Vulture

### HIGH VOLTAGE LINES

Eskom power line pylons/towers are regularly used as roosting, hunting and/or nesting habitat by certain species, especially raptors and crows. Southern Bald Ibis is also known to roost on transmission towers in large numbers. The priority species which could potentially use the high voltage lines in the study area on a regular basis are the following:

- Common Buzzard
- Jackal Buzzard
- Cape Crow
- Pied Crow
- Black-chested Snake Eagle
- Long-crested Eagle
- Amur Falcon
- Lanner Falcon
- Southern Bald Ibis
- Rock Kestrel
- Black-winged Kite

The priority species which could occasionally use the high voltage lines in the study area are the following:

- Brown Snake Eagle
- Martial Eagle
- Peregrine Falcon
- Western Osprey
- Cape Vulture

### PRIORITY SPECIES

The South African Bird Atlas Project 2 (SABAP2) data indicates that a total of 234 bird species could potentially occur within the broader area. Appendix 1 of the Avifauna Report provides a comprehensive list of all the species. Of these, 78 species are classified as priority species and 15 of these are South African Red List species. Of the priority species, 55 are likely to occur regularly in the development area.

**Table 6-10** lists all the priority species that are likely to occur regularly and the possible impact on the respective species by the proposed wind farm. The following abbreviations and acronyms are used:

- NT = Near threatened
- VU = Vulnerable
- EN = Endangered

**Table 6-10: Priority species potentially occurring at the development area (Red List species are shaded)**

| SPECIES NAME | SCIENTIFIC NAME | SABAP2 FULL PROTOCOL REPORTING RATE | SABAP2 AD HOC PROTOCOL REPORTING RATE | GLOBAL STATUS | REGIONAL STATUS | POWERLINE PRIORITY | RECORDED DURING SURVEYS | LIKELIHOOD OF REGULAR OCCURRENCE | GRASSLAND | DRAINAGE LINES AND WETLANDS | DAMS | PANS | ALIEN TREES | HV LINES | AGRICULTURE | POWERLINE - COLLISION | DISPLACEMENT: DISTURBANCE | DISPLACEMENT: HABITAT TRANSFORMATION | ELECTROCUTIONS: SUBSTATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hamerkop | *Scopus umbretta* | 12 | 0 | - | - | x | x | H | | x | x | x | | | | x | | | |
| Mallard | *Anas platyrhynchos* | 0.6 | 0.4 | - | - | x | | L | | | x | x | | | | x | | | |
| Secretarybird | *Sagittarius serpentarius* | 13 | 0 | EN | VU | x | x | H | x | | | x | x | | | x | x | x | |
| Black-bellied Bustard | *Lissotis melanogaster* | 0.6 | 0 | - | - | x | | L | x | | | | | | | x | x | x | |
| Denham's Bustard | *Neotis denhami* | 1.8 | 0 | NT | VU | x | | L | x | | | | | | | x | x | x | |
| White-bellied Bustard | *Eupodotis senegalensis* | 7.9 | 0 | - | VU | x | x | M | x | | | | | | | x | x | x | |
| Common Buzzard | *Buteo buteo* | 28 | 9.3 | - | - | x | x | H | x | | | | x | x | | | | | x |
| Jackal Buzzard | *Buteo rufofuscus* | 19 | 2.2 | - | - | x | x | H | x | | | | x | x | | | | | x |
| Red-knobbed Coot | *Fulica cristata* | 58 | 4.8 | - | - | x | x | H | | | x | x | | | | x | | | |
| Reed Cormorant | *Microcarbo africanus* | 64 | 4.8 | - | - | x | x | H | | | x | | x | | | x | | | |
| White-breasted Cormorant | *Phalacrocorax lucidus* | 12 | 0.9 | - | - | x | x | H | | | x | | x | | | x | | | |
| Blue Crane | *Grus paradisea* | 12 | 0.4 | VU | NT | x | x | H | x | x | | x | | | x | x | x | x | |
| Grey Crowned Crane | *Balearica regulorum* | 5.5 | 0 | EN | EN | x | x | M | x | x | | x | x | | x | x | x | x | |
| Wattled Crane | *Grus carunculata* | 0.6 | 0 | VU | CR | x | | L | | x | | | | | | x | | | |
| Cape Crow | *Corvus capensis* | 18 | 0.4 | - | - | x | x | H | x | | | | x | x | | | | | x |
| Pied Crow | *Corvus albus* | 12 | 3.5 | - | - | x | x | H | x | | | | x | x | | | | | x |

| SPECIES NAME | SCIENTIFIC NAME | SABAP2 FULL PROTOCOL REPORTING RATE | SABAP2 AD HOC PROTOCOL REPORTING RATE | GLOBAL STATUS | REGIONAL STATUS | POWERLINE PRIORITY | RECORDED DURING SURVEYS | LIKELIHOOD OF REGULAR OCCURRENCE | GRASSLAND | DRAINAGE LINES AND WETLANDS | DAMS | PANS | ALIEN TREES | HV LINES | AGRICULTURE | POWERLINE - COLLISION | DISPLACEMENT: DISTURBANCE | DISPLACEMENT: HABITAT TRANSFORMATION | ELECTROCUTIONS: SUBSTATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| African Darter | *Anhinga rufa* | 16 | 2.2 | - | - | x | x | H | | | x | | x | | | x | | | |
| African Black Duck | *Anas sparsa* | 11 | 0 | - | - | x | x | H | | x | | | | | | x | | | |
| Fulvous Whistling Duck | *Dendrocygna bicolor* | 0 | 0.4 | - | - | x | | L | | | | | | | | x | | | |
| White-backed Duck | *Thalassornis leuconotus* | 6.7 | 0 | - | - | x | x | M | | | | | | | | x | | | |
| White-faced Whistling Duck | *Dendrocygna viduata* | 0.6 | 0 | - | - | x | | L | | | | | | | | x | | | |
| Yellow-billed Duck | *Anas undulata* | 62 | 4.4 | - | - | x | x | H | | | | | | | | x | | | |
| African Fish Eagle | *Haliaeetus vocifer* | 12 | 0.9 | - | - | x | x | H | | | | | x | | | | | | x |
| Black-chested Snake Eagle | *Circaetus pectoralis* | 3 | 0.4 | - | - | x | x | M | x | | | x | x | x | | | | | x |
| Brown Snake Eagle | *Circaetus cinereus* | 1.8 | 0 | - | - | x | | L | x | | | x | x | x | | | | | x |
| Long-crested Eagle | *Lophaetus occipitalis* | 6.7 | 9.3 | - | - | x | x | M | x | | | | x | x | | | | | x |
| Martial Eagle | *Polemaetus bellicosus* | 2.4 | 0 | EN | EN | x | x | L | x | | | x | x | x | | | | | x |
| Spotted Eagle-Owl | *Bubo africanus* | 9.1 | 0.9 | - | - | x | x | M | x | | | | x | | | x | x | x | x |
| Great Egret | *Ardea alba* | 7.9 | 1.3 | - | - | x | | M | | x | x | | | | | x | | | |
| Intermediate Egret | *Ardea intermedia* | 14 | 1.8 | - | - | x | x | H | | x | x | | | | | x | | | |
| Little Egret | *Egretta garzetta* | 4.2 | 1.3 | - | - | x | | H | | x | x | | | | | x | | | |
| Western Cattle Egret | *Bubulcus ibis* | 45 | 12 | - | - | x | x | H | x | | | | x | | | x | | | |
| Amur Falcon | *Falco amurensis* | 29 | 6.6 | - | - | x | x | H | x | | | | x | x | x | | | | x |

| SPECIES NAME | SCIENTIFIC NAME | SABAP2 FULL PROTOCOL REPORTING RATE | SABAP2 AD HOC PROTOCOL REPORTING RATE | GLOBAL STATUS | REGIONAL STATUS | POWERLINE PRIORITY | RECORDED DURING SURVEYS | LIKELIHOOD OF REGULAR OCCURRENCE | GRASSLAND | DRAINAGE LINES AND WETLANDS | DAMS | PANS | ALIEN TREES | HV LINES | AGRICULTURE | POWERLINE - COLLISION | DISPLACEMENT: DISTURBANCE | DISPLACEMENT: HABITAT TRANSFORMATION | ELECTROCUTIONS: SUBSTATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lanner Falcon | *Falco biarmicus* | 7.3 | 0 | - | VU | x | x | M | x | | | x | x | x | x | | | | x |
| Peregrine Falcon | *Falco peregrinus* | 1.2 | 0 | - | - | x | x | L | x | | | x | x | x | | | | | x |
| Greater Flamingo | *Phoenicopterus roseus* | 3.6 | 4.4 | - | NT | x | x | M | | | | x | | | | x | | | |
| Lesser Flamingo | *Phoeniconaias minor* | 3.6 | 1.3 | NT | NT | x | x | M | | | | x | | | | x | | | |
| Egyptian Goose | *Alopochen aegyptiaca* | 78 | 6.2 | - | - | x | x | H | | | x | x | | | x | x | | | |
| Spur-winged Goose | *Plectropterus gambensis* | 44 | 1.8 | - | - | x | x | H | | | x | | | | x | x | | | |
| Black-necked Grebe | *Podiceps nigricollis* | 0.6 | 0.4 | - | - | x | | L | | | x | | | | | x | | | |
| Little Grebe | *Tachybaptus ruficollis* | 39 | 3.1 | - | - | x | x | H | | | x | | | | | x | | | |
| Helmeted Guineafowl | *Numida meleagris* | 49 | 3.1 | - | - | x | x | H | x | | | | x | | x | | x | x | x |
| African Marsh Harrier | *Circus ranivorus* | 0.6 | 0 | - | EN | x | | L | | x | | | | | | | | | |
| Black Harrier | *Circus maurus* | 0 | 0.9 | EN | EN | x | | L | x | | | | | | | | | | |
| Montagu's Harrier | *Circus pygargus* | 1.2 | 0 | - | - | x | | L | x | | | | | | | | | | |
| African Harrier-Hawk | *Polyboroides typus* | 12 | 1.8 | - | - | x | x | M | x | | | | x | | | | | | |
| Black Heron | *Egretta ardesiaca* | 0.6 | 0 | - | - | x | | L | | | x | | | | | x | | | |
| Black-crowned Night Heron | *Nycticorax nycticorax* | 0.6 | 0 | - | - | x | | L | | | x | | | | | x | | | |
| Black-headed Heron | *Ardea melanocephala* | 52 | 4 | - | - | x | x | H | x | | | | | | | x | | | x |
| Goliath Heron | *Ardea goliath* | 2.4 | 0 | - | - | x | | L | | | x | | | | | x | | | |

| SPECIES NAME | SCIENTIFIC NAME | SABAP2 FULL PROTOCOL REPORTING RATE | SABAP2 AD HOC PROTOCOL REPORTING RATE | GLOBAL STATUS | REGIONAL STATUS | POWERLINE PRIORITY | RECORDED DURING SURVEYS | LIKELIHOOD OF REGULAR OCCURRENCE | GRASSLAND | DRAINAGE LINES AND WETLANDS | DAMS | PANS | ALIEN TREES | HV LINES | AGRICULTURE | POWERLINE - COLLISION | DISPLACEMENT: DISTURBANCE | DISPLACEMENT: HABITAT TRANSFORMATION | ELECTROCUTIONS: SUBSTATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grey Heron | *Ardea cinerea* | 25 | 3.5 | - | - | x | x | H | | | x | | | | | x | | | |
| Purple Heron | *Ardea purpurea* | 4.2 | 0 | - | - | x | | M | | | x | | | | | x | | | |
| Squacco Heron | *Ardeola ralloides* | 1.2 | 0 | - | - | x | | L | | | x | | | | | x | | | |
| African Sacred Ibis | *Threskiornis aethiopicus* | 48 | 6.2 | - | - | x | x | H | | | x | | x | | | x | | | |
| Glossy Ibis | *Plegadis falcinellus* | 4.2 | 1.8 | - | - | x | | M | | x | | | | | | x | | | |
| Hadada Ibis | *Bostrychia hagedash* | 90 | 14 | - | - | x | x | H | x | x | | | x | | | x | | | x |
| Southern Bald Ibis | *Geronticus calvus* | 23 | 3.1 | VU | VU | x | x | H | x | | | | x | x | x | x | | | x |
| Rock Kestrel | *Falco rupicolus* | 5.5 | 0.9 | - | - | x | x | M | | | | | x | x | | | | | |
| Black-winged Kite | *Elanus caeruleus* | 61 | 13 | - | - | x | x | H | x | | | | x | x | | | | | x |
| Yellow-billed Kite | *Milvus aegyptius* | 2.4 | 0 | - | - | x | x | L | x | | | x | x | | | | | | x |
| Blue Korhaan | *Eupodotis caerulescens* | 6.1 | 0 | NT | LC | x | x | H | x | | | | | | | x | x | x | |
| Northern Black Korhaan | *Afrotis afraoides* | 0.6 | 0 | - | - | x | | L | x | | | | | | | x | x | x | |
| Common Moorhen | *Gallinula chloropus* | 33 | 1.8 | - | - | x | x | H | | | x | | | | | | | | |
| Western Osprey | *Pandion haliaetus* | 0.6 | 0 | - | - | x | | L | | | x | | x | x | | | | | x |
| African Grass Owl | *Tyto capensis* | 2.4 | 0 | - | VU | x | x | M | x | x | | | | | | x | x | x | x |
| Marsh Owl | *Asio capensis* | 5.5 | 0.4 | - | - | x | x | M | x | x | | | | | | x | x | x | x |
| Western Barn Owl | *Tyto alba* | 3 | 0.4 | - | - | x | | M | x | | | | x | | | x | | | x |

| SPECIES NAME | SCIENTIFIC NAME | SABAP2 FULL PROTOCOL REPORTING RATE | SABAP2 AD HOC PROTOCOL REPORTING RATE | GLOBAL STATUS | REGIONAL STATUS | POWERLINE PRIORITY | RECORDED DURING SURVEYS | LIKELIHOOD OF REGULAR OCCURRENCE | GRASSLAND | DRAINAGE LINES AND WETLANDS | DAMS | PANS | ALIEN TREES | HV LINES | AGRICULTURE | POWERLINE - COLLISION | DISPLACEMENT: DISTURBANCE | DISPLACEMENT: HABITAT TRANSFORMATION | ELECTROCUTIONS: SUBSTATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Southern Pochard | *Netta erythrophthalma* | 9.1 | 0 | - | - | x | x | M | | | x | | | | | x | | | |
| South African Shelduck | *Tadorna cana* | 30 | 3.5 | - | - | x | x | H | | | x | x | | | | x | | | |
| Cape Shoveler | *Spatula smithii* | 19 | 0 | - | - | x | x | H | | | | | | | | x | | | |
| Black Sparrowhawk | *Accipiter melanoleucus* | 12 | 0.9 | - | - | x | x | H | | | | | x | | | | | | x |
| African Spoonbill | *Platalea alba* | 16 | 2.2 | - | - | x | x | H | | | | | | | | x | | | |
| White Stork | *Ciconia ciconia* | 7.3 | 1.3 | - | - | x | x | M | x | | x | | | | | x | | | |
| African Swamphen | *Porphyrio madagascariensis* | 6.1 | 2.2 | - | - | x | x | M | | | x | | | | | | | | |
| Blue-billed Teal | *Spatula hottentota* | 1.2 | 0 | - | - | x | | L | | | x | | | | | x | | | |
| Cape Teal | *Anas capensis* | 3 | 0 | - | - | x | x | L | | | x | x | | | | x | | | |
| Red-billed Teal | *Anas erythrorhyncha* | 17 | 1.3 | - | - | x | x | H | | | x | | | | | x | | | |
| Cape Vulture | *Gyps coprotheres* | 0 | 0 | EN | EN | x | x | L | x | | | x | x | x | | x | | | x |

### AVIFAUNA SENSITIVITY

The avifauna sensitivities identified for the Project are shown in **Figure 6-34.**

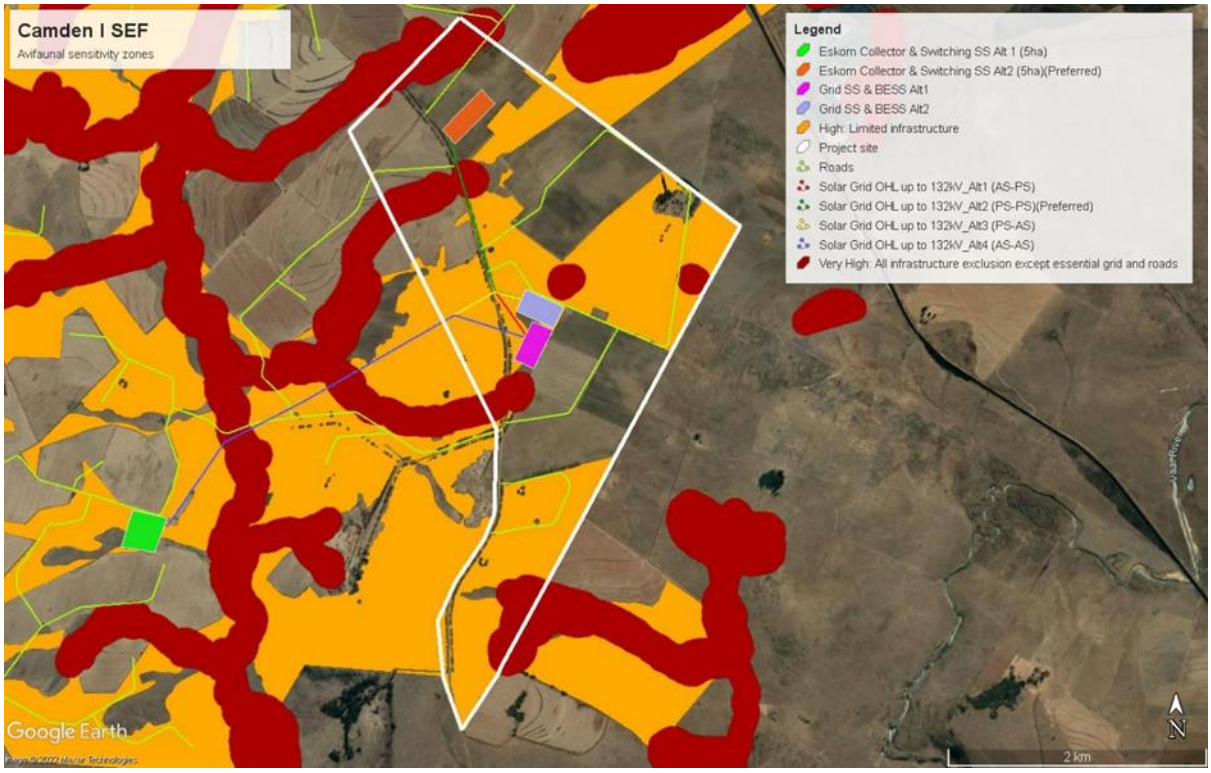



**Figure 6-34: Avifaunal sensitivity zones**

# 6.3 SOCIAL ENVIRONMENT

## *6.3.1 LAND USE*

### DEVELOPMENT SITE

The site is used for cultivation and for the grazing of both cattle and sheep. Cultivated crops include maize, soya beans and the fodder crop, weeping love grass, *Eragrostis curvula*.

In terms of the South African National Land Cover dataset, the site is classified as Grassland interspersed with cultivation areas, small sections of forested land and numerous wetlands/water bodies throughout the project site (**Figure 6-35**).

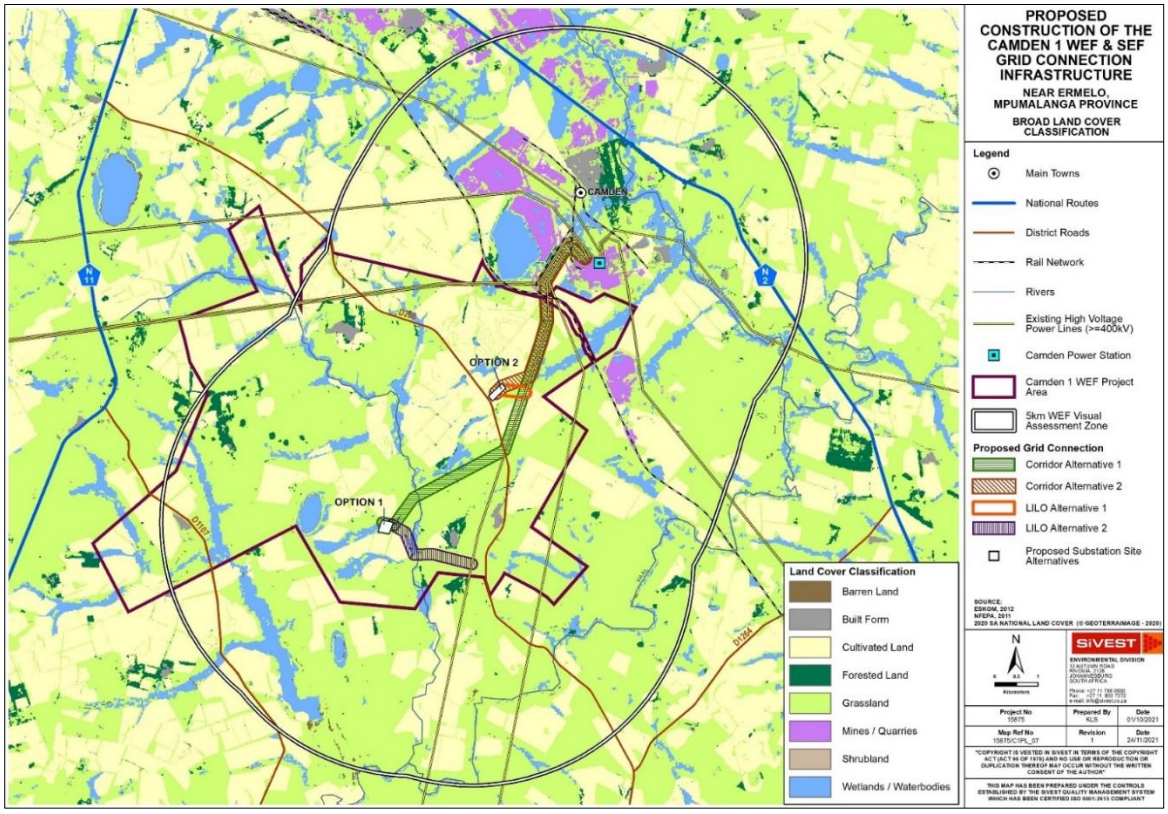



**Figure 6-35: Broad land cover classification (SiVest 2021)**

### SURROUNDING AREAS

The study area is located approximately 10km southeast of the town of Ermelo. The only other settlement in the area is the rural settlement of Sheepmore located approximately 20 km to the east of the proposed project site.

Commercial agriculture is the dominant activity in the study area, with the main focus being maize cultivation and livestock grazing. There are multiple farm portions in the study area, resulting in a relatively moderate density of rural settlement with many scattered farmsteads in evidence. Built form in much of the study area comprises farmsteads, ancillary farm buildings and workers' dwellings, gravel access roads, telephone lines, fences and windmills.

High levels of human influence are however visible in the northern / north-eastern sector of the study area. Much of the town of Ermelo encroaches into the study area and peri-urban areas stretching southwards from Ermelo along the N2 national route are dominated by mining activity and associated infrastructure, including Mooiplaats and Vunene Collieries. Also located in this area is the Camden Power Station with associated high voltage power lines, and the adjacent Camden residential area.

Other evidence of significant human influence includes a sizeable quarry (Rietspruit Crushers) located to the west of the N11 national route, as well as road, rail, telecommunications and high voltage electricity infrastructure.

## *6.3.2 HERITAGE AND CULTURAL RESOURCES*

*The following is extracted from the Heritage Impact Assessment, compiled by Beyond Heritage (Pty) Ltd (June, 2022) and included as* ***Appendix F-4****.*

### FINDINGS OF THE SURVEY

Heritage finds in the area are limited to burial sites and the demolished remains of structures in the greater area (**Figure 6-36**). Feature CA005 and CA012 are located close to the proposed Grid infrastructure and is described below. No other recorded features are located closer than 250 meters from the proposed

infrastructure and will not be directly impacted on and are therefore not further discussed here. Locations of recorded heritage features are included in the Heritage Register for the Camden Renewable Energy Cluster provided to WSP.

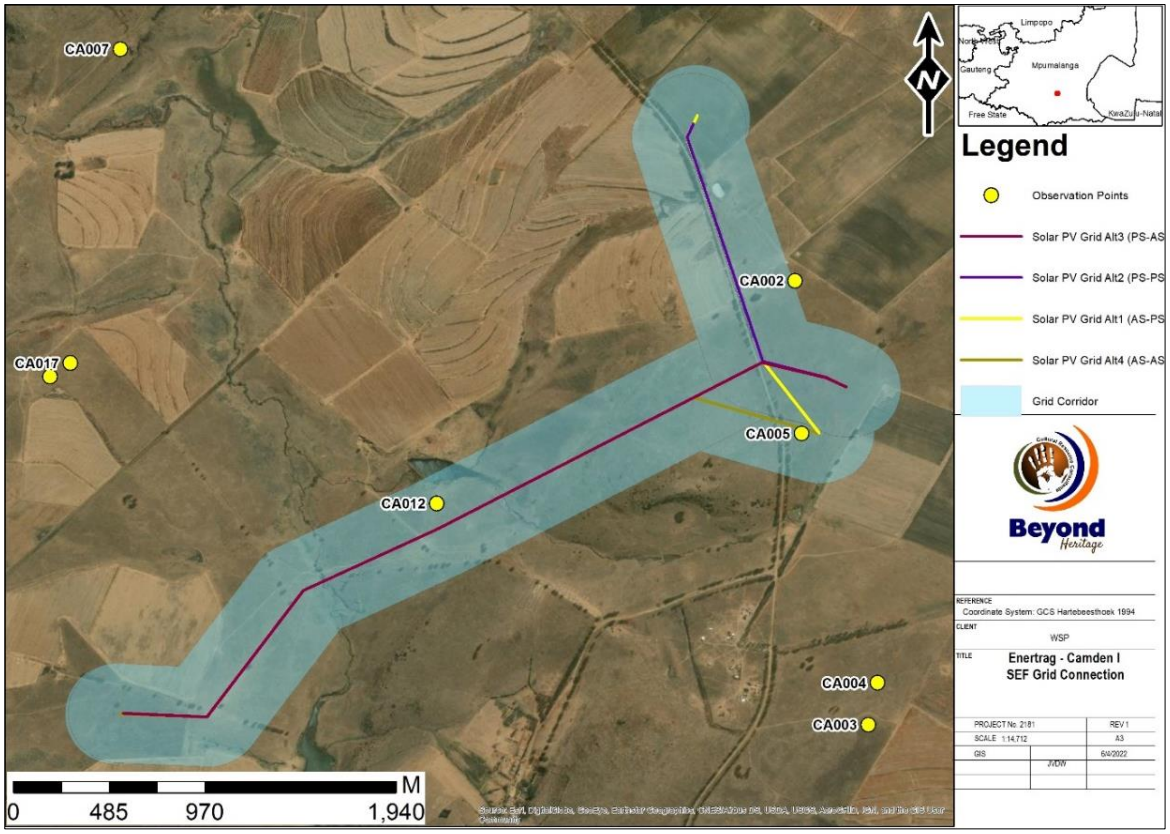



**Figure 6-36: Observation points in relation the project area.**

CA005 comprise the remnants of a possible square stone feature. The site is severely degraded and possibly the remnants of a stone structure or foundation. The feature has a Field Rating of GP C and is of low significance. It should be noted that ruins such as this one can be associated with the graves of still born children and graves are always of high social significance. CA012 is an historical and consists of the remains of three stone structures one is rectangular and is 20mx13m in size while the other is circular 4m x4m in size while the third is 12mx9m in size the site extends over an 80mx50m area and is situated 50m south of a dam. The site is of low significance with a field rating of GP C.

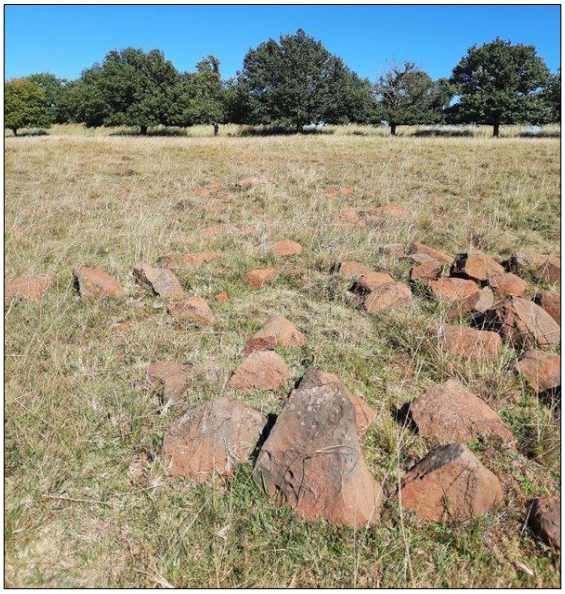


Figure 6-37: Stone packed remains at CA005

Figure 6-38: General site conditions at CA005 showing the ephemeral nature of the feature

Figure 6-39: Series of stone packed structures at CA012

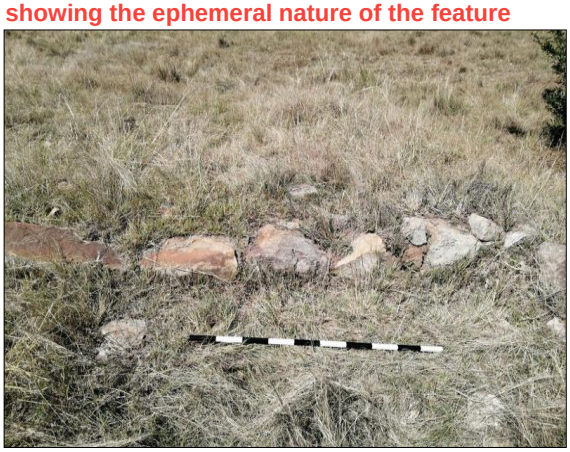


Figure 6-40: Remnants of a stone packed feature at CA012

### CULTURAL LANDSCAPE

The study area is in a rural setting and characterised by cultivation and agricultural activities with a historical layering consisting of burial sites and the remnants of stone packed structures/ settlements. A more recent industrial element is introduced by the Camden Power Station commissioned in 1967.

## *6.3.3 PALAEONTOLOGICAL*

*The following is extracted from the Heritage Impact Assessment, compiled by Beyond Heritage (Pty) Ltd (May, 2022) and included as* ***Appendix F-5****.*

### FINDINGS OF THE SURVEY

The palaeontological sensitivity of the area under consideration is presented in **Figure 6-41**. The site for development is in the Vryheid Formation (red; very highly sensitive) and the non-fossiliferous Jurassic dolerite (grey). The latter is an intrusive igneous rock and do does not preserve fossils, in fact, dykes can destroy any fossils that were in the rocks through which they have intruded.

The Vryheid Formation is potentially very rich in fossils of the Glossopteris flora. This flora includes Glossopteris leaves, seeds, roots, stems and reproductive structures, as well as other plants such as lycopods, sphenophytes, ferns, cordaitaleans and early gymnosperms (Plumstead, 1969; Anderson an Anderson, 1985; Bamford, 2004). Coal seams were formed from peats comprising these plants that were altered by heat and

pressure to make coal. The coal itself, however, does not preserve any recognisable plant structure, but the shales associated with the seams can preserve recognisable impressions of the ancient plants.

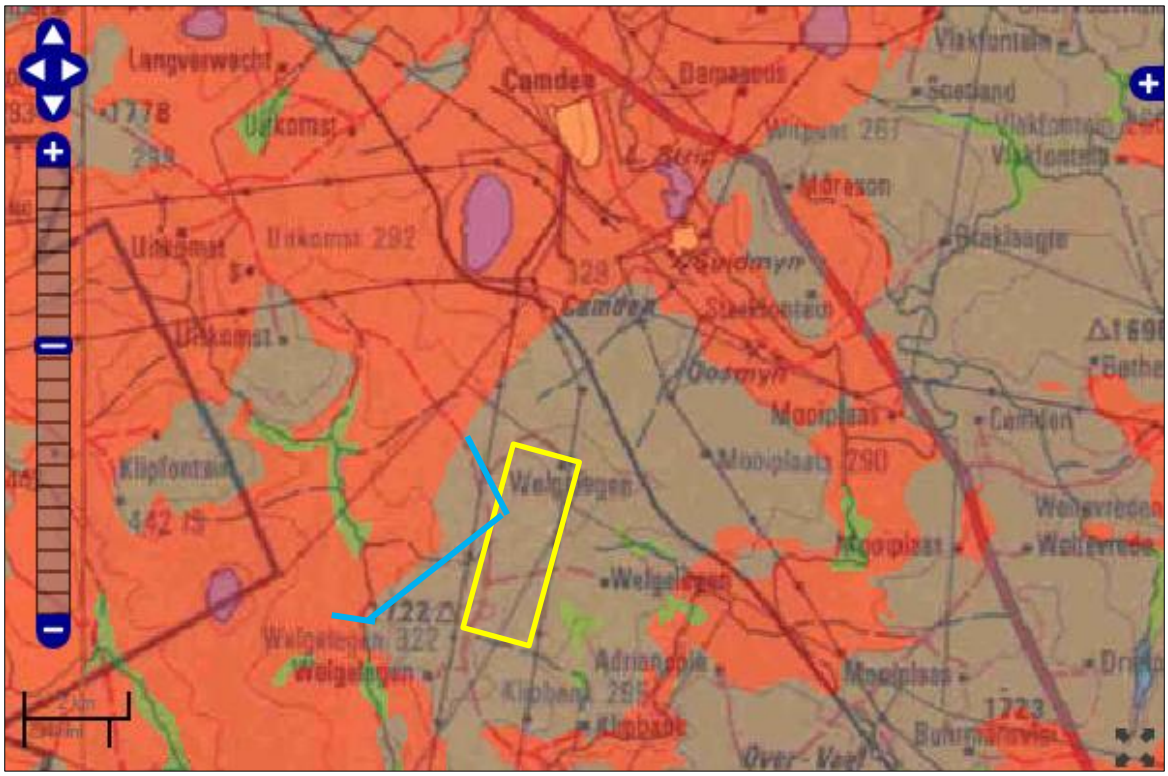



**Figure 6-41: SAHRIS palaeosensitivity map for the site for the proposed Grid Connection for the Camden I SEF within the yellow polygon. Blue lines are the potential grid connections. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero**

## SITE VISIT OBSERVATIONS

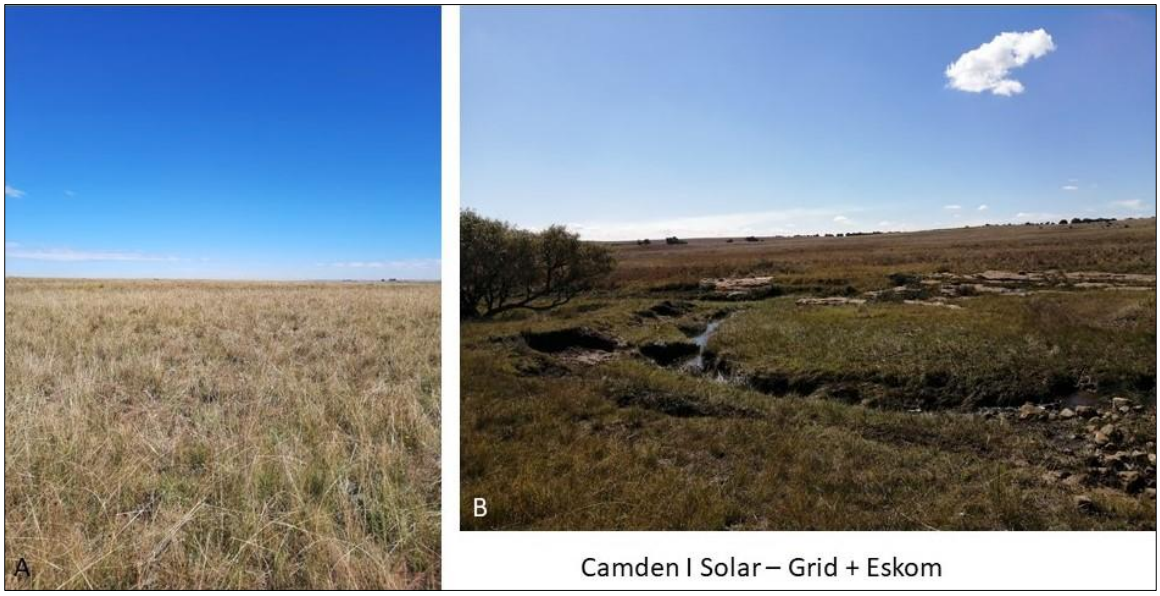



**Figure 6-42: Photographs from the walk down for the Grid Connection route for the Camden I Solar Energy Facility. A - View of a field that has been ploughed previously so it flat and featureless, with no rocky or shale outcrops. B – View of a stream and some erosion that reveals the dolerite below the soils. No fossils were seen**

No rocky outcrops were seen and no fossils. Some dolerite was exposed in the stream bed but as it is volcanic it does not preserve any fossils.

### 6.3.4 VISUAL CHARACTER AND SENSITIVITY

*The following is extracted from the Visual Impact Assessment, compiled by SLR Consulting (Pty) Ltd (May, 2022) and included as* ***Appendix F-7F-7****.*

The nature of the topography and the position of the viewer within the landscape are strong factors influencing the types of vistas typically present. Wider vistas will typically be experienced from higher-lying areas or hilltops and as such the view will be directly dependent on whether the viewer is within a valley bottom or in an area of higher elevation. Importantly in the context of this study, the same is true of objects placed at different elevations and within different landscape settings. Objects placed on high-elevation slopes or ridge tops would be highly visible, while those placed in valleys or enclosed plateaus would be far less visible.

The PV arrays will not however be located on high elevation slopes or on ridgelines and as such there will be minimal impact on the skyline. Localised topographic variations may limit views of the PV arrays from some parts of the study area, but across the remainder of the study area there would be little topographic shielding to reduce the visibility of the steel structures of the proposed on-site substation from many of the locally occurring receptor locations.

GIS technology was used to undertake a preliminary visibility analysis for the proposed PV arrays based on the project information provided by the Proponent. A worst-case scenario was assumed when undertaking the analysis, in which the proposed PV panels were assigned a maximum height of 5 m. The resulting viewshed (**Figure 6-43)**. indicates that the PV arrays would not be visible, or only partially visible from many parts of the study area. Areas of high visibility are largely contained within the project area and several of the identified receptor locations are outside the viewshed for the PV arrays.

Power line towers and the steel structures of the proposed substation, at a maximum height of 35m, are likely to be visible from many of the locally occurring receptor locations. In addition, sections of the proposed power line could impact on the skyline, particularly where they traverse ridges or areas of relatively higher elevation. A preliminary visibility analysis was undertaken for the proposed power line routes and substation sites, based on points at 250 m intervals along the centre line of the corridor alternatives, and assuming a tower height of 35 m. The resulting viewshed as per **Figure 6-43** below, indicates that elements of the proposed grid connection infrastructure would be highly visible from areas to the north and west of the assessment corridors, although much of the remainder of the study area is outside the viewshed for the power lines.

However, the visibility analysis is based entirely on topography and does not consider any existing vegetation cover or built infrastructure which may screen views of the proposed development. Detailed topographic data was not available for the broader study area and as such the visibility analysis does not take into account any localised topographic variations which may constrain views. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.

#### POWER LINE ROUTE SENSITIVITY

GIS-based visibility analysis in respect of the Camden I SEF power line route alignments determined that no sections of the route alignment are significantly more visible than any other. As such, in terms of visibility, no sections of the route alignment were found to be more sensitive than others.

In considering the possible visual impact of the power line or substations on any nearby farmsteads or receptors, investigation determined that there are no farmsteads within 500m of the assessment corridors. Accordingly, no areas of visual sensitivity were identified in relation to any of the corridor alternatives.

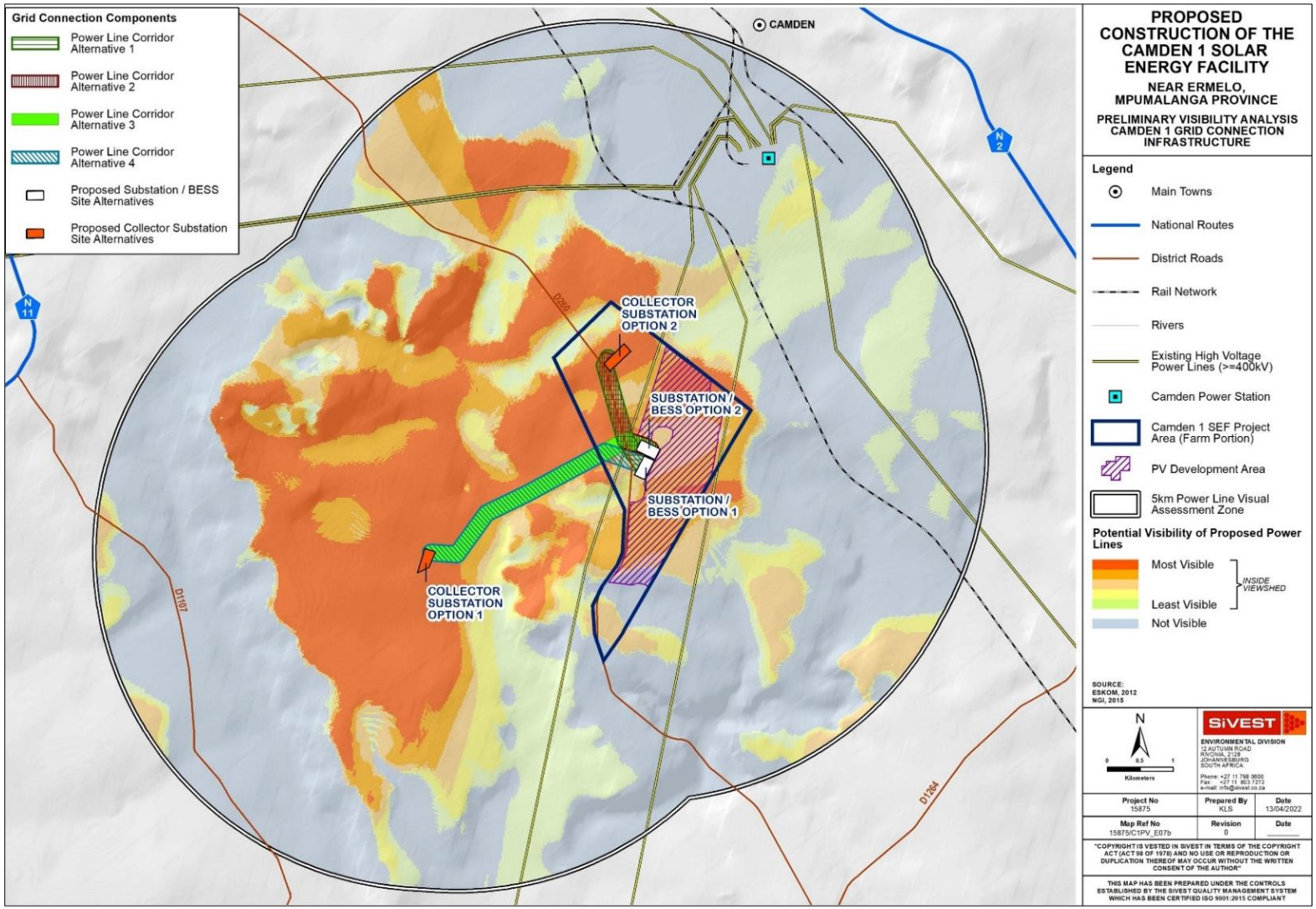



**Figure 6-43: Potential visibility of Camden I SEF power lines, substations, and associated infrastructure**

## 6.3.5 SOCIO-ECONOMIC

### SOCIAL OVERVIEW OF THE STUDY AREA

The study area is located ~ 10-14 km to the south-east of the town of Ermelo, which is the administrative centre of the MM. Ermelo is the administrative seat of both the Msukaligwa Local Municipality (MLM) and the Gert Sibande District Municipality (GSDM) and is also known as the garden city of Mpumalanga and the gateway to the province. The small settlement of Camden associated with Camden Power station (located 2.3 km north of the project site), is the only other urban area located in significant proximity.

Three national highways, namely the N2, N11 and the N17 intersect at Ermelo. The N2 freeway connects Ermelo with Richards Bay on the KwaZulu Natal coastline. The N11 South connects the town to Newcastle to the south and then onto the Ladysmith before linking up with the N3 to Durban. The N11 north connects to Middelburg and the N4 freeway west to Pretoria. The N17 West connects the town to the southern suburbs of Johannesburg and N17 East to eSwatini. Ermelo is also a major railway junction between Mpumalanga and KwaZulu-Natal. The rail junction connects to Machadodorp, which is on the Pretoria and Maputo railway line. The town also lies on the Richards Bay railway line that connects the Mpumalanga coalfields with the export Port of Richards Bay on the Indian Ocean. The proposed Camden 1 SEF 132 kV transmission line (Tx) project is located just to the south of Eskom's large Camden power station, approximately 11 km south-east of the town of Ermelo in the south-central part of Mpumalanga Province.

The Eskom Camden Coal Power station is located immediately to the north and north east of the site (**Figure 6-45).** Construction of the 1600 MW power station commenced in November/December 1962 and the first turbo-generator was commissioned in April 1967. The last of the eight units was commissioned in 1969. The Camden Power station became the starting point of the national power grid, consisting of a series of 400 kV lines which today interconnect the entire country. The power station has six 111.86 m high cooling towers and four 154 chimney (smoke stacks) that served 8 boilers. Between 1990 and 2006 the station was mothballed, but South Africa's energy crisis in the early 21st century prompted Eskom to recommission the station, starting with unit 6 in July 2005 and completing with unit 1 in July 2008. The development of the Camden Power station also involved the construction of the village of Camden, located ~ 1.3km to the north of the power station. The village, which consists of 356 was established to accommodate administration, operating and maintenance personnel. Community facilities including a community hall, sports facilities, included four tennis courts, a bowling green, swimming bath, shooting range, rugby, hockey, soccer, and cricket fields and jukskei, and the associated clubhouses and changerooms were also established. Several parks, situated throughout the residential property, provided playgrounds for some 500 children at Camden. Schooling was provided in Ermelo for these children, with a regular bus service operating between Camden and Ermelo[9]. The settlement currently accommodates a SANDF military base (Camden).

[9] https://www.eskom.co.za/sites/heritage/Pages/Camden.aspx

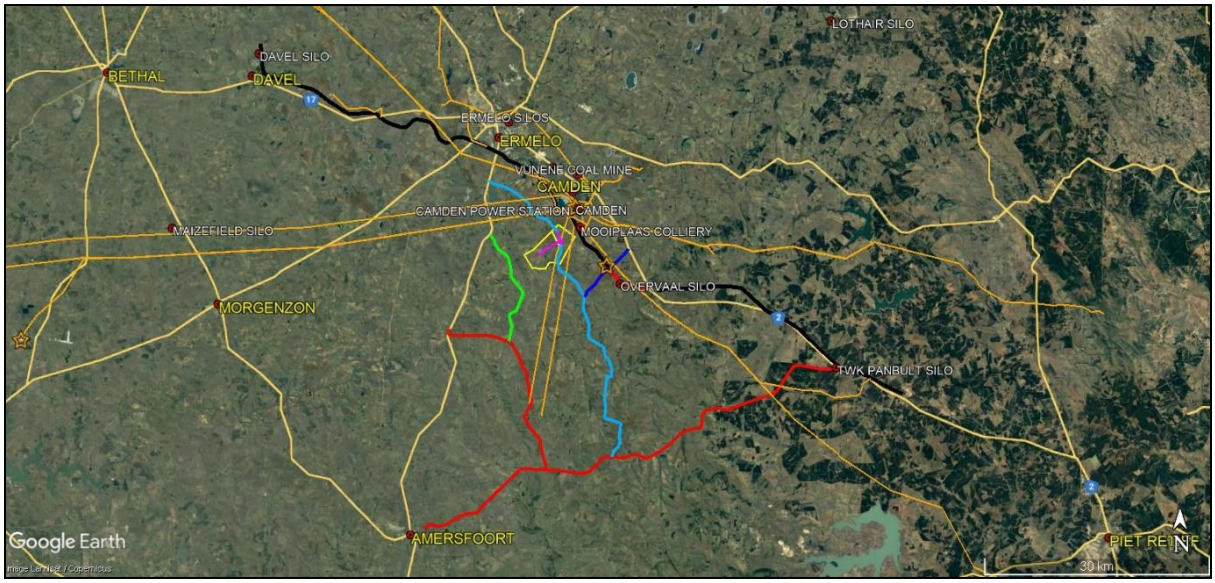



**Figure 6-44: Proposed Camden I PV up to 132 kV line alternatives (pink) and subject properties (yellow) indicated in relation to settlements, grain silos and local collieries, Camden power plant, existing Eskom lines (orange lines), railway line (black) and local public gravel roads (red), including the Familiehoek road (green) De Emigratie road (light blue) and Overvaal road (dark blue)**

**Figure 6-45: Camden Power Station**

Study area properties are primarily accessed off three public gravel roads which intersect with the N11 or N2, viz. the De Emigratie- (N11), Familiehoek- (N11) and Overvaal (N2) roads. Of these, the De Emigratie road is of most relevance to the project. It functions as a north-south-aligned spine, ultimately providing two routes between the N11 and the N2 via the study area (**Figure 6-45**). Base farms are typically accessed directly off these roads, with internal roads providing access to uninhabited farm portions or properties. Access to farm roads is typically unrestricted (i.e., no access gates – but there are exceptions). A road off the Overvaal road provides the only access road to the Overvaal silo complex.

**Figure 6-46: De Emigratie Road**

**Emigratie Road**

The study area forms part of the Ermelo commercial farming district. Ermelo is a key producer of field crops and livestock, typically in mixed operations. Field crops are grown under dryland conditions. Key crops include maize and field beans (**Figure 6-47**). Six large silo complexes are located within a 40 km of Ermelo, including the silos at the Overvaal rail siding (**Figure 6-48**).

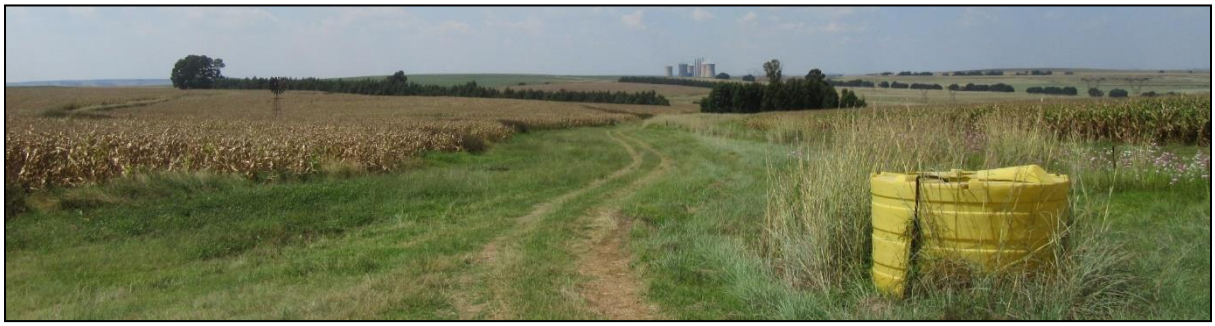


**Figure 6-47: Maize fields on Uitkomst farm along the De Emigratie gravel road; Camden power station in the background**

**Figure 6-48: Overvaal silo located adjacent to the Richards Bay railway line**

Both beef cattle and sheep are also farmed in the area raised (**Figure 6-49** and **Figure 6-50**). The natural grassveld grazing resource has a relatively high carrying capacity of around 1 head of cattle (LSU) to 3 hectares. Most owners also utilize pastures for hay production (**Figure 6-51**). The veld is prone to veldfires, specifically during the dry winter months. Key grazing spp. such as Oulandsgras (*Eragrostis curvula*) may take up to 3 years to recover to full productivity (van der Meulen, pers. comm).

**Figure 6-49: Beef cattle grazing on Adrianople Farm**

**Figure 6-50: Sheep grazing on Klipfontein Farm**

**Figure 6-51: Bales of hay on Welgelegen Farm**

The settlement pattern is sparse and concentrated along the main public gravel roads. The estimated minimum size of an economically feasible cropping operation is around 1 000 ha and many of the local farmers lease additional land. There is a tendency towards larger operations in order to maintain a viable economy of scale in the face of continuously rising input costs. As a result, many properties are devoid of dwellings, while farmsteads on a few have been abandoned (**Figure 6-52**). Base farms are typically inhabited by farm owners and or managers.

**Figure 6-52: Abandoned farmstead on Adrianople 296/1 (de Jager) adjacent to the De Emigratie Road**

Farms typically consist of a patchwork of cropped areas and veld used as rangeland. Essentially all the high potential agricultural land is used crop cultivation. The study area terrain is undulating and largely treeless, but substantial (and distinctive) oak lanes and small groves are located on some study area properties. Relatively small numbers of farm labourer families reside on a few farms, but the general trend is towards transporting in labourers in from Ermelo on a daily or weekly basis. Larger operations may provide permanent employment to up to 40 workers. Most of the opportunities are associated with cropping activities. Small groups of households with historical tenure rights reside in small clusters on a number of farms along the key public gravel roads (**Figure 6-53**).

**Figure 6-53: Dwellings of households with tenure rights and 400 kV line on Adrianople farm along the Overvaal Road**

A number of historic and operational coal mines are located in the immediate vicinity of Camden power station. These include the active Mooiplaas Colliery adjacent to the railway line south of Camden power station, and the large La Brie and Vunene mines to the north of the N2 between Camden and Ermelo. No historic diggings or active mining currently takes place in the study area located to the west (south) of the Richards Bat railway line. However, prospecting has been carried out on a number of farms in the study area in recent years.

The area located to the south of Camden (study area) is currently affected by 5 Eskom line corridors. These include two parallel line corridors approaching Camden from the west (both traversing the N11, **Figure 6-54**), two further parallel corridors approaching Camden from the south-west (traversing De Emigratie road, **Figure 6-55**), and a corridor aligned parallel to the north of the KZN railway line, approaching Camden from the south-east via a small substation located along the railway line just to the west of the Overvaal road.

**Figure 6-54: 400 kV line crossing the N11 approximately 6 km south of Ermelo**

**Figure 6-55: 400 kV line crossing the De Emigratie Road on Uitkomst**

Visitor accommodation in Ermelo largely caters for travellers and businesspeople. The town in not a regarded as a tourism destination. A few venue-type facilities are located to the south of the town and largely cater for local functions such as weddings.

### SITE PROPERTIES

The Camden I SEF up to 132kV line alternatives are proposed on the portions 1 and 2 of the farm Welgelegen 322. Dwellings are located only on 322/2, viz. a farmstead complex (2 dwellings) and a collection of small farm labourers' houses adjacent to the west of the De Emigratie road. The landowner of portion 2 Welgelegen 322 reside in separate dwellings on the main yard (**Figure 6-56**). Eight households reside in the collection of small houses adjacent to the De Emigratie road (**Figure 6-57**). Members of two households are employed by the landowner. The landowner runs a small logistics (grain transport) operation from 322/2. The majority of the land is currently leased out for cropping and stock farming purposes to two separate local farmers, Messrs. Both properties are affected by the existing 2 x 400 kV corridors approaching Camden power station from the SW, 322/1 by both, and 322/2 by a single line aligned approximately 480 m east of the farmyard.

**Figure 6-56: Farmstead on Welgelegen Farm**

**Figure 6-57: Farm labourers' dwellings on Uitkomst Farm**

**Figure 6-58: Rangeland and cropped fields (middle ground) on Welgelegen 322/1 leased to Mr de Jager**

## POTENTIALLY SENSITIVE SOCIAL RECEPTORS

The proposed transmission lines are located in a relatively sparsely populated area. The nearest dwellings are located on Welgelegen 322/2, 930 m (Alternative 3) to 1.2 km (Alternative 2) of the nearest inhabited dwellings, a cluster of labourers' dwellings along the De Emigrate Road. The cluster is located 130 m from an existing Eskom line (Table 3.6). The nearest dwelling on an adjacent property is located on Uitkomst, approximately 3.5 km north-west of the project, i.e., not in significant proximity. Only one tourist accommodation facility is located within 5 km of the site, namely Camden Guest House adjacent to Camden power station 4 km to the north. The nearest other facility is located to the north and north-east of the site, namely Indawo Game Lodge (7.5 km).

**Table 6-11: Overview of affected properties**

| PROPERTY | AFFECTED | DWELLING | COMMENT |
|---|---|---|---|
| 322/1 Welgelegen | Alt 1: 1.8 km<br>Alt 2: 1.7 km<br>Alt 3: 860 m<br>Alt 4: 700 m | n.a. | Camden I PV site;<br>Existing Eskom 2 x 400 kV lines;<br>Affected by 7 Camden I& II projects |
| 322/2 Welgelegen | Alt 1: n.a.<br>Alt 2: n.a.<br>Alt 3: 3.1 km<br>Alt 4: 3.1 km | 970 m (labour)<br>1.2 km (labour)<br>930 m (labour)<br>1.1 km (labour) | Existing Eskom 1 x 400 kV line;<br>Laboubers' dwelling cluster 130 m from existing 400 kV line<br>Affected by 6 Camden I& II projects<br>Farmstead >1.4 km from all Alts |

## POTENTIALLY SENSITIVE SOCIAL RECEPTORS

The proposed transmission lines are located in a relatively sparsely populated area. The nearest dwellings are located on Welgelegen 322/2, 930 m (Alternative 3) to 1.2 km (Alternative 2) of the nearest inhabited dwellings, a cluster of labourers' dwellings along the De Emigrate Road. The cluster is located 130 m from an existing Eskom line. The nearest dwelling on an adjacent property is located on Uitkomst, approximately 3.5 km north-west of the project, i.e., not in significant proximity. Only one tourist accommodation facility is located within 5 km of the site, namely Camden Guest House adjacent to Camden power station 4 km to the north. The nearest other facility is located to the north and north-east of the site, namely Indawo Game Lodge (7.5 km).

The four (4) transmission line alternatives being assessed are permutations of essentially two routes, namely two (2) feeding north-west to one collector substation location alternative from two different PV substation alternatives (Alts 1 and 2); and two feeding south-east to the alternative collector substation location (Alts 3 and 4) in switched substation order.

Alternatives 1 and 2 are aligned immediately to the east of the De Emigratie Road, essentially following the road alignment. The alignments affects only 322/1, and over a relatively short distance (~1.7 km). In contrast, Alts 3 and 4 would be substantially longer, affect both properties, and require traversing the De Emigratie road.

Welgelegen 322/1 is currenty affected by 2 400 kv Tx lines, and 322/2 by one. Unlike Alts 1 and 2 (De Emigratie road), Alts 3 and 4 would establish a new corridor. None of the four alternatives would however dircetly impact on cropped fields, Alts 1 and 2 being alignd close to the De Emigratie road, and Alts 3 and 4 traversing only tracts of rangeland.

Welgelegen 322/1 and 322/2 would be affected by 7 and 6 projects each (the same set). These include the Camden I WEF, Camden I Green Hydrogen and Ammonia Plant, and four sets of transmission lines and associated substations (Figure 3.4). Generally speaking, project alternatives associated with Collector Substation Alternative 2 and associated line Alternatives 1 and 2 would result in the least cumulative impact, as the impacts would be restricted to 322/1. Alternatives 1 and 2 linking up to Collector Substation Alternative 2 are therefore the preferred options.

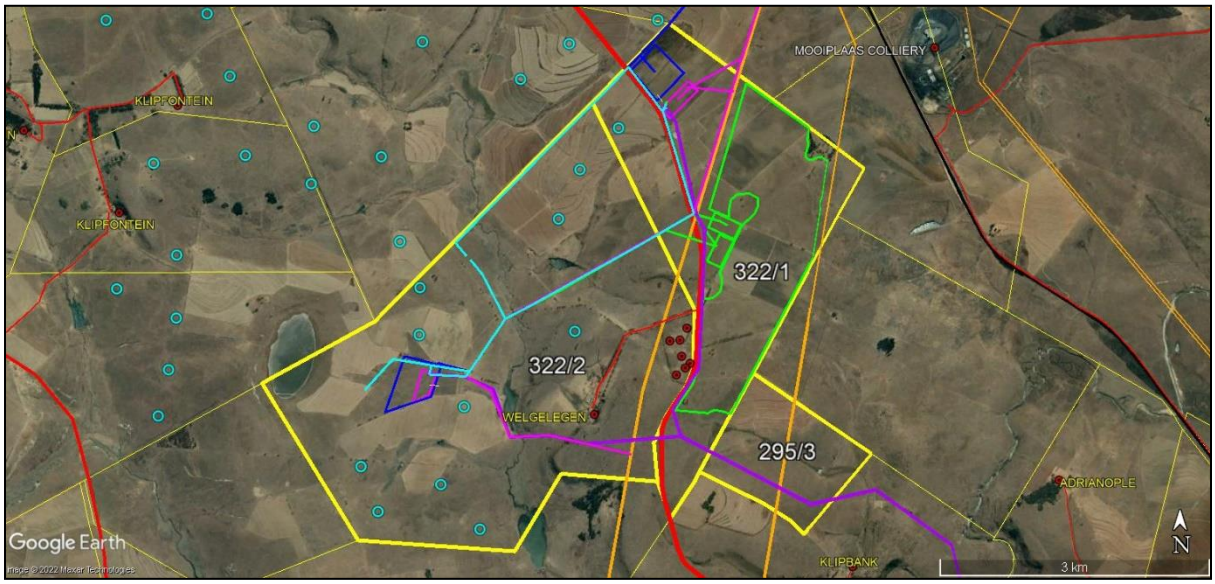



**Figure 6-59: Cumulative impact of proposed Camden I and II projects infrastructure on Reyneke properties (bold yellow outlines) and De Emigratie road (bold red): Camden I Hydrogen& Ammonia plant (dark blue), Camden 1 PV and Tx (green), Camden 1 WEF & Tx (light blue), Camden I Collector substation& 400 kV line; and Camden II WEF Tx line. Also indicated are Eskom lines (orange) and the railway line (black)**

# 7 ENVIRONMENTAL IMPACT ASSESSMENT

This Chapter identifies the perceived environmental and social effects associated with the proposed Project. The assessment methodology is outlined in **Section 3.5**. The issues identified stem from those aspects presented in **Chapter 6** of this document as well as the Project description provided in **Chapter 4**. The impact assessment is based on the preferred alternative at all Project phases. This section only assesses the preferred option along with the no-go alternative. The impact mitigation hierarchy criteria, as per **Section 3.5**, for each mitigation measure are indicated in brackets after each measure indicated.

Furthermore, a decommissioning assessment will be considered as part of the decommissioning process that will be subject to a separate authorisation and impact assessment process. Any decommissioning impacts will be assessed at this stage. The impact assessment in this section encompasses the geographical, physical, biological, social, economic, heritage and cultural aspects in accordance with Appendix 1 of GNR 326.

## 7.1 AIR QUALITY

### *7.1.1 CONSTRUCTION PHASE*

#### DUST AND PARTICULATE MATTER

The National Dust Control Regulations (GNR 827) prescribe general measures for the control of dust in both residential and non-residential areas and will be applicable during construction of the OHPL. **Table 7-1** provides the acceptable dust fall rates as prescribed by GNR 827.

**Table 7-1: Acceptable dust fall rates (GNR 827)**

| RESTRICTION AREAS | DUST FALL RATE (D) (mg/m$^2$/day – 30 DAYS AVERAGE) | PERMITTED FREQUENCY OF EXCEEDING DUST FALL RATE |
|---|---|---|
| Residential area | D < 600 | Two within a year, not sequential months |
| Non-residential area | 600 < D < 1200 | Two within a year, not sequential months |

During the construction phase, dust and vehicular emissions (carbon monoxide (CO), hydrocarbons, particulate matter (PM) and nitrogen oxides ($NO_x$) will be released as a result of vegetation clearing activities, transportation of equipment and materials to site, and the installation thereof, all of which involves the movement of large plant and trucks along unpaved roads and exposing of soils. The emissions will, however, have short-term impacts on the immediate surrounding areas that can be easily mitigated and thus the authorisation of such emissions will not be required. All construction phase air quality impacts will be minimised with the implementation of dust control measures contained within the EMPr (**Appendix G**).

The impact of the construction phase on the generation of dust and particulate matter (PM) is shown in **Table 7-2**.

**Table 7-2: Construction Impact on Generation of Dust and PM**

| Potential Impact | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| GENERATION OF DUST AND PM | | | | | | | | | |
| Without Mitigation | 2 | 2 | 3 | 1 | 4 | 32 | Moderate | (-) | High |
| With Mitigation | 1 | 1 | 3 | 1 | 3 | 18 | Low | (-) | High |
| Mitigation and Management Measures | — Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and soil/material stockpiles | | | | | | | | |

| Potential Impact<br>GENERATION OF DUST AND PM | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| | especially. This includes wetting of exposed soft soil surfaces and not conducting activities during high wind periods which will increase the likelihood of dust being generated;<br>– All stockpiles (if any) must be restricted to designated areas and may not exceed a height of two (2) metres;<br>– Ensure that all vehicles, machines and equipment are adequately maintained to minimise emissions;<br>– It is recommended that the clearing of vegetation from the site should be selective, be kept to the minimum feasible area, and be undertaken just before construction so as to minimise erosion and dust potential;<br>– All materials transported to, or from, site must be transported in such a manner that they do not fly or fall off the vehicle. This may necessitate covering or wetting friable materials.<br>– Enforcing of speed limits. Reducing the dust generated by the listed activities above, putting up signs to enforce speed limit in access roads.<br>– No burning of waste, such as plastic bags, cement bags and litter is permitted; and<br>– All issues/complaints must be recorded in the complaints register. | | | | | | | | |

### 7.1.2 OPERATIONAL PHASE

There are no anticipated air quality impacts during the operational phase as maintenance activities will occur as and when required and will be extremely short term.

## 7.2 NOISE EMISSIONS

### 7.2.1 CONSTRUCTION PHASE

Elevated noise levels are likely to be generated by the construction activities (machinery and vehicles) and the workforce. It is important to note that noise impacts (nuisance factor) may vary in the different areas as a result of the surrounding land uses and will be temporary in nature. Due to the temporary and limited nature of the Project activities, coupled with the fact that there are a limited number of noise receptors around the Project area, the impact is regarded as low. The construction impact on noise is indicated in **Table 7-3**.

**Table 7-3: Construction Impact on Noise**

| Potential Impact:<br>NOISE | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 2 | 1 | 3 | 1 | 4 | **28** | **Low** | (-) | High |
| **With Mitigation** | 2 | 1 | 1 | 1 | 3 | **15** | **Low** | (-) | High |
| **Mitigation and Management Measures** | – The equipment must be in maintained in good working order, within service dates, and inspected before use;<br>– Align working times with the substation related operational times; and | | | | | | | | |

| Potential Impact: | Magnitude | Extent | Reversibility | Duration | Probability | Significance | Character | Confidence |
|---|---|---|---|---|---|---|---|---|
| NOISE | | | | | | | | |
| | — Install noise reducing fittings on machinery (if required). | | | | | | | |

### 7.2.2 OPERATIONAL PHASE

There are no anticipated noise impacts during the operational phase as maintenance activities will occur as and when required and will be extremely short-term.

## 7.3 SOIL EROSION AND CONTAMINATION

### 7.3.1 CONSTRUCTION PHASE

#### SOIL EROSION

During the construction phase, measures should be implemented to manage stormwater and water flow on the site. If the stormwater and water flow is not regulated and managed on site, it could cause significant erosion of soil around the cleared areas.

During the construction phase, the Project activities could leave soils exposed and susceptible to erosion. The construction impact on soil erosion is indicated in **Table 7-4**.

**Table 7-4: Construction Impact on Soil Erosion**

| Potential Impact: | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| SOIL EROSION | | | | | | | | | |
| **Without Mitigation** | 2 | 1 | 3 | 2 | 4 | **32** | **Moderate** | (-) | High |
| **With Mitigation** | 1 | 1 | 3 | 2 | 3 | **21** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Implement stormwater management measures that will help to reduce the speed of the water. These measures must also assist with the prevention of water pollution, erosion and siltation;<br>— Any exposed earth should be rehabilitated promptly, and this could include planting suitable vegetation (vigorous indigenous grasses) that mimics the surrounding environment to protect the exposed soil;<br>— If excavations or foundations fill up with stormwater, these areas should immediately be drained and measures to prevent access to these areas should be implemented;<br>— Erosion control measures should be implemented during the construction phase on large, exposed areas and where stormwater is temporarily channelled;<br>— Stormwater channels and preferential flow paths should be delineated, filled with aggregate and/or logs (branches included) to dissipate and slow flows, limiting erosion; and<br>— Rehabilitate the area to manage erosion as soon as practicably possible. | | | | | | | | |

### SOIL CONTAMINATION

During construction activities, construction vehicles/trucks/machinery as well as hazardous substances stored on the site might spill and contaminate the soil. The impact of the construction phase on soil pollution is indicated in **Table 7-5**.

**Table 7-5: Construction Impact on Soil Contamination**

| Potential Impact: SOIL CONTAMINATION | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 2 | 1 | 3 | 3 | 4 | **36** | **Moderate** | (-) | High |
| **With Mitigation** | 1 | 1 | 3 | 2 | 3 | **21** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — All construction vehicles, plant, machinery and equipment must be properly maintained to prevent leaks;<br>— Plant and vehicles are to be repaired immediately upon developing leaks;<br>— Drip trays shall be supplied for all idle vehicles and machinery;<br>— Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants;<br>— Drip trays are to be inspected daily for leaks and effectiveness and emptied when necessary. This is to be closely monitored during rain events to prevent overflow;<br>— Ensure appropriate handling of hazardous substances;<br>— Keep adequate spill kits onsite and train personnel to use them appropriately;<br>— Fuels and chemicals must be stored in adequate storage facilities that are secure, enclosed and bunded; and<br>— Implement stormwater management measures that will help to reduce the speed of the water flows. | | | | | | | | |

## *7.3.2 OPERATIONAL PHASE*

### SOIL EROSION

There are no anticipated soil erosion impacts expected during the operational phase as maintenance activities will occur as and when required and will be extremely short-term. However, erosion and stormwater controls should be set up around the monopoles during construction to protect them during the operational phase.

### SOIL CONTAMINATION

Soil contamination is expected to be limited during the operational phase as maintenance activities will occur as and when required and will be extremely short-term. The operational impact on soil contamination is indicated in **Table 7-6**.

**Table 7-6: Operation Impact on Soil Contamination**

| Potential Impact: SOIL CONTAMINATION | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 2 | 1 | 3 | 3 | 3 | **27** | **Low** | (-) | High |
| **With Mitigation** | 1 | 1 | 3 | 2 | 2 | **14** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — All vehicles, plant, machinery and equipment must be properly maintained to prevent leaks; | | | | | | | | |

| Potential Impact: | Magnitude | Extent | Reversibility | Duration | Probability | Significance | Character | Confidence |
|---|---|---|---|---|---|---|---|---|
| SOIL CONTAMINATION | | | | | | | | |
| | — Vehicles and machinery are to be repaired immediately upon developing leaks;<br>— Drip trays shall be supplied for all idle vehicles and machinery;<br>— Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants;<br>— Drip trays are to be inspected daily for leaks and effectiveness and emptied when necessary. This is to be closely monitored during rain events to prevent overflow;<br>— Ensure appropriate handling of hazardous substances;<br>— Keep a spill kit on site and train personnel to use it appropriately; and<br>— Fuels and chemicals must be stored in adequate storage facilities that are secure, enclosed and bunded. | | | | | | | |

# 7.4 AQUATIC

Loss of Very High Sensitivity systems, namely the wetlands through physical disturbance, the proposed layout has avoided these systems with the exception of one of the buffer areas near the southern entrance

## 7.4.1 CONSTRUCTION PHASE

| Potential Impact: | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| LOSS OF VERY HIGH SENSITIVITY SYSTEMS | | | | | | | | | |
| **Without Mitigation** | 4 | 4 | 5 | 4 | 2 | **34** | **Moderate** | (-) | High |
| **With Mitigation** | 2 | 2 | 2 | 2 | 2 | **16** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. Suitable dust and erosion control mitigation measures should be included in the EMP to mitigate these impacts.<br>— A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. The stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks.<br>— No runoff may be discharged or directed into the Pans, as these are not tolerant of excessive / regular volumes of water and would then change in nature and attributes. Suitable measures must be implemented to prevent such runoff, i.e. stormwater detention pond (or similar appropriate measure).<br>— Containment of all contaminated water by means of careful run-off management on site, as per the specifications provided in the stormwater management plan. | | | | | | | | |

| Potential Impact: DAMAGE OR LOSS OF RIPARIAN AND OR RIVERINE SYSTEMS AND DISTURBANCE OF THESE WATERBODIES IN THE CONSTRUCTION PHASE | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 4 | 4 | 5 | 4 | 2 | **34** | **Moderate** | (-) | High |
| **With Mitigation** | 2 | 2 | 2 | 2 | 2 | **16** | **Low** | (-) | High |
| **Mitigation and Management Measures** | – All alien plant re-growth must be monitored as per the Alien Plant Management Plan and should these alien plants reoccur these plants should be re-eradicated. The scale of the development does however not warrant the use of a Landscape Architect and / or Landscape Contractor.<br>– It is further recommended that a comprehensive rehabilitation / monitoring plan be implemented from the project onset i.e. during the preconstruction phase, to ensure a net benefit to the environment within all areas that will remain undisturbed.<br>– Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. Suitable dust and erosion control mitigation measures should be included in the EMP to mitigate these impacts.<br>– A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. The stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks.<br>– No runoff may be discharged or directed into the Pans, as these are not tolerant of excessive / regular volumes of water and would then change in nature and attributes. Suitable measures must be implemented to prevent such runoff, i.e. stormwater detention pond (or similar appropriate measure).<br>– Strict use and management of all hazardous materials used on site.<br>– Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.) within demarcated / bunded areas<br>– Containment of all contaminated water by means of careful run-off management on site, as per the specifications provided in the stormwater management plan.<br>– Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. These must be situated outside of any delineated watercourses and pans/depressions or the buffers provided.<br>– Strict control of the behaviour of construction workers.<br>– Appropriate waste management. | | | | | | | | | |
| **Potential Impact: WATER QUALITY** | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
| **Without Mitigation** | 4 | 4 | 5 | 4 | 2 | **34** | **Moderate** | (-) | High |
| **With Mitigation** | 2 | 2 | 2 | 2 | 2 | **16** | **Low** | (-) | High |

| Potential Impact: | Magnitude | Extent | Reversibility | Duration | Probability | Significance | Character | Confidence |
|---|---|---|---|---|---|---|---|---|
| **DAMAGE OR LOSS OF RIPARIAN AND OR RIVERINE SYSTEMS AND DISTURBANCE OF THESE WATERBODIES IN THE CONSTRUCTION PHASE** | | | | | | | | |
| **Mitigation and Management Measures** | — All alien plant re-growth must be monitored as per the Alien Plant Management Plan and should these alien plants reoccur these plants should be re-eradicated. The scale of the development does however not warrant the use of a Landscape Architect and / or Landscape Contractor.<br>— It is further recommended that a comprehensive rehabilitation / monitoring plan be implemented from the project onset i.e. during the preconstruction phase, to ensure a net benefit to the environment within all areas that will remain undisturbed.<br>— Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. Suitable dust and erosion control mitigation measures should be included in the EMP to mitigate these impacts.<br>— A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. The stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks.<br>— No runoff may be discharged or directed into the Pans, as these are not tolerant of excessive / regular volumes of water and would then change in nature and attributes. Suitable measures must be implemented to prevent such runoff, i.e. stormwater detention pond (or similar appropriate measure).<br>— Strict use and management of all hazardous materials used on site.<br>— Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.) within demarcated / bunded areas<br>— Containment of all contaminated water by means of careful run-off management on site, as per the specifications provided in the stormwater management plan.<br>— Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. These must be situated outside of any delineated watercourses and pans/depressions or the buffers provided.<br>— Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Environmental Management Plan (EMPr) for the project and strictly enforced in the applicable phase/s.<br>— In the instances where facility roads are required on the present road / track crossings already installed by local landowners / public works entities, install properly sized culverts with erosion protection measures | | | | | | | |

| Potential Impact: IMPACT ON HABITAT CHANGE AND FRAGMENTATION RELATED TO HYDROLOGICAL REGIMES | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 4 | 4 | 5 | 4 | 2 | **34** | **Moderate** | (-) | High |
| **With Mitigation** | 2 | 2 | 2 | 2 | 2 | **16** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — All alien plant re-growth must be monitored as per the Alien Plant Management Plan and should these alien plants reoccur these plants should be re-eradicated. The scale of the development does however not warrant the use of a Landscape Architect and / or Landscape Contractor.<br>— It is further recommended that a comprehensive rehabilitation / monitoring plan be implemented from the project onset i.e. during the preconstruction phase, to ensure a net benefit to the environment within all areas that will remain undisturbed<br>— Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. Suitable dust and erosion control mitigation measures should be included in the EMP to mitigate these impacts.<br>— A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. The stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks.<br>— No runoff may be discharged or directed into the Pans, as these are not tolerant of excessive / regular volumes of water and would then change in nature and attributes. Suitable measures must be implemented to prevent such runoff, i.e. stormwater detention pond (or similar appropriate measure).<br>— Strict use and management of all hazardous materials used on site.<br>— Containment of all contaminated water by means of careful run-off management on site, as per the specifications provided in the stormwater management plan.<br>— Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. These must be situated outside of any delineated watercourses and pans/depressions or the buffers provided.<br>— In the instances where facility roads are required on the present road / track crossings already installed by local landowners / public works entities, install properly sized culverts with erosion protection measures | | | | | | | | |

## 7.4.2 OPERATIONAL PHASE

Impact on aquatic systems through possible increase in surface water run-off on the form and function which could also lead to erosion and or sedimentation if no adequate stormwater management is provided for.

| **Potential Impact:**<br>**IMPACT ON AQUATIC SYSTEMS THROUGH POSSIBLE INCREASE IN SURFACE WATER RUN-OFF ON THE FORM AND FUNCTION WHICH COULD ALSO LEAD TO EROSION AND OR SEDIMENTATION IF NO ADEQUATE STORMWATER MANAGEMENT IS PROVIDED FOR** | **Magnitude** | **Extent** | **Reversibility** | **Duration** | **Probability** | **Significance** | | **Character** | **Confidence** |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 2 | 4 | 5 | 4 | 2 | **30** | **Moderate** | (-) | High |
| **With Mitigation** | 1 | 2 | 2 | 2 | 2 | **14** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — All alien plant re-growth must be monitored as per the Alien Plant Management Plan and should these alien plants reoccur these plants should be re-eradicated. The scale of the development does however not warrant the use of a Landscape Architect and / or Landscape Contractor.<br>— It is further recommended that a comprehensive rehabilitation / monitoring plan be implemented from the project onset i.e. during the preconstruction phase, to ensure a net benefit to the environment within all areas that will remain undisturbed<br>— Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. Suitable dust and erosion control mitigation measures should be included in the EMP to mitigate these impacts.<br>— A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. The stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks.<br>— No runoff may be discharged or directed into the Pans, as these are not tolerant of excessive / regular volumes of water and would then change in nature and attributes. Suitable measures must be implemented to prevent such runoff, i.e. stormwater detention pond (or similar appropriate measure).<br>— Strict use and management of all hazardous materials used on site.<br>— Containment of all contaminated water by means of careful run-off management on site, as per the specifications provided in the stormwater management plan.<br>— Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. These must be situated outside of any delineated watercourses and pans/depressions or the buffers provided.<br>— In the instances where facility roads are required on the present road / track crossings already installed by local landowners / public works entities, install properly sized culverts with erosion protection measures | | | | | | | | |

# 7.5 TERRESTRIAL BIODIVERSITY

## 7.5.1 CONSTRUCTION PHASE

The following potential impacts were considered on terrestrial communities. This phase refers to the period when construction of the proposed infrastructure is built/installed. This phase usually has the largest direct impact on biodiversity.

### LOSS OF INDIGENOUS NATURAL VEGETATION DUE TO CLEARING

The regional vegetation type in the broad study area is Eastern Highveld Grassland, classified in the scientific literature as Endangered (Mucina *et al*., 2008) and listed as Vulnerable in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011). Any areas of natural habitat (specifically natural grassland, as described above) within this regional vegetation type are therefore considered to have high conservation value.

Vegetation on site is within the Grassland Biome. Mesic grasslands in South Africa have a life-form composition that includes a high number of resprouting sub-terranean species that constitute more than 50% of the species richness at any single location and a higher proportion, if counted across a wider area. Secondary grassland that develops in previously cleared areas (for example, cultivated lands) usually develop a perennial grass cover, but the resprouting component of the flora almost never recovers. This means that any clearing of grassland vegetation, even if temporary, results in permanent loss of the local species composition. Clearing of natural grassland is therefore a permanent impact.

Habitat loss refers to physical disturbance of habitats through clearing, grading and other permanent to semi-permanent loss or degradation. Loss of habitat on site could lead to loss of biodiversity as well as habitat important for the survival of populations of various species.

The impact of the construction phase on the impact on **flora** is shown in **Table 7-7**.

**Table 7-7: Assessment of significance of potential impacts on the habitats, ecosystems and vegetation community associated with the construction phase of the project.**

| Potential Impact: CLEARING OF NATURAL HABITAT FOR CONSTRUCTION | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 1 | 5 | 3 | 1 | 4 | **40** | **Moderate** | (-) | High |
| **With Mitigation** | 1 | 4 | 3 | 1 | 4 | **36** | **Moderate** | (-) | High |
| **Mitigation and Management Measures** | – Restrict impact to development footprint only and limit disturbance in surrounding areas.<br>– Prior to commencement of construction, compile a Rehabilitation Plan including monitoring specifications, to be included into the EMPr during final approval.<br>– Prior to commencement of construction, compile an Alien Plant Management Plan, to be included into the EMPr during final approval. | | | | | | | | |

### ESTABLISHMENT AND SPREAD OF DECLARED WEEDS AND ALIEN INVADER PLANTS DUE TO THE CLEARING AND DISTURBANCE OF INDIGENOUS VEGETATION

Major factors contributing to invasion by alien invader plants includes inter alia high disturbance (such as clearing for construction activities) and negative grazing practices. Exotic species are often more prominent near infrastructural disturbances than further away. Consequences of this may include:

- loss of indigenous vegetation.
- change in vegetation structure leading to change in various habitat characteristics.

- change in plant species composition.
- change in soil chemical properties.
- loss of sensitive habitats.
- loss or disturbance to individuals of rare, endangered, endemic and/or protected species.
- fragmentation of sensitive habitats.
- change in flammability of vegetation, depending on alien species.
- hydrological impacts due to increased transpiration and runoff.
- impairment of wetland function.

Low existing populations of alien plants were seen on site, but areas of farm infrastructure were not investigated in detail during the field survey. There is a high possibility that alien plants could be introduced to areas within the footprint of the proposed activities from surrounding areas in the absence of control measures. The potential consequences may be of moderate seriousness for affected natural habitats. Control measures could prevent the impact from occurring.

These control measures are relatively standard and well-known. Known alien invasive species recorded in the general geographical area that includes the site are as follows (in order of frequency observed):

- *Campuloclinium macrocephalum*
- *Acacia mearnsii*
- *Verbena bonariensis*
- *Solanum mauritianum*
- *Datura stramonium*
- *Cirsium vulgare*
- *Rumex acetosella*
- *Acacia dealbata*
- *Solanum sisymbriifolium*
- *Cortaderia selloana*
- *Arundo donax*
- *Sesbania punicea*
- *Ipomoea purpurea*
- *Melia azedarach*
- *Nicotiana glauca*
- *Eucalyptus camaldulensis*
- *Solanum elaeagnifolium*
- *Phytolacca octandra*
- *Robinia pseudoacacia*
- *Ailanthus altissima*
- *Xanthium spinosum*
- *Myriophyllum aquaticum*
- *Araujia sericifera*
- *Nasturtium officinale*

- *Verbena rigida*
- *Acacia melanoxylon*
- *Xanthium strumarium*
- *Azolla filiculoides*
- *Pinus taeda*
- *Alisma plantago-aquatica*
- *Rubus niveus*
- *Agave americana*
- *Acacia podalyriifolia*
- *Carduus nutans*
- *Ligustrum lucidum*
- *Ageratum houstonianum*
- *Spathodea campanulata*
- *Verbena brasiliensis*
- *Salvia tiliifolia*
- *Solanum pseudocapsicum*
- *Argemone ochroleuca*
- *Pinus patula*
- *Paspalum quadrifarium*
- *Austrocylindropuntia subulata*
- *Rumex usambarensis*

The impact of the construction phase due to the **introduction of alien species** is shown in **Table 7-8**.

**Table 7-8: Assessment of significance of potential impacts on the terrestrial biodiversity associated with the construction phase of the project**

| **Potential Impact:** ESTABLISHMENT AND SPREAD OF DECLARED WEEDS AND ALIEN INVADER PLANTS | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 2 | 1 | 3 | 2 | 3 | **24** | **Low** | (-) | High |
| **With Mitigation** | 1 | 1 | 3 | 1 | 2 | **12** | **(VERY LOW)** | (-) | High |
| **Mitigation and Management Measures** | — Prior to commencement of construction, compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control, including monitoring specifications.<br>— Undertake regular monitoring to detect alien invasions early so that they can be controlled.<br>— Implement control measures as per the specifications of the alien management plan. | | | | | | | | |

## 7.5.2 OPERATIONAL PHASE

### CONTINUED DISTURBANCE TO NATURAL HABITATS DUE TO GENERAL OPERATIONAL ACTIVITIES AND MAINTENANCE

During the operational phase of the project, there will be continuous activity on site, including normal operational activities, maintenance and monitoring. There may also be minor additional construction. Rehabilitation of various sites, such as the construction camps, will also take place. These activities all have the potential to cause additional direct and/or indirect damage to natural habitat and vegetation.

The impact of the operational phase due to the disturbance to natural habitats is shown in **Table 7-9**.

**Table 7-9: Assessment of significance of potential impacts on the terrestrial biodiversity associated with the operational phase of the project**

| Potential Impact: CONTINUED DISTURBANCE TO NATURAL HABITATS DUE TO GENERAL OPERATIONAL ACTIVITIES AND MAINTENANCE | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 1 | 5 | 3 | 1 | 3 | **30** | **Low** | (-) | High |
| **With Mitigation** | 1 | 5 | 3 | 1 | 2 | **20** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — As per construction phase. | | | | | | | | |

### CONTINUED ESTABLISHMENT AND SPREAD OF ALIEN INVASIVE PLANT SPECIES DUE TO THE PRESENCE OF MIGRATION CORRIDORS AND DISTURBANCE VECTORS

The presence of disturbed surfaces on site creates ecological edges and corridors along which alien species can travel and become established.

The impact of the operational phase due to the disturbance to natural habitats is shown in **Table 7-10**.

**Table 7-10: Assessment of significance of potential impacts on the terrestrial biodiversity associated with the operational phase of the project**

| Potential Impact: ESTABLISHMENT AND SPREAD OF DECLARED WEEDS AND ALIEN INVADER PLANTS | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 2 | 4 | 3 | 3 | 3 | **36** | **Moderate** | (-) | High |
| **With Mitigation** | 1 | 2 | 3 | 1 | 2 | **14** | **Very Low** | (-) | High |
| **Mitigation and Management Measures** | — Prior to commencement of construction, compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control.<br>— Undertake regular monitoring to detect alien invasions early so that they can be controlled.<br>— Implement control measures as per the specifications of the alien management plan. | | | | | | | | |

### RUNOFF AND EROSION DUE TO THE PRESENCE OF HARD SURFACES THAT CHANGE THE INFILTRATION AND RUNOFF PROPERTIES OF THE LANDSCAPE

Increased erosion (water and wind) and water run-off will be caused by the clearing of indigenous vegetation, creation of new hard surfaces and compaction of soil. The substation will be the main source of disturbance and erosion if not properly constructed and provided with water run-off structures. The substation site will be levelled

and compacted causing run-off that may lead to erosion. Increased run-off and erosion could affect hydrological processes in the area and will change water and silt discharge into drainage lines and streams.

The impact of the operational phase due to the disturbance to natural habitats is shown in **Table 7-11**.

**Table 7-11: Assessment of significance of potential impacts on the terrestrial biodiversity associated with the operational phase of the project**

| Potential Impact: CONTINUED RUNOFF AND EROSION | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 1 | 5 | 3 | 1 | 3 | **30** | **Low** | (-) | High |
| **With Mitigation** | 1 | 5 | 3 | 1 | 2 | **20** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Prior to commencement of construction, compile and implement a stormwater management plan including monitoring specifications.<br>— Monitor surfaces for erosion, repair and/or upgrade, where necessary. | | | | | | | | |

## 7.5.3 DECOMMISSIONING PHASE

It is expected that the project will operate for a minimum of twenty to twenty-five years (a typical planned lifespan for a project of this nature). Decommissioning will probably require a series of steps resulting in the removal of equipment from the site and rehabilitation of footprint areas. It is possible that the site could be returned to a rural nature, but it is unlikely that natural vegetation would become established at disturbed locations on site for a very long time thereafter. The reality is that it is not possible to determine at this stage whether rehabilitation measures will be implemented or not or what the future for the site would be nor is it possible at this stage to determine what surrounding land pressures would be. These uncertainties make it difficult to undertake any assessment to determine possible impacts of decommissioning. It is recommended that a closure and rehabilitation plan be compiled near to the decommissioning stage but in advance of when decommissioning is planned, and that this would be required to be implemented prior to closure of the project. The closure and rehabilitation plan must follow the regulatory requirements at the time of decommissioning. Possible impacts are described below.

### LOSS AND DISTURBANCE OF NATURAL VEGETATION DUE TO THE REMOVAL OF INFRASTRUCTURE AND NEED FOR WORKING SITES

During the decommissioning phase of the project, there will be a flurry of activity on site over a period, similar to during the construction phase, including dismantling and removal of equipment and rehabilitation. There may also be minor additional construction. Rehabilitation of various sites will also take place. These activities all have the potential to cause additional direct and/or indirect damage to natural habitat and vegetation.

The impact of the decommissioning phase is shown in **Table 7-12**.

**Table 7-12: Assessment of significance of potential impacts on the terrestrial biodiversity associated with the decommissioning phase of the project**

| Potential Impact: DISTURBANCE OF NATURAL HABITAT DURING INFRASTRUCTURE REMOVAL | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 1 | 5 | 3 | 1 | 2 | **20** | **Low** | (-) | High |
| **With Mitigation** | 1 | 5 | 3 | 1 | 2 | **20** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Prior to decommissioning commencing, compile a Rehabilitation Plan in compliance with the regulatory requirements at the time of decommissioning. | | | | | | | | |

### CONTINUED ESTABLISHMENT AND SPREAD OF ALIEN INVASIVE PLANT SPECIES DUE TO THE PRESENCE OF MIGRATION CORRIDORS AND DISTURBANCE VECTORS

The presence of disturbed surfaces on site creates ecological edges and corridors along which alien species can travel and become established. The impact of the decommissioning phase is shown in **Table 7-13**.

**Table 7-13: Assessment of significance of potential impacts on the terrestrial biodiversity associated with the decommissioning phase of the project**

| Potential Impact: ESTABLISHMENT AND SPREAD OF DECLARED WEEDS AND ALIEN INVADER PLANTS | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| Without Mitigation | 2 | 4 | 3 | 2 | 4 | 44 | Moderate | (-) | High |
| With Mitigation | 1 | 4 | 3 | 1 | 3 | 27 | Low | (-) | High |
| Mitigation and Management Measures | — Rehabilitate disturbed areas in accordance with the specifications of a Rehabilitation Plan. | | | | | | | | |

## 7.6 TERRESTRIAL PLANT SPECIES

### LOSS OF INDIVIDUALS OF SPECIES OF CONSERVATION CONCERN DUE TO CLEARING FOR CONSTRUCTION

The impact of the construction phase is shown in **Table 7-14**.

**Table 7-14: Assessment of significance of potential impacts on the terrestrial flora associated with the construction phase of the project.**

| Potential Impact: CLEARING OF NATURAL HABITAT FOR CONSTRUCTION | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| Without Mitigation | 2 | 5 | 5 | 2 | 3 | 42 | Moderate | (-) | High |
| With Mitigation | 2 | 5 | 5 | 2 | 1 | 14 | Very Low | (-) | High |
| Mitigation and Management Measures | — It is a legal requirement to obtain permits for specimens or protected species that will be lost due to construction of the project<br>— Prior to construction commencing, undertake a detailed walk-through survey of footprint areas that are within habitats where SCC are likely to occur.<br>— Where significant populations of SCC are found, collect the data for any flora permits or micro-siting of infrastructure that may be required.<br>— Prior to construction commencing, compile a Plant Rescue Plan, including monitoring specifications (timeframe, frequency etc).<br>— Undertake monitoring (as per the Plant Rescue Plan specifications) to evaluate whether further measures would be required to manage impacts. | | | | | | | | |

# 7.7 TERRESTRIAL ANIMAL SPECIES

## 7.7.1 CONSTRUCTION PHASE

### CONSTRUCTION ACTIVITIES WILL REQUIRE CLEARING OF NATURAL HABITAT, TO BE REPLACED BY THE INFRASTRUCTURE. THIS WILL RESULT IN PERMANENT LOCAL LOSS OF HABITAT

The impact of the construction phase is shown in **Table 7-15**.

**Table 7-15: Construction phase impacts associated with the clearing of natural habitat**

| Potential Impact: CLEARING OF NATURAL HABITAT FOR CONSTRUCTION | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 1 | 5 | 3 | 1 | 4 | **40** | **Moderate** | (-) | High |
| **With Mitigation** | 1 | 5 | 3 | 1 | 3 | **30** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — No driving of vehicles off-road outside of construction areas.<br>— Apply mitigation measures recommended in the Terrestrial Biodiversity Assessment to minimize loss of natural vegetation. | | | | | | | | |

### DIRECT MORTALITY OF FAUNA DUE TO MACHINERY, CONSTRUCTION AND INCREASED TRAFFIC

The impact of the construction phase is shown in **Table 7-16**.

**Table 7-16: Construction phase impacts associated with the direct mortality of fauna**

| Potential Impact: DIRECT MORTALITY OF FAUNA DUE TO PRESENCE OF TRAFFIC AND HEAVY MACHINERY | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 1 | 2 | 1 | 2 | 3 | **18** | **Low** | (-) | High |
| **With Mitigation** | 1 | 2 | 1 | 1 | 2 | **10** | **Very Low** | (-) | High |
| **Mitigation and Management Measures** | — Personnel on site should undergo environmental induction training, including the need to abide by speed limits, the increased risk of collisions with wild animals on roads in rural areas.<br>— No collecting, hunting or poaching of any plant or animal species; and no killing of snakes must be permitted.<br>— Personnel to be educated about protection status of species, including distinguishing features, to be able to identify protected species. A course on basic identification of all snakes specific to the area should be undertaken.<br>— Appropriate lighting should be installed to minimize impacts on nocturnal animals, as per visual specialist assessment. | | | | | | | | |

### 7.7.2 OPERATIONAL PHASE

**DIRECT MORTALITY OF FAUNA THROUGH TRAFFIC, ILLEGAL COLLECTING, POACHING AND COLLISIONS AND/OR ENTANGLEMENT WITH INFRASTRUCTURE**

| Potential Impact: Direct mortality of fauna due to presence of traffic and heavy machinery | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 1 | 4 | 1 | 2 | 3 | **24** | **Low** | (-) | High |
| **With Mitigation** | 1 | 4 | 1 | 1 | 2 | **14** | **Very Low** | (-) | High |
| **Mitigation and Management Measures** | — Personnel on site should undergo environmental induction training, including the need to abide by speed limits, the increased risk of collisions with wild animals on roads in rural areas.<br>— No collecting, hunting or poaching of any plant or animal species.<br>— Personnel to be educated about protection status of species, including distinguishing features, to be able to identify protected species.<br>— Appropriate lighting should be installed to minimize impacts on nocturnal animals, as per visual specialist assessment. | | | | | | | | |

### 7.7.3 DECOMMISSIONING PHASE

Decommissioning phase impacts are identical in nature and rating to that of the construction phase impacts. Please refer to the construction phase for assessment.

## 7.8 AVIFAUNA

### 7.8.1 DESIGN PHASE

**MITIGATION MEASURES**

- The medium voltage cable should be buried as far as possible. Overhead lines should only be considered if technical constraints to trenching are present.
- A bird-friendly pole design must be employed for all medium voltage overhead lines. The avifaunal specialist must approve the final design prior to construction commencing.
- Bird flight diverters should be installed on all overhead medium voltage power lines according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines).
- A 100m all infrastructure exclusion zone must be implemented around drainage lines, associated wetlands, and pans (except essential road and gridline crossings). Wetlands are important breeding, roosting and foraging habitat for a variety of SCC, most notably for African Grass Owl (SA status Vulnerable), Grey Crowned Crane (SA status Endangered) and African

### 7.8.2 CONSTRUCTION PHASE

The following potential impacts have been identified:

- Displacement of priority species due to disturbance associated construction
- Displacement of priority species due to disturbance associated construction

## DISPLACEMENT DUE TO DISTURBANCE ASSOCIATED WITH THE CONSTRUCTION

The **Displacement due to disturbance associated with the construction impact on avifauna habitat** is shown in **Table 7-17**.

**Table 7-17: Displacement due to disturbance associated with the construction Impact on Avifauna**

| Potential Impacts: DISPLACEMENT OF PRIORITY SPECIES DUE TO DISTURBANCE ASSOCIATED CONSTRUCTION | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 4 | 2 | 3 | 2 | 4 | **44** | **Moderate** | **(-)** | **High** |
| **With Mitigation** | 3 | 2 | 3 | 2 | 3 | **30** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Conduct a pre-construction inspection to identify Red List species that may be breeding within the project footprint to ensure that the impacts to breeding species (if any) are adequately managed.<br>— Construction activity should be restricted to the immediate footprint of the infrastructure.<br>— Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species.<br>— Measures to control noise and dust should be applied according to current best practice in the industry.<br>— Maximum used should be made of existing access roads and the construction of new roads should be kept to a minimum.<br>— Vegetation clearance should be limited to what is necessary.<br>– A site-specific CEMPr must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the CEMPr and should apply good environmental practice during construction. The CEMPr must specifically include the following:<br>– No off-road driving;<br>– Maximum use of existing roads, where possible;<br>– Measures to control noise and dust according to latest best practice;<br>— Restricted access to the rest of the property; | | | | | | | | |

## DISPLACEMENT DUE TO HABITAT TRANSFORMATION ASSOCIATED WITH THE CONSTRUCTION

The **Displacement due to habitat transformation associated with the construction** impact on avifauna is shown in **Table 7-18** below.

**Table 7-18: Displacement due to habitat transformation associated with the construction Impact on Avifauna**

| Potential Impacts: DISPLACEMENT DUE TO HABITAT TRANSFORMATION ASSOCIATED WITH THE CONSTRUCTION | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 2 | 2 | 3 | 2 | 4 | **36** | **Moderate** | **(-)** | **High** |
| **With Mitigation** | 2 | 2 | 3 | 2 | 3 | **27** | **Low** | (-) | High |

| Potential Impacts: DISPLACEMENT DUE TO HABITAT TRANSFORMATION ASSOCIATED WITH THE CONSTRUCTION | Magnitude | Extent | Reversibility | Duration | Probability | Significance | Character | Confidence |
|---|---|---|---|---|---|---|---|---|
| **Mitigation and Management Measures** | — Conduct a pre-construction inspection to identify Red List species that may be breeding within the project footprint to ensure that the impacts to breeding species (if any) are adequately managed.<br>— Construction activity should be restricted to the immediate footprint of the infrastructure.<br>— Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species.<br>— Measures to control noise and dust should be applied according to current best practice in the industry.<br>— Maximum used should be made of existing access roads and the construction of new roads should be kept to a minimum.<br>— Vegetation clearance should be limited to what is necessary.<br>– Monitor rehabilitation via site audits and site inspections to ensure compliance. Record and report any non-compliance. | | | | | | | |

## 7.8.3 OPERATIONAL PHASE

The following potential impacts have been identified;

— Electrocution of priority species on the on-site substation infrastructure
— Electrocution of priority species on the up to 132kv OHPL

### ELECTROCUTION OF PRIORITY SPECIES ON THE ON-SITE SUBSTATION INFRASTRUCTURE

The **Electrocution of priority species on the on-site substation infrastructure** with the 132kV overhead power line operational impact on avifauna is shown in **Table 7-19** below.

**Table 7-19: Electrocution of priority species on the on-site substation infrastructure Operation Impact on Avifauna**

| Potential Impacts: ELECTROCUTION OF PRIORITY SPECIES ON THE ON-SITE SUBSTATION INFRASTRUCTURE | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| Without Mitigation | 5 | 3 | 3 | 4 | 2 | **30** | **Low** | (-) | High |
| With Mitigation | 1 | 2 | 3 | 4 | 2 | **20** | **Low** | (-) | High |
| Mitigation and Management Measures | — The mitigation measures proposed by the biodiversity specialist must be strictly enforced.<br>— The hardware within the proposed substation yard is too complex to warrant any mitigation for electrocution at this stage. It is recommended that if on-going impacts are recorded once operational, site-specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red List priority species are unlikely to frequent the substation.<br>— Inspections of the substation yard to look for carcasses of electrocuted birds. | | | | | | | | |

### ELECTROCUTION OF PRIORITY SPECIES ON THE 132KV OHPL

The **Electrocution of priority species on the on-site substation infrastructure** with the 132kV overhead power line operational impact on avifauna is shown in **Table 7-20** below.

**Table 7-20: Electrocution of priority species on the on-site 132kVOHPL Operation Impact on Avifauna**

| Potential Impacts: ELECTROCUTION OF PRIORITY SPECIES ON THE UP TO 132KV OHPL | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| Without Mitigation | 5 | 3 | 3 | 4 | 3 | **45** | **Moderate** | (-) | High |
| With Mitigation | 1 | 2 | 3 | 4 | 2 | **20** | **Low** | (-) | High |
| Mitigation and Management Measures | — The mitigation measures proposed by the biodiversity specialist must be strictly enforced.<br>— The hardware within the proposed substation yard is too complex to warrant any mitigation for electrocution at this stage. It is recommended that if on-going impacts are recorded once operational, site-specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red List priority species are unlikely to frequent the substation. | | | | | | | | |

## *7.8.4 DECOMMISSIONING PHASE*

The following potential impacts have been identified;

— Displacement of priority species due to disturbance associated with decommissioning of the on-site substation and up to 132kV overhead power line

### DISPLACEMENT OF PRIORITY SPECIES DUE TO DISTURBANCE ASSOCIATED WITH DECOMMISSIONING OF THE ON-SITE SUBSTATION AND 132KV OVERHEAD POWER LINE

The **Displacement of priority species due to disturbance associated with decommissioning** of the on-site substation and 132kV overhead power line decommissioning impact on avifauna is shown in **Table 7-21** below.

**Table 7-21: Displacement of priority species due to disturbance associated with decommissioning of the on-site substation and 132kV overhead power line Decommissioning Impact on Avifauna**

| Potential Impact: DISPLACEMENT OF PRIORITY SPECIES DUE TO DISTURBANCE ASSOCIATED WITH DECOMMISSIONING OF THE ON-SITE SUBSTATION AND UP TO 132KV OVERHEAD POWER LINE | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 4 | 2 | 3 | 2 | 4 | **44** | **Moderate** | (-) | High |
| **With Mitigation** | 3 | 2 | 3 | 2 | 2 | **20** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Decommissioning activity should be restricted to the immediate footprint of the infrastructure.<br>— Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species.<br>— Measures to control noise and dust should be applied according to current best practice in the industry.<br>— Maximum used should be made of existing access roads and the construction of new roads should be kept to a minimum. | | | | | | | | |

| | |
|---|---|
| | — A site-specific EMPr must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the EMPr and must apply good environmental practice during construction. The EMPr must specifically include the following:<br>— No off-road driving.<br>— Maximum use of existing roads.<br>— Measures to control noise and dust according to latest best practice.<br>— Restricted access to the rest of the property.<br>— Strict application of all recommendations in the botanical specialist report pertaining to the limitation of the footprint. |

# 7.9 VISUAL IMPACTS

## *7.9.1 CONSTRUCTION PHASE*

### POTENTIAL VISUAL IMPACT OF CONSTRUCTION ACTIVITIES ON CAMDEN I SEF 132KV GRID CONNECTION INFRASTRUCTURE

The significance of visual impacts associated with the grid connection infrastructure during construction is expected to be Low but will be further reduced with the implementation of mitigation measures.

The construction impact on the visual landscape of all alternatives is shown in **Table 7-22** below.

**Table 7-22: Construction Impact on Visual Landscape resulting from Camden I SEF 132kV Grid Connection Infrastructure**

| **Potential Impact:**<br>LARGE CONSTRUCTION VEHICLES, EQUIPMENT AND CONSTRUCTION MATERIAL STOCKPILES WILL ALTER THE NATURAL CHARACTER OF THE STUDY AREA AND EXPOSE VISUAL RECEPTORS TO IMPACTS ASSOCIATED WITH CONSTRUCTION | **Magnitude** | **Extent** | **Reversibility** | **Duration** | **Probability** | **Significance** | | **Character** | **Confidence** |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 3 | 2 | 3 | 2 | 2 | **30** | **Low** | (-) | High |
| **With Mitigation** | 2 | 2 | 3 | 2 | 2 | **18** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Carefully plan to minimise the construction period and avoid construction delays.<br>— Make use of existing gravel access roads where possible.<br>— Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible.<br>— Ensure that dust suppression techniques are implemented:<br>— on all access roads;<br>— in all areas where vegetation clearing has taken place;<br>— on all soil stockpiles.<br>— | | | | | | | | |
| **Potential Impact:** | **Magnit** | **Extent** | **Reversi** | **Durati** | **Probab** | **Significance** | | **Chara** | **Confi** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **CONSTRUCTION ACTIVITIES MAY BE PERCEIVED AS AN UNWELCOME VISUAL INTRUSION, PARTICULARLY IN MORE NATURAL UNDISTURBED SETTINGS** | | | | | | | | | |
| **Without Mitigation** | 3 | 2 | 3 | 2 | 2 | **30** | **Low** | (-) | High |
| **With Mitigation** | 2 | 2 | 3 | 2 | 2 | **18** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Carefully plan to minimise the construction period and avoid construction delays.<br>— Vegetation clearing should take place in a phased manner.<br>— Make use of existing gravel access roads where possible.<br>— Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible.<br>— Ensure that dust suppression techniques are implemented:<br>— on all access roads;<br>— in all areas where vegetation clearing has taken place;<br>— on all soil stockpiles. | | | | | | | | |
| **Potential Impact:**<br>**TEMPORARY STOCKPILING OF SOIL DURING CONSTRUCTION MAY ALTER THE FLAT LANDSCAPE. WIND BLOWING OVER THESE DISTURBED AREAS COULD RESULT IN DUST WHICH WOULD HAVE A VISUAL IMPACT** | **Magnitude** | **Extent** | **Reversibility** | **Duration** | **Probability** | **Significance** | | **Character** | **Confidence** |
| **Without Mitigation** | 3 | 2 | 3 | 2 | 2 | **30** | **Low** | (-) | High |
| **With Mitigation** | 2 | 2 | 3 | 2 | 2 | **18** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Ensure that dust suppression techniques are implemented:<br>— on all access roads;<br>— in all areas where vegetation clearing has taken place;<br>— on all soil stockpiles. | | | | | | | | |
| **Potential Impact:**<br>**DUST EMISSIONS AND DUST PLUMES FROM INCREASED TRAFFIC ON THE GRAVEL ROADS SERVING THE CONSTRUCTION SITE MAY EVOKE NEGATIVE SENTIMENTS FROM SURROUNDING VIEWERS** | **Magnitude** | **Extent** | **Reversibility** | **Duration** | **Probability** | **Significance** | | **Character** | **Confidence** |
| **Without Mitigation** | 3 | 2 | 3 | 2 | 2 | **30** | **Low** | (-) | High |
| **With Mitigation** | 2 | 2 | 3 | 2 | 2 | **18** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible.<br>— Ensure that dust suppression techniques are implemented:<br>— on all access roads;<br>— in all areas where vegetation clearing has taken place;<br>— on all soil stockpiles. | | | | | | | | |
| **Potential Impact:**<br>**SURFACE DISTURBANCE DURING CONSTRUCTION WOULD EXPOSE BARE SOIL RESULTING IN VISUAL SCARRING OF THE LANDSCAPE AND INCREASING THE LEVEL OF VISUAL CONTRAST WITH THE SURROUNDING ENVIRONMENT** | **Magnitude** | **Extent** | **Reversibility** | **Duration** | **Probability** | **Significance** | | **Character** | **Confidence** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 3 | 2 | 3 | 2 | 2 | **30** | **Low** | (-) | High |
| **With Mitigation** | 2 | 2 | 3 | 2 | 2 | **18** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Carefully plan to minimise the construction period and avoid construction delays.<br>— Vegetation clearing should take place in a phased manner.<br>— Make use of existing gravel access roads where possible.<br>— Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible.<br>— Ensure that dust suppression techniques are implemented:<br>— on all access roads;<br>— in all areas where vegetation clearing has taken place;<br>— on all soil stockpiles. | | | | | | | | |
| **Potential Impact:**<br>POTENTIAL VISUAL POLLUTION RESULTING FROM LITTERING ON THE CONSTRUCTION SITE | **Magnitude** | **Extent** | **Reversibility** | **Duration** | **Probability** | **Significance** | | **Character** | **Confidence** |
| **Without Mitigation** | 3 | 2 | 3 | 2 | 2 | **30** | **Low** | (-) | High |
| **With Mitigation** | 2 | 2 | 3 | 2 | 2 | **18** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Maintain a neat construction site by removing litter, rubble and waste materials regularly. | | | | | | | | |

## 7.9.2 OPERATIONAL PHASE

### POTENTIAL VISUAL IMPACT ON SENSITIVE VISUAL RECEPTORS LOCATED WITHIN THE CAMDEN I SEF 132KV GRID CONNECTION INFRASTRUCTURE

The significance of visual impacts associated with the grid connection infrastructure during operation are expected to be Low but will be further reduced with the implementation of mitigation measures.

The operational impact on the visual landscape for all alternatives are shown in in **Table 7-23**.

**Table 7-23: Operational Impact on Visual Landscape resulting from Camden I SEF 132kV Grid Connection Infrastructure**

| **Potential Impact:**<br>THE PROPOSED POWER LINE AND SUBSTATION COULD ALTER THE VISUAL CHARACTER OF THE SURROUNDING AREA AND EXPOSE SENSITIVE VISUAL RECEPTOR LOCATIONS TO VISUAL IMPACTS | **Magnitude** | **Extent** | **Reversibility** | **Duration** | **Probability** | **Significance** | | **Character** | **Confidence** |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 4 | 2 | 3 | 4 | 2 | **26** | **Low** | (-) | High |
| **With Mitigation** | 4 | 2 | 3 | 4 | 2 | **26** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — The buildings on the substation site should not be illuminated at night unless required to adhere to safety standards and should be painted in natural tones that fit with the surrounding environment. | | | | | | | | |
| **Potential Impact:** | **Magnit** | **Extent** | **Reversi** | **Durati** | **Probab** | **Significance** | | **Chara** | **Confi** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **THE PROPOSED DEVELOPMENT WILL ALTER THE VISUAL CHARACTER OF THE SURROUNDING AREA AND EXPOSE POTENTIALLY SENSITIVE VISUAL RECEPTOR LOCATIONS TO VISUAL IMPACTS** | | | | | | | | | |
| **Without Mitigation** | 3 | 3 | 3 | 4 | 2 | **26** | **Low** | (-) | High |
| **With Mitigation** | 3 | 3 | 3 | 4 | 2 | **26** | **Low** | (-) | High |
| **Mitigation and Management Measures** | – The buildings on the substation site should not be illuminated at night unless required to adhere to safety standards and should be painted in natural tones that fit with the surrounding environment. | | | | | | | | |
| **Potential Impact:** **DUST EMISSIONS AND DUST PLUMES FROM MAINTENANCE VEHICLES ACCESSING THE SITE VIA GRAVEL ROADS MAY EVOKE NEGATIVE SENTIMENTS FROM SURROUNDING VIEWERS** | **Magnitude** | **Extent** | **Reversibility** | **Duration** | **Probability** | **Significance** | | **Character** | **Confidence** |
| **Without Mitigation** | 2 | 3 | 3 | 4 | 2 | **24** | **Low** | (-) | High |
| **With Mitigation** | 2 | 3 | 3 | 4 | 2 | **24** | **Low** | (-) | High |
| **Mitigation and Management Measures** | – Where possible, limit the number of maintenance vehicles using access roads.<br>– Ensure that dust suppression techniques are implemented on all gravel access roads.<br>– As far as possible, limit the amount of security and operational lighting present on the substation site whilst adhering to safety standards | | | | | | | | |
| **Potential Impact:** **THE NIGHTTIME VISUAL ENVIRONMENT COULD BE ALTERED AS A RESULT OF OPERATIONAL AND SECURITY LIGHTING AT THE PROPOSED SUBSTATION** | **Magnitude** | **Extent** | **Reversibility** | **Duration** | **Probability** | **Significance** | | **Character** | **Confidence** |
| **Without Mitigation** | 2 | 3 | 3 | 4 | 2 | **24** | **Low** | (-) | High |
| **With Mitigation** | 2 | 3 | 3 | 4 | 2 | **24** | **Low** | (-) | High |
| **Mitigation and Management Measures** | – As far as possible, limit the amount of security and operational lighting present on the substation site.<br>– Light fittings for security at night should reflect the light toward the ground and prevent light spill.<br>– Lighting fixtures should make use of minimum lumen or wattage.<br>– Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used.<br>– If possible, make use of motion detectors on security lighting.<br>– The buildings on the substation site should not be illuminated at night unless required to adhere to safety standards and should be painted in natural tones that fit with the surrounding environment | | | | | | | | |

## *7.9.3 DECOMMISSIONING PHASE*

### POTENTIAL VISUAL IMPACT ON SENSITIVE VISUAL RECEPTORS LOCATED WITHIN THE CAMDEN I SEF 132KV GRID CONNECTION INFRASTRUCTURE

The significance of visual impacts associated with the grid connection infrastructure during decommissioning is expected to be Low but will be further reduced with the implementation of mitigation measures.

**Table 7-24: Decommissioning Phase Impact on Visual Landscape resulting from post construction decommissioning phase.**

| Potential Impact: VEHICLES AND EQUIPMENT REQUIRED FOR DECOMMISSIONING WILL ALTER THE NATURAL CHARACTER OF THE STUDY AREA AND EXPOSE VISUAL RECEPTORS TO VISUAL IMPACTS | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 3 | 2 | 3 | 2 | 2 | **30** | **Low** | (-) | High |
| **With Mitigation** | 2 | 2 | 3 | 2 | 2 | **18** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — All infrastructure that is not required for post-decommissioning use should be removed.<br>— Carefully plan to minimize the decommissioning period and avoid delays.<br>— Maintain a neat decommissioning site by removing rubble and waste materials regularly. | | | | | | | | |

| Potential Impact: DECOMMISSIONING ACTIVITIES MAY BE PERCEIVED AS AN UNWELCOME VISUAL INTRUSION | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 3 | 2 | 3 | 2 | 2 | **30** | **Low** | (-) | High |
| **With Mitigation** | 2 | 2 | 3 | 2 | 2 | **18** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — All infrastructure that is not required for post-decommissioning use should be removed.<br>— Carefully plan to minimize the decommissioning period and avoid delays.<br>— Maintain a neat decommissioning site by removing rubble and waste materials regularly.<br>— Position storage / stockpile areas in unobtrusive positions in the landscape, where possible.<br>— Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase.<br>— All cleared areas should be rehabilitated as soon as possible.<br>— Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required. | | | | | | | | |

| Potential Impact: DUST EMISSIONS AND DUST PLUMES FROM INCREASED TRAFFIC ON THE GRAVEL ROADS SERVING THE DECOMMISSIONING SITE MAY EVOKE NEGATIVE SENTIMENTS FROM SURROUNDING VIEWERS | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 3 | 2 | 3 | 2 | 2 | **30** | **Low** | (-) | High |
| **With Mitigation** | 2 | 2 | 3 | 2 | 2 | **18** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. | | | | | | | | |

| Potential Impact: | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **SURFACE DISTURBANCE DURING CONSTRUCTION WOULD EXPOSE BARE SOIL RESULTING IN VISUAL SCARRING OF THE LANDSCAPE AND INCREASING THE LEVEL OF VISUAL CONTRAST WITH THE SURROUNDING ENVIRONMENT** | | | | | | | | | |
| **Without Mitigation** | 3 | 2 | 3 | 2 | 2 | **30** | **Low** | (-) | High |
| **With Mitigation** | 2 | 2 | 3 | 2 | 2 | **18** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — All cleared areas should be rehabilitated as soon as possible.<br>— Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required. | | | | | | | | |
| **Potential Impact:** | **Magnitude** | **Extent** | **Reversibility** | **Duration** | **Probability** | **Significance** | | **Character** | **Confidence** |
| **TEMPORARY STOCKPILING OF SOIL DURING DECOMMISSIONING MAY ALTER THE FLAT LANDSCAPE. WIND BLOWING OVER THESE DISTURBED AREAS COULD RESULT IN DUST WHICH WOULD HAVE A VISUAL IMPACT** | | | | | | | | | |
| **Without Mitigation** | 3 | 2 | 3 | 2 | 2 | **30** | **Low** | (-) | High |
| **With Mitigation** | 2 | 2 | 3 | 2 | 2 | **18** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Position storage / stockpile areas in unobtrusive positions in the landscape, where possible.<br>— All cleared areas should be rehabilitated as soon as possible.<br>— Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required. | | | | | | | | |

# 7.10 WASTE MANAGEMENT

## *7.10.1 CONSTRUCTION PHASE*

Construction-related waste is not anticipated to trigger the need for a Waste Management Licence (WML) in terms of NEMWA (Refer to **Section 2**). Waste management at the Project site will be undertaken in line with the EMPr to consider the correct disposal of general and hazardous waste generated on the Project. **Table 7-25** describes the different waste streams that the proposed Project will likely generate, as well as the various potential management options. Due to the nature of the Project, waste will mainly be generated during the construction phase. During operation, Eskom staff are only on the site for limited amount of time as and when maintenance is required.

The construction impact on improper waste management and littering is indicated in

**Table 7-26.**

**Table 7-25: Waste Management Options**

| WASTE | TYPE OF WASTE | MANAGEMENT OPTIONS |
|---|---|---|
| Hydrocarbons (Contaminated soil) | Hazardous | – Fuel and oil spillages can be a source of contamination of water sources and the soil. Management options include:<br>– Ensure hazardous waste is stored separately from general waste;<br>– Using spill kits to clean any spillages;<br>– Ensure storage facilities are maintained and meet industry regulations;<br>– Transportation and storage of fuel must be regulated and correctly managed according to the EMPr;<br>– Waste generated along servitude to be taken to the contractor laydown area weekly<br>– Co-ordinate waste removal with the removal of waste from the contractor laydown area; and<br>– All hazardous waste is to be disposed of at a registered hazardous landfill (safe disposal certificates must be obtained). |
| Contaminated Personal Protective Equipment (PPE) / Used oil containers | Hazardous | – PPE can be contaminated during handling of hydrocarbons. Management options include:<br>– Store contaminated PPE / used oil containers in hazardous waste skips along the servitude;<br>– Waste generated along servitude to be taken to the contractor laydown area weekly;<br>– Co-ordinate waste removal with the removal of waste from the contractor laydown area; and<br>– Ensure contaminated PPE is disposed of at a registered hazardous landfill (safe disposal certificates must be obtained). |
| General waste | General | – General waste (inorganic matter) can be disposed of as per normal and form part of the municipal waste management system. Management options include:<br>– Ensure waste is stored securely in refuse bins;<br>– Recycling of waste to be undertaken, where possible;<br>– Waste generated along servitude to be taken to the contractor laydown area weekly; and<br>– Co-ordinate waste removal with the general removal of waste from the contractor laydown area. |
| Food waste | General | – Food waste is generated as site personnel take their meals on the construction site. Management options include:<br>– Store any waste and packaging into a labelled food waste bin;<br>– Waste generated along servitude to be taken to the contractor laydown area weekly;<br>– Co-ordinate waste removal with the removal of waste from the contractor laydown area; and<br>– Co-ordinate waste removal with the general removal of waste from the contractor laydown area. |

**Table 7-26: Construction Impact on Improper Waste Management**

| Potential Impact: IMPROPER WASTE MANAGEMENT AND LITTERING | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 3 | 1 | 3 | 1 | 4 | **32** | **Moderate** | (-) | High |
| **With Mitigation** | 2 | 1 | 1 | 1 | 3 | **15** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be stored at the construction camp / laydown area and removed from site on a weekly basis to prevent rodents and pests entering the site;<br>— A minimum of one toilet must be provided per 10 persons;<br>— The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility;<br>— Hazardous waste must be stored separately in covered containers and appropriately disposed of at a licensed disposal facility;<br>— Recycling should take place, where possible;<br>— Where a registered disposal facility is not available close to the Project area, the Contractor shall provide a method statement with regards to waste management. Under no circumstances may domestic waste be burned on site; and<br>— Storage of domestic waste shall be in covered waste skips. | | | | | | | | |

### *7.10.2 OPERATIONAL PHASE*

No operational phase impacts are expected as a maintenance team will only be on site as and when required (intermittently) and for an extremely limited time. As such, the impacts are considered negligible.

## 7.11 TRAFFIC

### *7.11.1 CONSTRUCTION PHASE*

The impact of additional traffic during construction is expected to be minimal and short term. Trucks delivering construction supplies will predominantly make use of the R354 and existing access roads. The intermittent movement of trucks delivering construction supplies is likely to have a low impact. The construction impact on traffic is indicated in **Table 7-27**.

**Table 7-27: Construction Impact on Increased Local Traffic**

| Potential Impact: INCREASED LOCAL TRAFFIC | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 2 | 1 | 3 | 1 | 4 | **28** | **Low** | (-) | High |
| **With Mitigation** | 2 | 1 | 1 | 1 | 3 | **15** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — The road network used to access the Project area will have to be correctly maintained in order to support additional movement of vehicles. Transport of abnormal loads should be limited to non-peak hours where possible; | | | | | | | | |

| Potential Impact: | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **INCREASED LOCAL TRAFFIC** | | | | | | | | | |
| | — Ensure that trucks and other vehicles do not block access roads; and<br>— All site vehicles must limit the idle time on access roads. | | | | | | | | |

### 7.11.2 OPERATION PHASE

No operational phase traffic-related impacts are expected as a maintenance team will only be on site as and when required (intermittently) and for an extremely limited time. As such, the impacts are considered negligible.

## 7.12 HERITAGE

Based on the current layout, Solar Grid Alternative 4 will have a direct impact on the recorded feature at CA005 and CA012. CA005 is of low significance but if associated with stillborn graves the graves are of high significance. CA012 is of also of low significance. The sites should be indicated on development plans and avoided during construction after which the impacts will be very low. Impacts to heritage resources without mitigation within the project footprint will be permanent and negative and occur during construction activities.

Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a Chance Find Procedure. All known sites should be avoided and additional recommendations in this report should be implemented during all phases of the project. With the implementation of the recommended mitigation measures impacts of the project on heritage resources is acceptable.

### 7.12.1 CONSTRUCTION PHASE

It is assumed that the construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure. These activities can have a negative and irreversible impact on heritage features if any occur. Impacts include destruction or partial destruction of non-renewable heritage resources.

**Table 7-28: Construction Impact on Damage to Heritage Resources**

| Potential Impact: | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **DESTRUCTION OR DAMAGE TO RECORDED RUINS** | | | | | | | | | |
| **Without Mitigation** | 3 | 1 | 5 | 5 | 2 | **28** | **Low** | (-) | High |
| **With Mitigation** | 3 | 1 | 5 | 5 | 1 | **14** | **Very Low** | (-) | High |
| **Mitigation and Management Measures** | — Implementation of a Chance Find Procedure for the Project.<br>— The study area should be monitored by the ECO during construction.<br>— Recorded heritage features should be indicated on development plans and avoided with a 30 m buffer.<br>— The final alignment should be subjected to a heritage walkthrough | | | | | | | | |

### 7.12.2 OPERATIONAL PHASE

There are no anticipated heritage impacts during the operational phase, as any existing resources would have been discovered during excavations and other intrusive construction activities.

# 7.13 PALAEONTOLOGY

The proposed Common Collector Substation and Grid transmission line will be undertaken within the Vryheid Formation and non-fossiliferous Jurassic dolerite. The Vryheid Formation is classified as very highly sensitive.

## 7.13.1 CONSTRUCTION PHASE

Potential loss to paleontological resources due to excavation during construction phase.

| **Potential Impact:** **LOSS OF FOSSILS** | **Magnitude** | **Extent** | **Reversibili** | **Duration** | **Probability** | **Significanc e** | | **Character** | **Confidence** |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 2 | 1 | 3 | 4 | 2 | **20** | **Low** | (-) | High |
| **With Mitigation** | 1 | 1 | 3 | 1 | 6 | 6 | **Very low** | (-) | High |
| **Mitigation and Management Measures** | — If fossils occur in the footprint of any section of the project, the route for the grid connection (overhead powerline pole foundations/below ground piping), the hydrogen and ammonia facilities, access roads or infrastructure, they can be removed (Fossil Chance Find Protocol), and the project can continue.<br>— If fossils are recovered, removed and placed in a recognised institution such as a museum or university palaeontology collection this will be a positive impact because the fossils will be available for research. Otherwise they would have remained unknown to science. | | | | | | | | |
| **Potential Impact:** **DAMAGE TO HERITAGE RESOURCES** | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
| **Without Mitigation** | 2 | 1 | 3 | 4 | 2 | **20** | **Low** | (-) | High |
| **With Mitigation** | 1 | 1 | 3 | 1 | 6 | 6 | **Very low (+ve)** | (-) | High |
| **Mitigation and Management Measures** | — If fossils occur in the footprint of any section of route for the grid connection (overhead powerline pole foundations/below ground piping) access roads or infrastructure, they can be removed, and the project can continue. If no fossils are found, then no mitigation is required.<br>— Once fossils have been removed there will be not further impact on the palaeontological heritage. Therefore, the impact is only applicable to the construction phase. The operation and de-commissioning phases will NOT impact the palaeontology.<br>— If fossils are recovered, removed and placed in a recognised institution such as a museum or university palaeontology collection this will be a positive impact because the fossils will be available for research. Otherwise, they would have remained unknown to science | | | | | | | | |

## 7.13.2 OPERATIONAL PHASE

There are no anticipated impacts on palaeontology during the operational phase as any existing resources would have been discovered during excavations and other intrusive construction activities.

# 7.14 AGRICULTURAL POTENTIAL

The proposed overhead powerline has negligible agricultural impact, regardless of its route and design and the agricultural potential of the land it traverses. All agricultural activities can continue completely unhindered underneath the powerline. This is because its direct, permanent, physical footprint that has any potential to interfere with agriculture (pylon bases and servitude track, where it is needed), is insignificantly small and the pylons can mostly, although not always, be located outside of or on the edges of cropland where they minimise interference with crop production. There will therefore be little to no reduction in future agricultural production potential underneath the powerline. The only potential source of impact of the powerline is minimal disturbance to the land (erosion and topsoil loss) during construction (and decommissioning). This impact can be completely mitigated with standard, generic mitigation measures that are included in the generic DFFE EMPr.

The only impact of this development is therefore the loss of approximately 2 hectares of agricultural land on the site of the substation. The significance of the loss of agricultural land is a direct function of two things, firstly the amount of land that will be lost and secondly, the production potential of the land that will be lost. In this case the amount of land loss is very small and the production potential of the land on both substation sites is limited to being unsuitable for crop production and only suitable as grazing land. Therefore, the agricultural impact of the development is assessed as being of LOW significance.

# 7.15 SOCIO-ECONOMIC

Positive socio-economic impacts associated with the proposed OHPL include job creation, skills development and local business opportunities as well as increased energy security. The findings of the SIA indicate that the significance of the potential negative impacts is likely to be low. The potential negative impacts associated with the proposed power line can be effectively mitigated if the recommended mitigation measures are implemented.

## *7.15.1 CONSTRUCTION PHASE*

### CREATION OF LOCAL EMPLOYMENT, TRAINING, AND BUSINESS OPPORTUNITIES

Based on similar projects the construction phase of for the grid connection will extend over a period of approximately 6 months and create in the region of 30-40 employment opportunities. Most of the low and semi-skilled employment opportunities would benefit community members from Ermelo and the local area. Most of the employment opportunities are also likely to accrue to Historically Disadvantaged (HD) members from these local communities. Given high local unemployment levels and limited job opportunities in the area, this will represent a localised, social benefit. The remainder of the skilled employment opportunities are likely to be associated with the contactors appointed to construct the grid infrastructure. However, in the absence of specific commitments from the developer to maximise local employment targets the potential opportunities for local employment will be limited. The proponent should therefore commit to employing as many local community members as possible. The total wage bill will be in the region of R 4 million (2022 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in MM. The capital expenditure associated with the construction of grid infrastructure is estimated to be ~ R 50 million and will create opportunities for local companies and the regional and local economy. Implementing the enhancement measures listed below can enhance these opportunities. The sector of the local economy that is most likely to benefit from the proposed development is the local service industry. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site. However, given the relatively small scale of the project and short duration of the construction phase these benefits will be limited.

The impact on **employment, skills development and business opportunities** is shown in

**Table 7-29**.

**Table 7-29: Impact assessment of employment, skills development, and business creation opportunities during the construction phase**

| Potential Impact: CREATION OF EMPLOYMENT AND BUSINESS OPPORTUNITIES DURING THE CONSTRUCTION PHASE | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 2 | 2 | 0 | 2 | 3 | **18** | **Low** | (+) | High |
| **With Mitigation** | 2 | 3 | 0 | 2 | 4 | **28** | **Low** | (+) | High |
| **Mitigation and Management Measures** | – **Employment**<br>– Stakeholder engagement processes should be put in place to make sure that all interested and affected party have buy in in the process which will be designed and followed for employment and local procurement opportunities<br>– Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.<br>– Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.<br>– Before the construction phase commences the proponent should meet with representatives from the MM to establish the existence of a skills database for the area. If such as database exists, it should be made available to the contractors appointed for the construction phase.<br>– The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.<br>– Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.<br>– The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.<br>– **Business**<br>– The proponent should liaise with the MM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work.<br>*Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.* | | | | | | | | |

## IMPACT OF CONSTRUCTION WORKERS ON LOCAL COMMUNITIES

The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to potentially risky behaviour, mainly of male construction workers, including:

- An increase in alcohol and drug use.
- An increase in crime levels.
- The loss of girlfriends and/or wives to construction workers.
- An increase in teenage and unwanted pregnancies.
- An increase in prostitution.
- An increase in sexually transmitted diseases (STDs), including HIV.

Given the relatively small number of construction workers, namely ~ 30-40, the potential impact on the local community is likely to be negligible.

The impact of the presence of construction workers in the area on local communities is show in **Table 7-30.**

**Table 7-30: Construction Impact on workers in the area on local communities**

| Potential Impact: | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **POTENTIAL IMPACTS ON FAMILY STRUCTURES AND SOCIAL NETWORKS ASSOCIATED WITH THE PRESENCE OF CONSTRUCTION WORKERS** | | | | | | | | | |
| **Without Mitigation** | 2 | 2 | 3 | 2 | 2 | **18** | **Low** | (-) | High |
| **With Mitigation** | 1 | 1 | 3 | 2 | 2 | **14** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories.<br>— The proponent and the contractor(s) should develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be subject to appropriate disciplinary action and/or dismissed. All dismissals must comply with the South African labour legislation.<br>— The proponent and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase.<br>— The proponent and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase.<br>— The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site.<br>— The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end.<br>— No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site. | | | | | | | | |

## RISK TO SAFETY, LIVESTOCK, AND FARM INFRASTRUCTURE

The presence on and movement of construction workers on and off the site poses a potential safety threat to local famers and farm workers in the vicinity of the site. In addition, farm infrastructure, such as fences and gates, may

be damaged and stock losses may also result from gates being left open and/or fences being damaged, or stock theft linked either directly or indirectly to the presence of farm workers on the site. The potential risks (safety, livestock, and farm infrastructure) can be effectively mitigated by careful planning and managing the movement of construction on and off the site workers during the construction phase.

The impact of the **risk to safety, livestock, and farm infrastructure** is shown in **Table 7-31.**

**Table 7-31: Construction Impact on Safety, Livestock, and Farm Infrastructure**

| **Potential Impact:** RISK TO SAFETY, LIVESTOCK, AND FARM INFRASTRUCTURE | **Magnitude** | **Extent** | **Reversibility** | **Duration** | **Probability** | **Significance** | | **Character** | **Confidence** |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 3 | 2 | 3 | 2 | 4 | **40** | **Moderate** | (-) | High |
| **With Mitigation** | 2 | 1 | 3 | 2 | 2 | **16** | **Low** | (-) | High |
| **Mitigation and Management Measures** | – The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.<br>– All farm gates must be closed after passing through.<br>– Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site.<br>– All farm gates must be closed after passing through.<br>– Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site.<br>– The proponent should consider the option of establishing a MF (see above) that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site.<br>– The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below).<br>– Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.<br>– Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation.<br>– It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site. | | | | | | | | |

## INCREASED RISK OF GRASS FIRES

The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could, in turn pose, a threat to livestock, crops, wildlife and farm infrastructure. The potential risk of grass fires will be higher during the dry, windy winter months from May to October. The impacts will be largely local and can be effectively mitigated.

The impact of i**ncreased risk of grass fires** is shown in **Table 7-32**.

**Table 7-32: Construction Impact associated with potential increased risk of grass fires**

| **Potential Impact:** POTENTIAL LOSS OF LIVESTOCK AND GRAZING AND DAMAGE TO FARM INFRASTRUCTURE ASSOCIATED WITH INCREASED INCIDENCE OF GRASS FIRES | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 3 | 2 | 3 | 2 | 3 | **30** | **Moderate** | (-) | High |
| **With Mitigation** | 2 | 1 | 3 | 2 | 2 | **16** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.<br>— Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas.<br>— Smoking on site should be confined to designated areas.<br>— Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy summer months.<br>— Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle.<br>— Contractor should provide fire-fighting training to selected construction staff.<br>— No construction staff, with the exception of security staff, to be accommodated on site overnight.<br>— As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities. | | | | | | | | |

## NUISANCE IMPACTS ASSOCIATED WITH CONSTRUCTION RELATED ACTIVITIES

Construction related activities, including the movement of heavy construction vehicles of and on the site, has the potential to create dust, noise and safety impacts and damage roads. The impacts will be largely local and can be effectively mitigated. The significance of the impacts is also likely to low due to the relatively short timeframe of the construction phase and small footprint of the disturbances.

The **Nuisance impacts associated with construction related activities** is shown in **Table 7-33**.

**Table 7-33: Nuisance impacts associated with construction related activities**

| **Potential Impact:** | Magni- | Extent | Rever- | Durati | Proba- | Signifi cance | | Chara cter | Confi dence |
|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **POTENTIAL NOISE, DUST AND SAFETY IMPACTS ASSOCIATED WITH MOVEMENT OF CONSTRUCTION RELATED ACTIVITIES AND MOVEMENT OF TRAFFIC TO AND FROM THE SITE** | | | | | | | | | |
| **Without Mitigation** | 2 | 2 | 1 | 2 | 3 | **21** | **Low** | (-) | High |
| **With Mitigation** | 2 | 1 | 1 | 2 | 2 | **12** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — As indicated above, the proponent should consider the establishment of a Monitoring Forum (MF) to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from local farmers and the contractor(s). The MF should also address issues associated with damage to roads and other construction related impacts.<br>— Ongoing communication with landowners and road users during construction period.<br>— Establishment of a Grievance Mechanism that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads.<br>— Implementation of a road maintenance programme throughout the construction phase to ensure that the affected roads maintained in a good condition and repaired once the construction phase is completed.<br>— Repair of all affected road portions at the end of construction period where required.<br>— Dust suppression measures must be implemented on un-surfaced roads, such as wetting on a regular basis and ensuring that vehicles used to transport building materials are fitted with tarpaulins or covers.<br>— All vehicles must be roadworthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits. | | | | | | | | |

## IMPACTS ASSOCIATED WITH LOSS OF FARMLAND

The activities associated with the construction phase and establishment of the proposed project and associated infrastructure will result in the disturbance and loss of land available for grazing. The impact on farmland associated with the construction phase can be mitigated by minimising the footprint of the construction related activities and ensuring that disturbed areas are fully rehabilitated on completion of the construction phase. In addition, the landowner will be compensated for the loss of land.

The **impacts associated with loss of farmland** is shown in **Table 7-34**.

**Table 7-34: Nuisance impacts associated with construction related activities**

| **Potential Impact:**<br>**POTENTIAL IMPACT ON PRODUCTIVE FARMLAND DUE TO CONSTRUCTION RELATED ACTIVITIES AND MOVEMENT OF TRAFFIC ON THE SITE** | **Magnitude** | **Extent** | **Reversibility** | **Duration** | **Probability** | **Significance** | | **Character** | **Confidence** |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 3 | 2 | 3 | 2 | 4 | **40** | **Moderate** | (-) | High |
| **With Mitigation** | 2 | 1 | 3 | 2 | 3 | **24** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — The loss of high-quality agricultural land should be avoided and or minimised by careful planning in the final layout of the proposed grid facilities. | | | | | | | | |

| | |
|---|---|
| | — Affected landowners should be consulted about the timing of construction related activities in advance.<br>— The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be minimised.<br>— An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase.<br>— All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase.<br>— The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme should be drawn up by the Environmental Consultants appointed to manage the BA.<br>— The implementation of the Rehabilitation Programme should be monitored by the ECO. |

## 7.15.2 OPERATIONAL PHASE

### IMPROVE ENERGY SECURITY AND SUPPORT THE RENEWABLE ENERGY SECTOR

The proposed power line is essential to enable the development and operation of 100 MW Camden I SEF. The primary goal of the proposed 100 MW Camden I SEF is to improve energy security in South Africa by generating renewable energy. The proposed power line should therefore be viewed within the context of the South Africa's current power supply constraints and the reliance on coal powered energy to meet most of its energy needs.

South Africa's energy crisis, which started in 2007 and is ongoing, has resulted in widespread rolling blackouts (referred to as load shedding) due to supply shortfalls. The load shedding has had a significant impact on all sectors of the economy and on investor confidence. The mining and manufacturing sector have been severely impacted and will continue to be impacted until such time as there is a reliable supply to energy. Load shedding in the first six months of 2015 was estimated to have cost South African businesses R13.72 billion in lost revenue with an additional R716 million was spent by businesses on backup generators10. A survey of 3 984 small business owners found that 44% said that they had been severely affected by load shedding with 85% stating that it had reduced their revenue, with 40% of small businesses losing 20% or more or revenue during due to load shedding period11.

The operational impact on **energy security, reduce reliance on coal generated power** is shown in **Table 7-35**.

**Table 7-35: Operational Impact on improved energy security, reduce reliance on coal generated power**

| **Potential Impact:**<br>**DEVELOPMENT OF INFRASTRUCTURE TO IMPROVE ENERGY SECURITY AND REDUCE RELIANCE ON COAL** | **Magnitude** | **Extent** | **Reversibility** | **Duration** | **Probability** | **Significance** | | **Character** | **Confidence** |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 3 | 4 | 0 | 4 | 4 | **44** | **Moderate** | (+) | High |
| **With Mitigation** | 3 | 4 | 0 | 4 | 5 | **55** | **Moderate** | (+) | High |
| **Mitigation and Management Measures** | — Maximise the number of employment opportunities for local community members. | | | | | | | | |

[10] Goldberg, Ariel (9 November 2015). "The economic impact of load shedding: The case of South African retailers" (PDF). Gordon Institute of Business Science. p. 109

[11] "How does load shedding affect small business in SA?". *The Yoco Small Business Pulse (3: Q1 2019): 3*

| | |
|---|---|
| | — Implement training and skills development programs for members from the local community.<br>— Maximise opportunities for local content and procurement. |

Residual impacts include improved energy security and overall benefit for economic development and investment, reduction in $CO_2$ emission and reduction in water consumption for energy generation.

## CREATION OF EMPLOYMENT, SKILLS DEVELOPMENT AND BUSINESS OPPORTUNITIES

The potential employment, skills development and business-related opportunities associated with the power line will be limited and largely confined to periodic maintenance and repairs. The potential socio-economic benefits are therefore likely to be limited. The potential opportunities can however be enhanced if a local service provider is appointed to undertake the work required. This may involve providing training and skills development to enable a locally based service provider to provide the required services.

The impact on **employment, skills development and business creation opportunities** is shown in **Table 7-36**.

**Table 7-36: Operational Impact on Employment Opportunities**

| Potential Impact: CREATION OF EMPLOYMENT, SKILLS DEVELOPMENT AND BUSINESS OPPORTUNITIES ASSOCIATED WITH THE OPERATIONAL PHASE | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 2 | 1 | 0 | 4 | 2 | **14** | **Low** | (+) | High |
| **With Mitigation** | 4 | 2 | 0 | 4 | 4 | **40** | **Moderate** | (+) | High |
| **Mitigation and Management Measures** | — Maximise the number of employment opportunities for local community members.<br>— Implement training and skills development programs for members from the local community.<br>— Maximise opportunities for local content and procurement. | | | | | | | | |

Residual impacts include the creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area.

## GENERATE INCOME FOR AFFECTED LANDOWNERS

The proponent will be required to either purchase the land or enter into a rental agreement with the affected landowners for the use of the land for the establishment of the proposed transmission line. Based on the findings of the SIA the area is prone to droughts and farming operations can be challenging. Any additional source of income therefore represents a significant benefit for the affected landowner(s). The additional income would assist to reduce the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as fuel, feed etc. The additional income would improve economic security of farming operations, which in turn would improve job security of farm workers and benefit the local economy.

The impact on **income generated for affected farmer(s)** is shown in **Table 7-37**.

**Table 7-37: Operational Impact on income generated for affected farmer(s)**

| Potential Impact: THE GENERATION OF ADDITIONAL INCOME REPRESENTS A SIGNIFICANT BENEFIT FOR THE LOCAL AFFECTED FARMER(S) AND REDUCES THE RISKS TO THEIR LIVELIHOODS POSED BY DROUGHTS AND FLUCTUATING MARKET PRICES FOR SHEEP AND FARMING INPUTS, SUCH AS FEED ETC | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 2 | 1 | 0 | 4 | 3 | **21** | **Low** | (+) | High |
| **With Mitigation** | 3 | 2 | 0 | 4 | 5 | **45** | **Moderate** | (+) | High |

| | |
|---|---|
| **Mitigation and Management Measures** | — Implement agreements with affected landowners. |

## VISUAL IMPACT AND IMPACT ON SENSE OF PLACE

The proposed development has the potential to impact on the areas existing rural sense of place. Based on the findings of the site visit potential impact on the areas sense of place is likely to be limited. This is due to the existence of the Camden Power station and existing power lines in the area. None of the landowners interviewed raised concerns regarding the potential visual impact on the areas sense of place.

The **visual impact and impact on sense of place** is shown in **Table 7-38**.

**Table 7-38: Operational Impact on Visual impact and impact on sense of place**

| **Potential Impact:** VISUAL IMPACT ASSOCIATED WITH THE PROPOSED GRID INFRASTRUCTURE AND THE POTENTIAL IMPACT ON THE AREA'S SENSE OF PLACE | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 2 | 2 | 1 | 4 | 3 | **27** | **Low** | (-) | High |
| **With Mitigation** | 2 | 2 | 1 | 4 | 3 | **27** | **Moderate** | (-) | High |
| **Mitigation and Management Measures** | — Recommendations of the VIA should be implemented. | | | | | | | | |

## IMPACT ON FARMING OPERATIONS DURING MAINTENANCE

The presence on and movement of maintenance workers on and off the site poses a potential risk to farming operations. Farm fence and gates may be damaged and stock losses may also result from gates being left open. The presence of maintenance workers on the site also increases the exposure of their farming operations and livestock to the outside world, which, in turn, increased the potential risk of stock theft and crime.

Based on experience with maintenance of the existing Eskom power lines this is an issue that will need to be addressed. The potential risks (safety, livestock, and farm infrastructure) can be effectively mitigated by ensuring the maintenance teams take care to ensure that gates are kept closed and affected property owners are kept informed about timing of maintenance operations. Mitigation measures to address these risks are outlined below.

The impact on **farming operations and damage to farm infrastructure is** shown in **Table 7-39**.

**Table 7-39: Operational Impact on on farming operations and damage to farm infrastructure**

| **Potential Impact:** POTENTIAL RISK TO SAFETY TO FARMING OPERATIONS AND LIVESTOCK ASSOCIATED WITH THE PRESENCE OF MAINTENANCE WORKERS ON THE SITE | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 3 | 2 | 3 | 2 | 4 | **30** | **Low** | (-) | High |
| **With Mitigation** | 2 | 2 | 3 | 2 | 3 | **27** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — Affected property owners should be notified in advance of the timing and duration of maintenance activities.<br>— Maintenance teams must ensure that all farm gates must be closed after passing through.<br>— Property owners should be compensated for damage to farm property and or loss of livestock or game associated maintenance related activities.<br>— Movement of traffic and maintenance related activities should be strictly contained within designated areas associated with transmission lines and substations.<br>— Strict traffic speed limits must be enforced on the farm.<br>— No maintenance workers should be allowed to stay over-night on the affected properties. | | | | | | | | |

# 7.16 HEALTH AND SAFETY

## 7.16.1 CONSTRUCTION PHASE

During construction, the employees are exposed to health and safety hazards from the mechanical machines and equipment used on the site. Furthermore, there is a potential for snakes and other dangerous animals in the area, to which the employees must be warned about and trained on how to handle situations if any encounters occur. The construction impact on health and safety is indicated in **Table 7-40** below.

**Table 7-40: Construction Impact on Employee Health and Safety**

| Potential Impact: EMPLOYEE HEALTH AND SAFETY | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 4 | 2 | 3 | 4 | 4 | **52** | **Moderate** | (-) | High |
| **With Mitigation** | 2 | 1 | 3 | 4 | 2 | **20** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — An HSE officer must be appointed to monitor safety conditions during construction activities;<br>— Ensure employees are properly trained to use specific equipment or machinery;<br>— Train personnel on how to deal with snake encounters, as well as encounters with other dangerous animals known to occur in the area;<br>— Provide suitable personal protective equipment (PPE);<br>— Conduct site and safety induction to raise awareness of the risks associated with the site;<br>— Conduct regular toolbox talks as refreshers to improve health and safety;<br>— Develop safe work instruction method statements that should be used by employees in completing their tasks;<br>— Train all relevant personnel on handling, use and storage of hazardous substances;<br>— Provide Material Safety Data Sheets (MSDS) for all hazardous substances kept onsite; and<br>— All visitors should undergo site induction and be made aware of the risks associated with the site. | | | | | | | | |

## 7.16.2 OPERATIONAL PHASE

The operational phase health and safety impacts are expected to be limited to loading and unloading of heavy equipment as well as via the storage and handling of any hazardous material onsite. The impact is expected to be low following mitigation and is indicated in **Table 7-41** below.

**Table 7-41: Operation Impact on Employee Health and Safety**

| Potential Impact: EMPLOYEE HEALTH AND SAFETY | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 3 | 2 | 3 | 3 | 3 | **33** | **Moderate** | (-) | High |
| **With Mitigation** | 2 | 1 | 3 | 4 | 2 | **20** | **Low** | (-) | High |
| **Mitigation and Management Measures** | — The HSE officer will monitor safety conditions during activities; | | | | | | | | |

| Potential Impact:<br>EMPLOYEE HEALTH AND SAFETY | Magnitude | Extent | Reversibility | Duration | Probability | Significance | Character | Confidence |
|---|---|---|---|---|---|---|---|---|
| | – Ensure employees are properly trained to use specific equipment or machinery;<br>– Train personnel on how to deal with snake encounters, as well as encounters with other dangerous animals known to occur in the area;<br>– Provide suitable PPE;<br>– Conduct site and safety induction to raise awareness of the risks associated with the site;<br>– Conduct regular toolbox talks as refreshers to improve health and safety;<br>– Develop safe work instruction method statements that should be used by employees in completing their tasks;<br>– Train all relevant personnel on handling, use and storage of hazardous substances;<br>– Provide MSDSs for all hazardous substances kept onsite; and<br>– All visitors should undergo site induction and be made aware of the risks associated with the site. | | | | | | | |

## 7.17 NO-GO ALTERNATIVE

The no-go alternative is essentially the option of not developing powerlines or substations in this area in which case none of the negative and positive impacts described above will come into effect.

The no-go option would represent a lost opportunity for South Africa to improve energy security and supplement its current energy needs with renewable energy given that energy security benefits associated with the proposed project are dependent upon it being able to connect to the national grid via the establishment of grid connection infrastructure. Considering South Africa's current energy security challenges and its position as one of the highest per capita producers of carbon emissions in the world, this would represent a significant socio-economic cost. Accordingly, the no-go option is not deemed viable.

# 8 CUMULATIVE IMPACT ASSESSMENT

Although the BA process is essential to assessing and managing the environmental and social impacts of individual projects, it often may be insufficient for identifying and managing incremental impacts on areas or resources used or directly affected by a given development from other existing, planned, or reasonably defined developments at the time the risks and impacts are identified.

IFC PS 1 recognizes that, in some instances, cumulative effects need to be considered in the identification and management of environmental and social impacts and risks. For private sector management of cumulative impacts, IFC considers good practice to be two pronged:

- effective application of and adherence to the mitigation hierarchy in environmental and social management of the specific contributions by the project to the expected cumulative impacts; and
- best efforts to engage in, enhance, and/or contribute to a multi-stakeholder, collaborative approach to implementing management actions that are beyond the capacity of an individual project proponent.

Even though Performance Standard 1 does not expressly require, or put the sole onus on, private sector clients to undertake a cumulative impact assessment (CIA), in paragraph 11 it states that the impact and risk identification process "*will take into account the findings and conclusions of related and applicable plans, studies, or assessments prepared by relevant government authorities or other parties that are directly related to the project and its area of influence*" including "*master economic development plans, country or regional plans, feasibility studies, alternatives analyses, and cumulative, regional, sectoral, or strategic environmental assessments where relevant*."

Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones. For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognized as important on the basis of scientific concerns and/or concerns of affected communities (IFC GPH).

Evaluation of potential cumulative impacts is an integral element of an impact assessment. In reference to the scope for an impact assessment, IFC's Performance Standards specify that "*Risks and impacts will be analysed in the context of the project's area of influence. This area of influence encompasses…areas potentially impacted by cumulative impacts from further planned development of the project, any existing project or condition, and other project-related developments that are realistically defined at the time the Social and Environmental Assessment is undertaken; and (iv) areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location.*" (IFC 2006).

A cumulative impact assessment is the process of (a) analysing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen Valued Environmental and Social Components (VECs) over time, and (b) proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible (IFC GPH).

Cumulative impacts with existing and planned facilities may occur during construction and operation of the proposed OHPL. While one project may not have a significant negative impact on sensitive resources or receptors, the collective impact of the projects may increase the severity of the potential impacts.

Potential cumulative impacts identified are summarised below. Other planned or existing projects that can interact with the Project will be identified during stakeholder engagement and finalisation of the BA process.

According to the official database of DFFE, there are currently 26 registered applications involving at least seven planned renewable wind energy projects within a 10km radius around the proposed development.

## 8.1 SOCIO-ECONOMIC CUMULATIVE IMPACT

The potential cumulative impacts on the areas sense of place will be largely linked to potential visual impacts. In this regard the Scottish Natural Heritage (2005) describes a range of potential cumulative landscape impacts associated with wind farms on landscapes. These issues are also likely to be relevant to solar facilities and associated infrastructure. The relevant issues identified by Scottish Natural Heritage study include:

- Combined visibility (whether two or more wind farms (power lines) will be visible from one location).

- Sequential visibility (e.g. the effect of seeing two or more wind farms (power lines) along a single journey, e.g. road or walking trail).
- The visual compatibility of different wind farms (power lines) in the same vicinity.
- Perceived or actual change in land use across a character type or region.
- Loss of a characteristic element (e.g. viewing type or feature) across a character type caused by developments across that character type.

The guidelines also note that cumulative impacts need to be considered in relation to dynamic as well as static viewpoints. The experience of driving along a tourist road, for example, needs to be considered as a dynamic sequence of views and visual impacts, not just as the cumulative impact of several developments on one location. The viewer may only see one renewable energy facility and the associated infrastructure at a time, but if each successive stretch of the road is dominated by views of renewable energy facilities, then that can be argued to be a cumulative visual impact (National Wind Farm Development Guidelines, DRAFT - July 2010). As indicated above, the potential impact of the proposed power lines and associated infrastructure on the areas sense of place is likely to be limited. The cumulative impacts are also likely to be low with mitigation. None of the landowners interviewed raised concerns regarding the potential visual impact on the areas sense of place.

**Table 8-1: Cumulative impacts on sense of place and the landscape**

| **Potential Impact:** VISUAL IMPACTS ASSOCIATED WITH THE ESTABLISHMENT OF ASSOCIATED GRID INFRASTRUCTURE AND THE POTENTIAL IMPACT ON THE AREA'S RURAL SENSE OF PLACE AND CHARACTER OF THE LANDSCAPE | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Overall impact of the proposed project considered in isolation** | 2 | 2 | 1 | 4 | 3 | **27** | **Moderate** | (-) | High |
| **Cumulative impact of the project and other projects in the area** | 3 | 2 | 1 | 4 | 4 | **40** | **Moderate** | (-) | High |
| **Mitigation and Management Measures** | — Recommendations of the VIA should be implemented. | | | | | | | | |

## 8.2 VISUAL CUMULATIVE IMPACTS

Cumulative impacts occur where existing or planned developments, in conjunction with the proposed development, result in significant incremental changes in the broader study area. In this instance, such developments would include:

— existing and proposed mining / quarrying activities,

— electrical infrastructure including Camden Power Station and associated power lines; and

— proposed renewable energy facilities comprising the Camden Renewable Energy Complex (Wind, Solar, Hydrogen and associated grid connection infrastructure).

Existing mining / quarrying and electrical infrastructure have already resulted in large scale visual impacts, mostly along the N2 national route, extending south-eastwards from Ermelo to Camden Power Station. These developments have significantly altered the sense of place and visual character in the broader region.

Renewable energy facilities have the potential to cause large-scale visual impacts, and although the level of transformation already present in the landscape will reduce the contrast and overall visual impact of the new development, the incremental change in the landscape will be increased and the visual impacts on surrounding visual receptors would be exacerbated. Although the South African Renewable Energy EIA Application Database from DFFE does not record any existing or proposed renewable projects within 35kms of the Camden 1 SEF project area, a cumulative assessment must include all elements of the proposed Camden Renewable Energy Complex. This complex, including wind, solar and green hydrogen energy facilities as well as associated grid connection infrastructure, will affect a large portion of the study area.

From a visual perspective, the concentration of renewable energy facilities as proposed will further change the visual character of the area and alter the inherent sense of place, extending an increasingly industrial character into the broader area, and resulting in significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommended mitigation measures. In

addition, it is possible that these developments in close proximity to each other could be seen as one large Renewable Energy Facility (REF) rather than several separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative visual impacts on the landscape.

**Table 8-2: Cumulative impacts on visual sense of place**

| **Potential Impact:** ADDITIONAL RENEWABLE ENERGY AND ASSOCIATED INFRASTRUCTURE DEVELOPMENTS IN THE BROADER AREA WILL ALTER THE NATURAL CHARACTER OF THE STUDY AREA TOWARDS A MORE INDUSTRIAL LANDSCAPE AND EXPOSE A GREATER NUMBER OF RECEPTORS TO VISUAL IMPACTS | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 5 | 3 | 3 | 5 | 4 | **64** | **High** | (-) | High |
| **With Mitigation** | 4 | 3 | 3 | 4 | 4 | **56** | **Moderate** | (-) | High |
| **Mitigation and Management Measures** | — Non-reflective surfaces should be utilised where possible. | | | | | | | | |
| **Potential Impact:** VISUAL INTRUSION OF MULTIPLE RENEWABLE ENERGY DEVELOPMENTS AND ASSOCIATED INFRASTRUCTURE MAY BE EXACERBATED, PARTICULARLY IN MORE NATURAL UNDISTURBED SETTINGS | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
| **Without Mitigation** | 5 | 3 | 3 | 5 | 4 | **64** | **High** | (-) | High |
| **With Mitigation** | 4 | 3 | 3 | 4 | 4 | **56** | **Moderate** | (-) | High |
| **Mitigation and Management Measures** | — Where possible, limit the number of maintenance vehicles using access roads.<br>— Non-reflective surfaces should be utilised where possible. | | | | | | | | |
| **Potential Impact:** ADDITIONAL RENEWABLE ENERGY FACILITIES IN THE AREA WOULD GENERATE ADDITIONAL TRAFFIC ON GRAVEL ROADS THUS RESULTING IN INCREASED IMPACTS FROM DUST EMISSIONS AND DUST PLUMES | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
| **Without Mitigation** | 5 | 3 | 3 | 5 | 4 | **64** | **High** | (-) | High |
| **With Mitigation** | 4 | 3 | 3 | 4 | 4 | **56** | **Moderate** | (-) | High |
| **Mitigation and Management Measures** | — Where possible, limit the number of maintenance vehicles using access roads. | | | | | | | | |
| **Potential Impact:** THE NIGHT TIME VISUAL ENVIRONMENT COULD BE ALTERED AS A RESULT OF OPERATIONAL AND SECURITY LIGHTING AT MULTIPLE RENEWABLE ENERGY FACILITIES IN THE BROADER AREA | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
| **Without Mitigation** | 5 | 3 | 3 | 5 | 4 | **64** | **High** | (-) | High |
| **With Mitigation** | 4 | 3 | 3 | 4 | 4 | **56** | **Moderate** | (-) | High |
| **Mitigation and Management Measures** | — Where possible, limit the amount of security and operational lighting present at the on-site substation.<br>— Light fittings for security at night should reflect the light toward the ground and prevent light spill. | | | | | | | | |

## 8.3 AQUATIC CUMULATIVE IMPACTS

**Table 8-3: Cumulative impacts on freshwater**

| Potential Impact: IN THE ASSESSMENT OF THIS PROJECT, ANY SIMILAR PROJECTS WERE ASSESSED | Magnitud | Extent | Reversibil | Duration | Probabilit | Significan ce | | Character | Confidenc e |
|---|---|---|---|---|---|---|---|---|---|
| **Overall impact of the proposed project considered in isolation** | 4 | 4 | 5 | 4 | 2 | **34** | **Moderate** | (-) | High |
| **Cumulative impact of the project and other projects in the area** | 2 | 2 | 2 | 2 | 2 | **16** | **Low** | (-) | High |

## 8.4 AGRICULTURAL POTENTIAL

The potential cumulative agricultural impact of importance is a regional loss of future agricultural production potential. The defining question for assessing the cumulative agricultural impact is this:

- What level of loss of future agricultural production potential is acceptable in the area, and will the loss associated with the proposed development, when considered in the context of all past, present or reasonably foreseeable future impacts, cause that level in the area to be exceeded

There are a number of non-agricultural developments that are leading to loss of agricultural production potential in the area. However, because this grid connection itself leads to a very small loss of production potential, its cumulative impact is low. It therefore does not make sense to conduct a more formal assessment of the development's cumulative impacts as per DFFE requirements for cumulative impacts. Many times, more electricity grid infrastructure than currently exists, or is currently proposed, can be accommodated before acceptable levels of change in terms of loss of production potential are exceeded. In reality the landscape in this environment could be covered with powerlines and agricultural production potential would be minimally affected.

Due to the considerations discussed above, the cumulative impact of loss of future agricultural production potential can confidently be assessed as being low and therefore not having an unacceptable negative impact on the area. In terms of cumulative impact, the proposed development is therefore acceptable, and it is therefore recommended that it be approved.

## 8.5 HERITAGE

Cumulative impacts considered as an effect caused by the proposed action that results from the incremental impact of an action when added to other past, present, or reasonably foreseeable future actions. (Cornell Law School Information Institute, 2020). Cumulative impacts occur from the combination of effects of various impacts on heritage resources. The importance of identifying and assessing cumulative impacts is that the whole is greater than the sum of its parts. In the case of this project, impacts can be mitigated to an acceptable level. However, this and other projects in the area can have a negative impact on heritage sites in the area where these sites have been destroyed unknowingly.

## 8.6 AVIFAUNA

The maximum combined length of the grid connections for the Camden I and II renewable energy projects listed above, the 400kV OHL to Camden Power Station Substation, and the Camden I SEF (maximum 13.7km) is approximately 40.1km. The existing high voltage lines in the 30km radius around the proposed Camden I SEF run into hundreds of kilometres. The Camden I SEF OHL contribution (maximum 13.7km) to the total length of high voltage lines within a 30km radius is **Low**. However, the density of all planned and existing high voltage lines within a 30km radius, and by implication the cumulative impact on avifauna, is considered to be **Moderate**.

**Table 8-4: Cumulative Avifauna Impacts**

| Potential Impact: POWERLINE COLLISION MORTALITY OF PRIORITY AVIFAUNA DUE TO THE CONSTRUCTION OF THE OVERHEAD POWER LINE | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Without Mitigation** | 2 | 2 | 2 | 4 | 3 | **30** | **Low** | (-) | High |
| **With Mitigation** | 2 | 3 | 3 | 4 | 2 | **24** | **Low** | (-) | High |
| **Potential Impact: DISPLACEMENT OF PRIORITY AVIFAUNA DUE TO DISTURBANCE AND HABITAT TRANSFORMATION** | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
| **Without Mitigation** | 3 | 2 | 3 | 2 | 3 | **30** | **Low** | (-) | High |
| **With Mitigation** | 3 | 2 | 3 | 2 | 2 | **20** | **Low** | (-) | High |
| **Potential Impact: MORTALITY (ELECTROCUTION) OF PRIORITY AVIFAUNA DUE TO THE CONSTRUCTION OF THE ON-SITE SUBSTATION** | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
| **Without Mitigation** | 3 | 3 | 3 | 4 | 2 | **26** | **Low** | (-) | High |
| **With Mitigation** | 1 | 2 | 3 | 4 | 2 | **20** | **Low** | (-) | High |

# 8.7 TERRESTRIAL BIODIVERSITY

Development of the entire site will result in some cumulative impacts. However, the vegetation unit, habitat and species are generally widespread.

The proposed powerline will result in the limited transformation and loss of some natural habitat, limited to the footprints for pylons and substations and access roads along the preferred route(s). This loss will be highly localised but will result in a cumulative loss of the vegetation type and species. This cumulative loss is negligible.

Cumulative impacts because of the development of the site, are regarded as being low due to the widespread nature of the vegetation unit and the low impact of the proposed activity which is unlikely to pose significant risk to potential localised populations of species of conservation concern.

## *8.7.1 CUMULATIVE IMPACTS ON INDIGENOUS NATURAL VEGETATION*

The regional terrestrial vegetation type in the broad study area is listed as Vulnerable and is impacted across its range by historical activities. Loss of habitat will occur for the project, which will be a small area in comparison to the total area of the vegetation type. However, the total loss of habitat due to several projects (including consideration of planned renewable energy developments) together will be greater than for any single project, so a cumulative effect will occur. The area lost in total will be very small compared to the total area of the vegetation type concerned. **The cumulative effect will therefore be low for vegetation loss.**

The cumulative biodiversity impacts are indicated in **Table 8-5** below.

**Table 8-5: Cumulative Impacts on indigenous vegetation**

| Potential Impact: CLEARING OF NATURAL HABITAT FOR CONSTRUCTION | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Current project** | 1 | 4 | 3 | 1 | 4 | **36** | **Moderate** | (-) | High |
| **Combination of projects** | 3 | 5 | 3 | 2 | 5 | **65** | **Moderate** | (-) | High |

## 8.7.2 CUMULATIVE IMPACTS ON ECOLOGICAL PROCESSES

There are various ecological processes that may be affected at a landscape level by the presence of multiple projects. This includes population processes, such as migration (movement of species through the landscape), pollination (can be disrupted if insect pollinators are blocked from movement)and dispersal, but also more difficult to interpret factors, such as spatial heterogeneity (the diversity of habitats and their spatial relationship to one another), community composition (the species that occur in the landscape) and environmental gradients, that can become disrupted when landscapes are disturbed at a high level. Disturbance can alter the pattern of variation in the structure or function of ecosystems. Fragmentation is the breaking up of a habitat, ecosystem, or land-use type into smaller parcels. An important consequence of repeated, random clearing is that contiguous cover can break down into isolated patches. This happens when the area cleared exceed a critical level and landscapes start to become disconnected. Spatially heterogenous patterns can be interpreted as individualistic responses to environmental gradients and lead to natural patterns in the landscape. Disrupting gradients and creating disturbance edges across wide areas is very disruptive of natural processes and will lead to fundamental changes in ecosystem function.

The current project has been designed to mostly occupy areas that are already disturbed. Where infrastructure is located in natural areas, it is near to edges or follows existing roads. There are few places where it intrudes significantly into natural areas

The cumulative biodiversity impacts are indicated in **Table 8-6** below.

**Table 8-6: Cumulative Impacts on ecological processes**

| Potential Impact: DISRUPTION OF ECOLOGICAL PROCESSES AT LANDSCAPE LEVEL | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Current project** | 1 | 4 | 3 | 2 | 3 | **30** | **Low** | (-) | High |
| **Combination of projects** | 3 | 4 | 3 | 3 | 4 | **52** | **Moderate** | (-) | High |

## 8.7.3 CUMULATIVE IMPACTS DUE TO SPREAD OF DECLARED WEEDS AND ALIEN INVADER PLANTS

There is a moderate possibility that alien plants could be introduced to areas within the footprint of the proposed infrastructure from surrounding areas in the absence of control measures. The greater the number of projects, the more likely this effect will happen; therefore, the effect is cumulative. For the current site, the impact is predicted to be low due to the current absence of invasive species on site and the high ability to control any additional impact. The significance will therefore be low, especially if control measures are implemented. However, the increased overall disturbance of the landscape will create opportunities and, if new invasions are not controlled, can create nodes that spread to new locations due to the heightened disturbance levels.

The cumulative biodiversity impacts are indicated in **Table 8-7** below.

**Table 8-7: Cumulative Impacts due to spread of declared weeds and alien invader plants**

| Potential Impact: ESTABLISHMENT AND SPREAD OF DECLARED WEEDS AND ALIEN INVADER PLANTS | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| **Current project** | 1 | 2 | 3 | 1 | 2 | **14** | **Very Low** | (-) | High |
| **Combination of projects** | 3 | 4 | 3 | 3 | 4 | **52** | **Moderate** | (-) | High |

# 8.8 TERRESTRIAL ANIMAL SPECIES

## 8.8.1 CUMULATIVE IMPACTS ON FAUNAL HABITAT FROM CONSTRUCTION CLEARING DUE TO A NUMBER OF PROJECTS

Construction activities will require clearing of natural habitat, to be replaced by the infrastructure. This will result in possible loss of habitat for populations of SCC. The cumulative biodiversity impacts are indicated in **Table 8-8** below.

**Table 8-8: Cumulative impacts on faunal habitat from construction clearing due to a number of projects**

| Potential Impact: LOSS OF FAUNAL HABITAT | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| Overall impact of the proposed project considered in isolation | 1 | 5 | 3 | 1 | 4 | 40 | Moderate | (-) | High |
| Cumulative impact of the project and other projects in the area | 3 | 5 | 3 | 3 | 4 | 56 | Moderate | (-) | High |

## 8.8.2 CUMULATIVE IMPACTS OF DIRECT FAUNAL MORTALITY DUE TO A NUMBER OF PROJECTS: CONSTRUCTION PHASE

Construction activities will require clearing of natural habitat, to be replaced by the infrastructure. This will result in possible loss of habitat for populations of SCC. The cumulative biodiversity impacts are indicated in **Table 8-9** below.

**Table 8-9: Cumulative impacts of direct faunal mortality due to a number of projects: construction phase**

| Potential Impact: LOSS OF FAUNAL HABITAT | Magnitude | Extent | Reversibility | Duration | Probability | Significance | | Character | Confidence |
|---|---|---|---|---|---|---|---|---|---|
| Overall impact of the proposed project considered in isolation | 1 | 2 | 1 | 2 | 3 | 18 | Very Low | (-) | High |
| Cumulative impact of the project and other projects in the area | 3 | 2 | 1 | 3 | 4 | 36 | Moderate | (-) | High |

## 8.8.3 CUMULATIVE IMPACTS OF DIRECT FAUNAL MORTALITY DUE TO A NUMBER OF PROJECTS: OPERATIONAL PHASE

The cumulative biodiversity impacts are indicated in **Table 8-10** below.

**Table 8-10: Cumulative impacts of direct faunal mortality due to a number of projects: operational phase**

| Potential Impact: LOSS OF FAUNAL HABITAT | Magnitude | Extent | Reversibility | Duration | Probability | Significance | Character | Confidence |
|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Overall impact of the proposed project considered in isolation** | 1 | 4 | 1 | 2 | 3 | **24** | **Very Low** | (-) | High |
| **Cumulative impact of the project and other projects in the area** | 3 | 4 | 1 | 3 | 4 | **44** | **Moderate** | (-) | High |

# 8.9 TERRESTRIAL PLANT SPECIES

## *8.9.1 CUMULATIVE IMPACTS ON SCC FROM CONSTRUCTION CLEARING DUE TO A NUMBER OF PROJECTS*

The cumulative biodiversity impacts are indicated in **Table 8-11** below.

**Table 8-11: Cumulative impacts on SCC from construction clearing due to a number of projects**

| **Potential Impact:** | **Magnitude** | **Extent** | **Reversibility** | **Duration** | **Probability** | **Significance** | | **Character** | **Confidence** |
|---|---|---|---|---|---|---|---|---|---|
| **LOSS OF FAUNAL HABITAT** | | | | | | | | | |
| **Overall impact of the proposed project considered in isolation** | 2 | 5 | 5 | 2 | 1 | **14** | **Very Low** | (-) | High |
| **Cumulative impact of the project and other projects in the area** | 3 | 5 | 5 | 3 | 3 | **48** | **Moderate** | (-) | High |

# 9 ENVIRONMENTAL IMPACT STATEMENT

The essence of any impact assessment process is aimed at ensuring informed decision-making, environmental accountability, and to assist in achieving environmentally sound and sustainable development. In terms of NEMA, the commitment to sustainable development is evident in the provision that "*development must be socially, environmentally and economically sustainable…. and requires the consideration of all relevant factors…*". NEMA also imposes a duty of care, which places an obligation on any person who has caused, is causing, or is likely to cause damage to the environment to take reasonable steps to prevent such damage. In terms of NEMA's preventative principle, potentially negative impacts on the environment and on people's environmental rights (in terms of the Constitution of the Republic of South Africa, Act No. 108 of 1996) should be anticipated and prevented, and where they cannot be prevented altogether, they must be minimised and remedied in terms of "reasonable measures".

In assessing the environmental feasibility of the proposed construction of the powerline and associated infrastructure, the requirements of all relevant legislation have been considered. The identification and development of appropriate mitigation measures that should be implemented to minimise potentially significant impacts associated with the project, has been informed by best practice principles, past experience, and the relevant legislation (where applicable).

The conclusions of this BA are the result of comprehensive assessments. These assessments were based on issues identified through the BA process and public participation undertaken to date. The BAR will be subject to public review, which will be undertaken according to the requirements of NEMA with every effort made to include representatives of all stakeholders within the process. The BAR will be updated and finalised taking into consideration all comments received during the public review period before being submitted to the CA for consideration.

## 9.1 ENVIRONMENTAL SENSITIVITIES

The following environmental sensitivities were identified on the site, as a result of the Project location and proposed activities and will require specific applications or measures for mitigation to minimise impact.

- **Biodiversity:**
  - CBA
  - ESA
  - Critically endangered and endangered species
  - Critical habitat
- **Avifauna:**
  - High value habitat unit
  - Presence of sensitive species
- **Freshwater:**
  - Aquatic CBAs
  - Wetland features
  - Freshwater ecosystem priority areas
- **Heritage:**
  - Heritage resource in study area
- **Palaeontology:**
  - Features with very high paleontological sensitivity

The above sensitivities are discussed in the sub-sections below. The combined environmental sensitivities of the proposed powerline Project footprint are shown in **Figure 9-1** below.

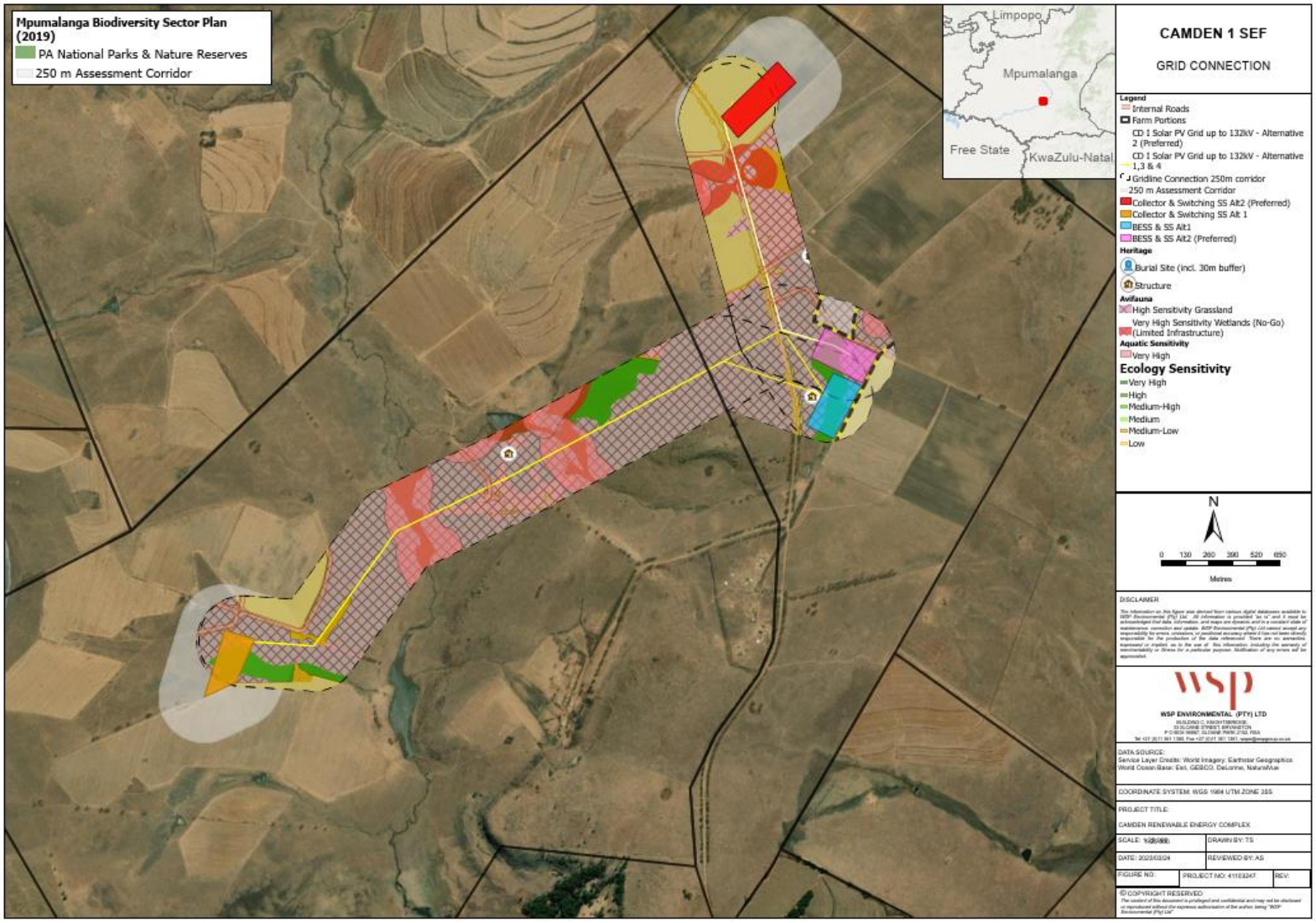



**Figure 9-1: Combined Sensitivity Map**

### 9.1.1 AGRICULTURAL POTENTIAL AND SOILS

The screening tool classifies agricultural sensitivity according to only two independent criteria – the land capability rating and whether the land is cultivated or not. All cultivated land is classified as at least high sensitivity, based on the logic that if it is under cultivation, it is indeed suitable for cultivation, irrespective of its land capability rating.

The screening tool sensitivity categories in terms of land capability are based upon the Department of Agriculture's updated and refined, country-wide land capability mapping, released in 2016. Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rain fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land. The higher land capability values (≥8 to 15) are likely to be suitable as arable land for the production of cultivated crops, while lower values are only likely to be suitable as non-arable, grazing land, or at the lowest extreme, not even suitable for grazing.

A map of the proposed powerline and substations alternatives, overlaid on the screening tool sensitivity, is given in **Figure 9-2**, however, the screening tool sensitivity of the powerline corridor is largely irrelevant to agricultural impact. The only relevance is that pylons should be located outside of or on the edges of cropland, where possible, so that they do not interfere with crop production.

The agricultural sensitivity of the substation footprint is relevant because that land will be permanently removed from agricultural production. The classified land capability of both substation sites is 8 which translates to a medium agricultural sensitivity.

At the relevant scale for substation sites, historical land use is actually a more reliable indication of soil cropping potential than land capability. The suitable versus the unsuitable soils have been identified over time through trial and error. In an agricultural environment like the one being assessed, all the suitable soils are generally cropped, and uncropped soils can therefore fairly reliably be considered to be unsuitable for crop production. The field-verified and updated indication of which lands should be classified as croplands shown in **Figure 6-19**. In terms of crop suitability, both substation sites should be also classified as MEDIUM agricultural sensitivity because they are uncropped and therefore unsuitable for crop production.

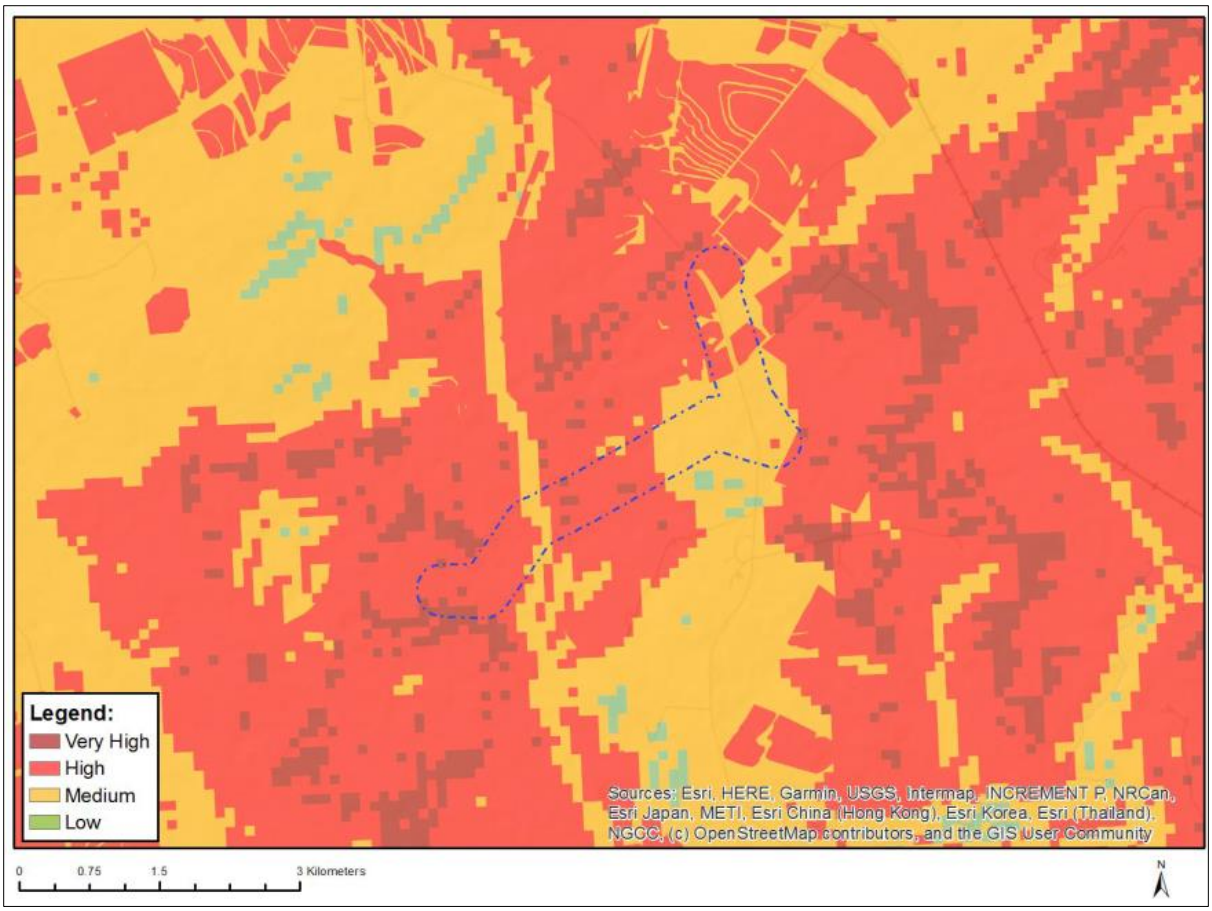



**Figure 9-2: DFFE Screening Tool extract: Agricultural species theme**

### 9.1.2 TERRESTRIAL ANIMAL SPECIES

The Department of Environmental Affairs online screening tool indicates that the animal species theme that are within two sensitivity classes, namely MEDIUM and HIGH (**Figure 9-3**). The level of the sensitivity classification would suggest that no threatened species are dependent on the site for survival.

The field assessment undertaken by the specialist verifies that the animal sensitivity is Moderate but there are significant areas that have been cultivated that do not warrant this classification.

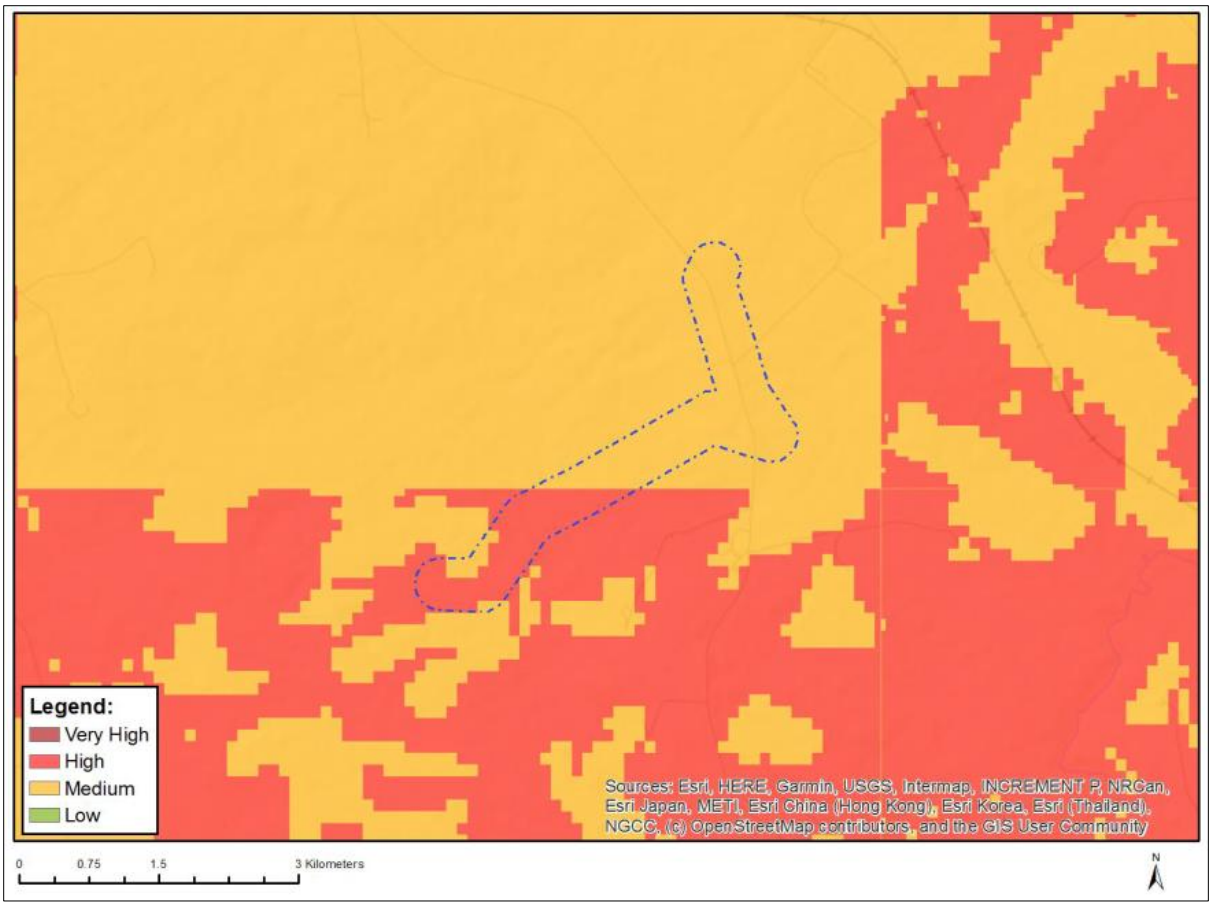



**Figure 9-3: DFFE Screening Tool extract: Animal species theme**

### 9.1.3 TERRESTRIAL PLANT SPECIES

The plant species theme indicates that the site is within two sensitivity classes, namely MEDIUM and LOW (**Figure 9-4**). No additional information is provided, but the level of the sensitivity classification would suggest that no threatened species are dependent on the site for survival.

These results were confirmed during the field assessment which indicated that there are no plant species occurring on site or likely to occur there that are protected according to the National Environmental Management: Biodiversity Act.

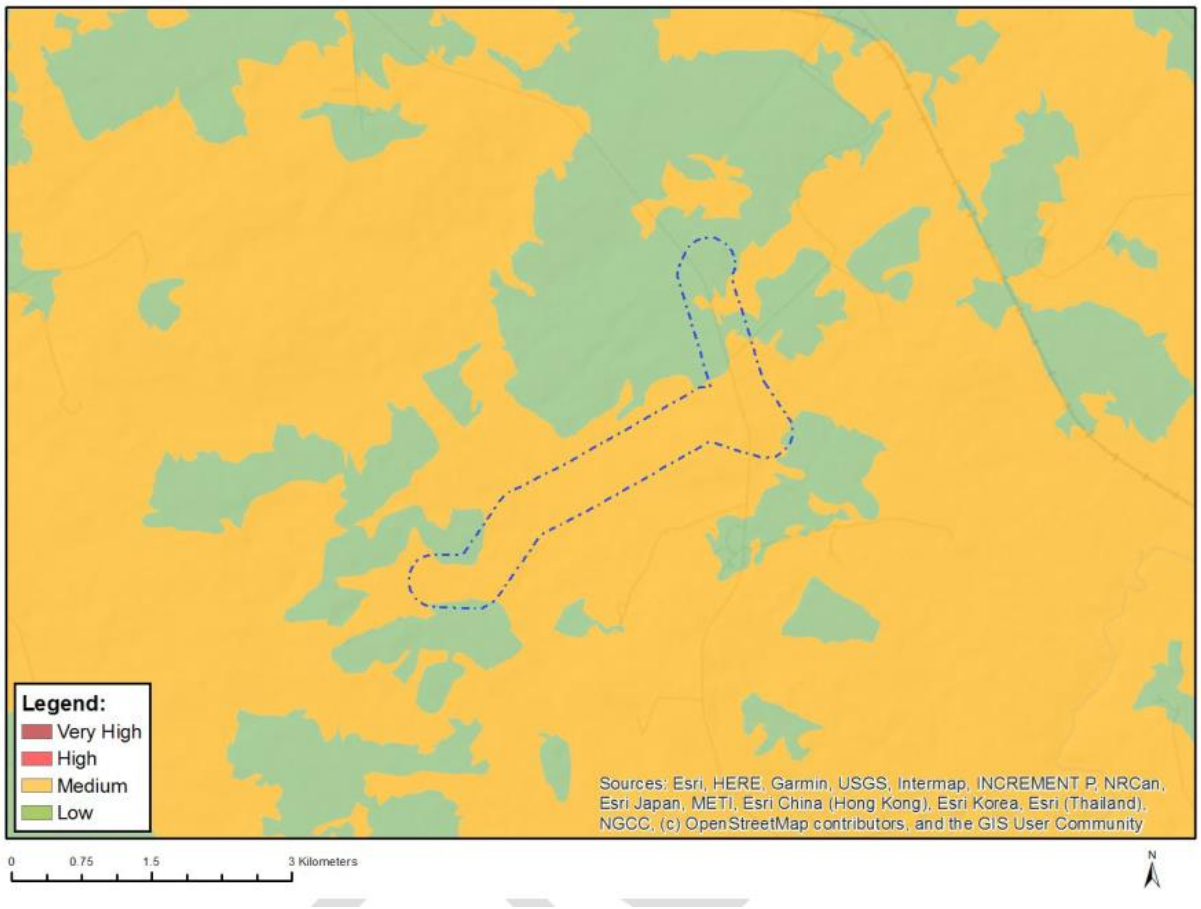



**Figure 9-4: DFFE Screening Tool extract: plant species theme**

### 9.1.4 TERRESTRIAL BIODIVERSITY THEME

The terrestrial biodiversity theme indicates that the site is within two sensitivity classes, namely VERY HIGH (**Figure 9-5**) as the site may include CBAs national, South African Protected Areas, and Threatened Ecosystems. The theme indicates almost the entire study area as being in the Very High sensitivity category, however, the impact assessment undertaken by the specialist indicated a Moderate impact after mitigation measures. This is due to the loss of vegetation that would be permanent, however, the extent of the impact is negligible.

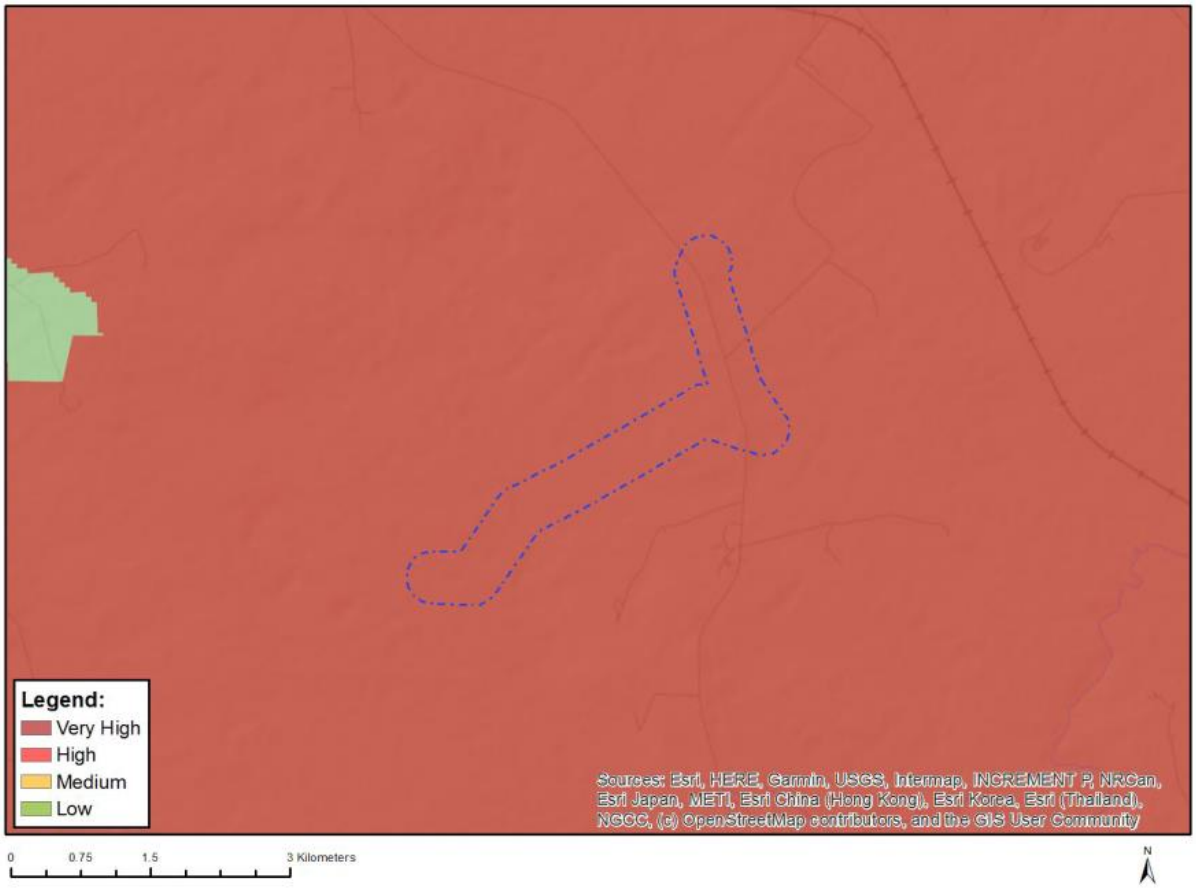



**Figure 9-5: DFFE Screening Tool extract: terrestrial biodiversity theme**

### *9.1.5 FRESHWATER*

Based on the DEFF Screening Tool, the site contains areas of VERY HIGH sensitivity due to the presence of CBAs and rivers. The remaining area within the development footprint is deemed to be of low sensitivity (**Figure 9-6**).

The outcomes of the impact assessment undertaken by the specialist indicated that the construction, operation of the proposed infrastructure does have the potential to impact the identified wetland and riparian systems, with impact ratings between **Low** and **Medium**. However, with mitigative measures in place the risks associated with the proposed infrastructure are **Low**.

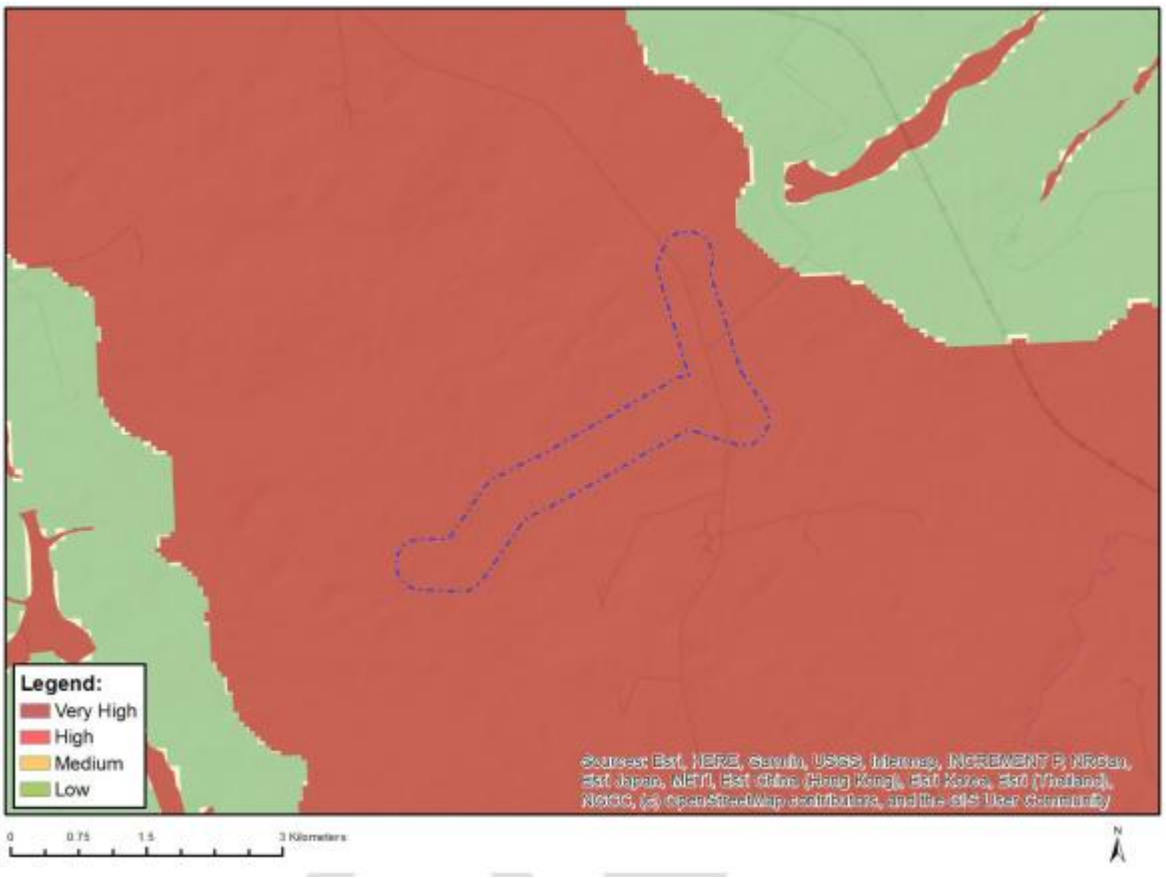



**Figure 9-6: DFFE Screening Tool outcome for the aquatic biodiversity theme**

### *9.1.6 HERITAGE*

Based on the DEFF Screening Tool, the site contains areas of LOW sensitivity (**Figure 9-7**). This was confirmed during the field survey and no archaeological sites of significance were noted and finds were limited to ruins and burial sites in the wider area. Only Grid Alternative 4 will impact on a recorded feature (CA005) and CA012 and this can be avoided with micro siting of pylons of the powerline. All four grid alternatives are acceptable from a heritage point of view.

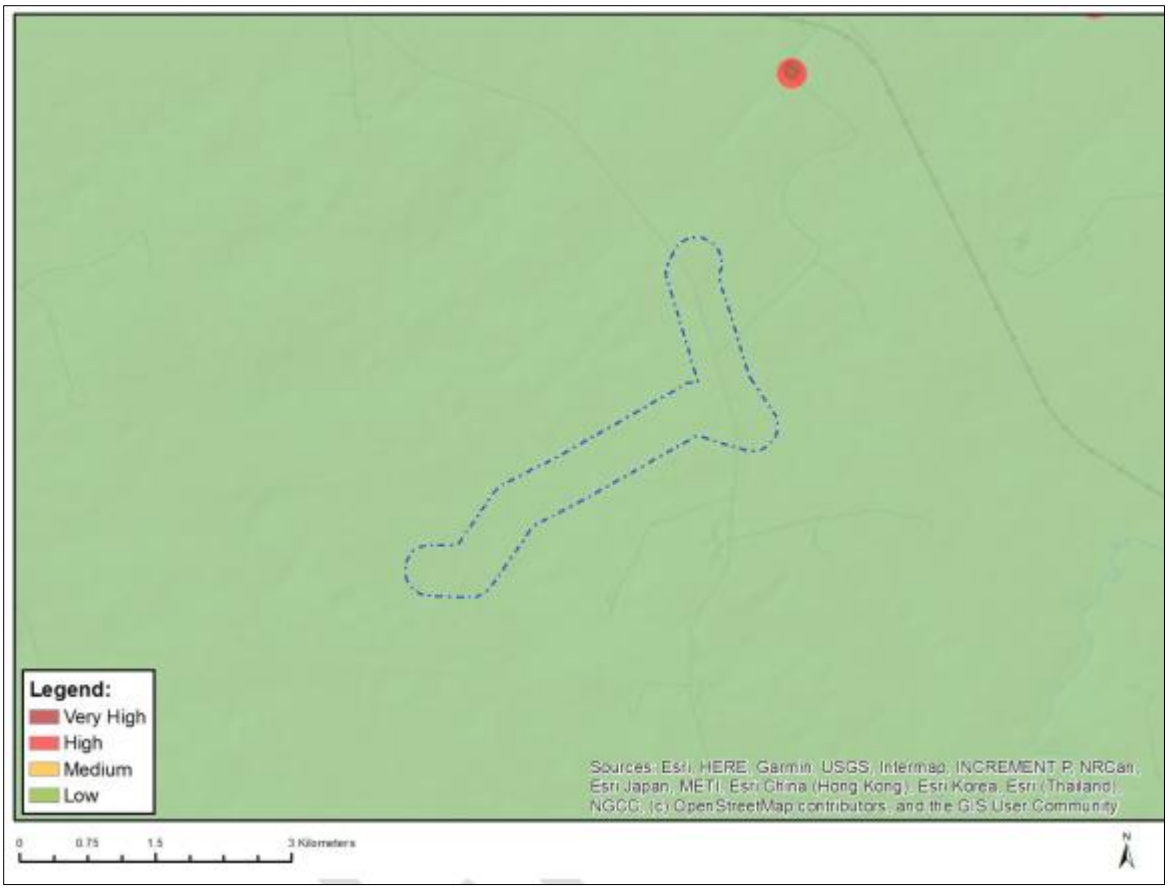



**Figure 9-7: DEFFE Screening Tool outcome for the heritage theme**

## 9.1.7 PALAEONTOLOGY

Based on the DEFF Screening Tool, the site contains areas of MEDIUM to VERY HIGH sensitivity (**Figure 9-8**). However, the specialist during the field assessment, that there are no fossils of the Glossopteris flora even though fossils have been recorded from rocks of a similar age and type in South Africa. A chance find protocol was provided in the palaeontological report in the event of chance findings.


**Figure 9-8: DEFFE Screening Tool outcome for the palaeontological theme**

# 9.2 SPECIALIST CONCLUSIONS

## *9.2.1 AVIFAUNA ASSESSMENT*

According to the DFFE national screening tool, the habitat within the development site is classified as Medium and High sensitivity for birds according to the Animal Species theme. This classification is accurate as far as the impact of the proposed SEF is concerned, based on actual conditions recorded on the ground during the 12 months of pre-construction monitoring. The classification of High is justified due to the recorded presence of Red List priority species in the SEF development area, namely Secretarybird (Globally Endangered, Locally Vulnerable) White-bellied Bustard (Locally Vulnerable), Blue Crane (Globally Vulnerable, Locally Near-threatened), Grey Crowned Crane (Globally and Locally Endangered), Martial Eagle (Globally and Locally Endangered), Lanner Falcon (Locally Vulnerable), Greater Flamingo (Locally Near-threatened), Lesser Flamingo (Globally and Locally Near-threatened), Black Harrier (Locally and Globally Endangered), Southern Bald Ibis (Locally and Globally Vulnerable), Blue Korhaan (Globally Near-threatened), African Grass Owl (Locally Vulnerable) and Cape Vulture (Globally and Locally Endangered).

The proposed up to 132kV OHL will have a mostly moderate impact on priority avifauna which, in all instances, could be reduced to a low impact through appropriate mitigation. No fatal flaws were discovered during the onsite investigations. The proposed development is therefore supported, provided the mitigation measures listed in this report are strictly implemented.

### 9.2.2 TERRESTRIAL BIODIVERSITY ASSESSMENT

The vegetation type that occurs on site is Eastern Highveld Grassland, listed as Vulnerable. All areas on site within Eastern Highveld Grassland also fall within another listed ecosystem, Chrissiesmeer Panveld, listed as Vulnerable, and defined independently to the vegetation types. The site is therefore within two listed ecosystems that overlap.

There is a proclaimed conservation area on site, the Langcarel Private Nature Reserve. This area has not been managed as a protected area and has undergone similar levels of degradation as surrounding areas due primarily to overgrazing, but also partially due to alien invasive plants. In addition, no conservation management activities were evident on site during the field assessment. This pattern of over-utilization affects all grasslands on site, resulting in them being in moderate to poor condition. A separate process is underway to have it (or part thereof) de-proclaimed as part of ongoing province-wide reserve verification efforts by the provincial authorities. The habitat has been used for livestock production and is impacted by this land-use. It is therefore the authors' opinion on the basis of the current land use and levels of modification, that the private nature reserve does not align with the objective and purpose of the protected area status.

Natural grassland on site is in moderate to poor condition, primarily due to heavy overgrazing. There are significant areas of low grass cover and bare areas, and plant species composition has been degraded by grazing effects.

The tower structures of the proposed powerline will occupy less than 1 ha footprint area, based on the longest powerline option that crosses the most amount of natural habitat. Assuming a worst-case scenario, the proposed project will have a barely detectable impact on surface areas of natural habitat.

Assessed impact with moderate significance after mitigation is "Loss of indigenous natural vegetation". However, these are only moderate because they are permanent and will happen – the extent of the impact is negligible. On this basis, the project is therefore deemed acceptable from a terrestrial biodiversity perspective, and it is recommended the Environmental Authorisation be granted. The author is of the opinion that the impacts associated with the project can be mitigated to acceptable levels provided the recommended mitigation measures identified are implemented.

### 9.2.3 TERRESTRIAL ANIMAL ASSESSMENT

Other than birds, which are assessed separately, there are two threatened animal species that are flagged for the site, as well as others not directly flagged that may occur there. It was assessed that neither of these is likely to occur on site. The infrastructure planned for the site has been located primarily in transformed areas (areas with no remaining natural habitat). Vertical infrastructure is widely dispersed and will therefore have a limited impact on habitats.

The main concern in terms of threatened animal species is direct loss of habitat, but this will be limited for this project. Fragmentation of habitat is assessed but will be very limited due to the placement of infrastructure as well as existing patterns of transformation on site. There may also be direct mortality of individual animals, but this is not very likely due to the placement of most of the infrastructure away from natural habitats.

An assessment of these impacts indicates that, after mitigation, they will have a significance of low or very low.

All route options are feasible, although Alternatives 3 and 4 affect a greater length of natural habitat. The preferred alternative (Alternative 2) is also preferred from a terrestrial animal perspective, followed by alternative 1.

### 9.2.4 TERRESTRIAL PLANT ASSESSMENT

There are four plant species of conservation concern flagged by the screening tool that could possibly occur on site, as well as additional species from historical records from SANBI databases and specifically mentioned by provincial conservation authorities, but none were seen during general field surveys. A targeted walk-through survey of footprint of construction areas is required prior to the commencement of construction, to determine whether any occur in the footprint of the development. This survey can take place at the same time as the required walk-through surveys for permitting purposes, or it can be undertaken as a separate targeted survey. It is recommended that this is undertaken in optimum growing season where possible.

### 9.2.5 FESHWATER ASSESSMENT

The current layouts have, to a large degree, avoided the sensitive features and buffer areas, greatly reducing the potential overall impact and risk to Aquatic resources. The overall and cumulative impacts, as assessed, are linked to instances where complete avoidance was not possible, or the nature of the activities involve a potential risk to aquatic resources even at great distance. Overall, it is expected that the impact on the aquatic environment would be Low (-) post mitigation and with the assumptions listed above.

Based on the findings of this study, the specialist finds no reason to withhold to an authorisation of any of the proposed activities for the various projects, assuming that key mitigations measures are implemented. Lastly no preference is provided with regard any of the grid connections, as it assumed based on the characteristics of the site, that all the aquatic systems could be spanned or avoided, while making use of existing tracks, only. This also applies to the various substation / construction and laydown positioning as none of these have a direct impact on the aquatic environment are anticipated for each of the projects.

### 9.2.6 HERITAGE ASSESSMENT

The Project area is a characterised by agricultural activities (mainly grazing and cultivated fields) without any major focal points like pans or hills that would have attracted human occupation in antiquity and is considered to be of low archaeological potential. This was confirmed during the field survey and no archaeological sites of significance were noted and finds were limited to ruins and burial sites in the wider area. Only Grid Alternative 4 will impact on a recorded feature (CA005) and CA012 and this can be avoided with micro siting of pylons of the powerline. All four grid alternatives are acceptable from a heritage point of view.

According to the SAHRA Paleontological sensitivity map the study area is of zero to very high paleontological significance and an independent study was conducted for this aspect. Bamford (2022) concluded an assessment of the paleontological significance of the area (Bamford 2022) concluded that the impact on palaeontological resources is low and the project should be authorised from a paleontological point of view. A Fossil Chance Find Protocol should be added to the EMPr.

The impact on heritage resources is low and the project can commence provided that the recommendations in this report are implemented as part of the EMPr, based on the South African Heritage Resource Authority (SAHRA) approval.

### 9.2.7 PALAEONTOLOGY ASSESSMENT

Based on the fossil record but confirmed by the site visit and walk through, there are NO FOSSILS of the Glossopteris flora even though fossils have been recorded from rocks of a similar age and type in South Africa. It is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a very small chance that fossils may occur below the ground surface in the shales of the Vryheid Formation (Ecca Group, Karoo Supergroup) so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, or other responsible person once excavations and drilling for foundations and amenities have commenced, then they should be rescued and a palaeontologist called to assess and collect a representative sample.

Option 1 and Option 2 differ close to the SEF area and BESS and this is on non-fossiliferous rocks so there is no difference between the two grid route and type options as far as the palaeontology is concerned.

### 9.2.8 SOCIO-ECONOMIC ASSESSMENT

The findings of the SIA indicate that the significance of the potential negative social impacts for both the construction and operational phase of the proposed grid infrastructure, including the 132 kV overhead power line are Low Negative with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The establishment of proposed grid connection for the Camden I SEF is therefore supported by the findings of the SIA.

### 9.2.9 VISUAL ASSESSMENT

It is the specialist's opinion that the potential visual impacts associated with the proposed Camden 1 SEF and the associated grid connection infrastructure are negative and of low to moderate significance. Given the relatively low number of potentially sensitive receptors and the significant level of human transformation and landscape degradation in areas near the proposed development, the project is deemed acceptable from a visual perspective and the EA should be granted. The specialist is of the opinion that the impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

### 9.2.10 GEOTECHNICAL ASSESSMENT

The potential presence of undermined areas at any given location across the study area has been identified as negligible due to the presence of the underlying dolerite stratigraphy. No fatal flaw to the proposed development has been identified. It must be noted that the extent or presence of any undermined areas cannot accurately be determined at a desk study level and will require

further investigation. Based on a preliminary geotechnical assessment, the site is considered suitable for the proposed development provided the recommendations highlighted in this report are adhered to. Conclusions presented in this specialist report will have to be more accurately confirmed during the detailed geotechnical investigation.

## 9.3 IMPACT SUMMARY

A summary of the identified impacts and corresponding significance ratings for the proposed powerline is provided in **Table 9-1** below.

**Table 9-1: Impact Summary**

| ASPECT | IMPACT DESCRIPTION | PHASE | WITHOUT MITIGATION | | WITH MITIGATION | |
|---|---|---|---|---|---|---|
| | | | SIGNIFICANCE | STATUS | SIGNIFICANCE | STATUS |
| Air Quality | Generation of Dust and PM | Construction | **Moderate** | **(-)** | **Low** | **(-)** |
| Noise | Noise Emissions | Construction | **Low** | **(-)** | **Low** | **(-)** |
| Soil Erosion & Contamination | Soil Erosion | Construction | **Moderate** | **(-)** | **Low** | **(-)** |
| | Soil Contamination | Construction | **Moderate** | **(-)** | **Low** | **(-)** |
| | Soil Contamination | Operation | **Low** | **(-)** | **Low** | **(-)** |
| Aquatic | Loss of high sensitivity systems, i.e. wetlands | Construction | **Moderate** | **(-)** | **Low** | **(-)** |
| | Damage or loss of riparian and or riverine systems and disturbance of these waterbodies in the construction phase | Construction | **Moderate** | **(-)** | **Low** | **(-)** |
| | Water Quality | Construction | **Moderate** | **(-)** | **Low** | **(-)** |
| | Impact on habitat change and fragmentation related to hydrological regimes | Construction | **Moderate** | **(-)** | **Low** | **(-)** |

| ASPECT | IMPACT DESCRIPTION | PHASE | WITHOUT MITIGATION | | WITH MITIGATION | |
|---|---|---|---|---|---|---|
| | | | SIGNIFICANCE | STATUS | SIGNIFICANCE | STATUS |
| | Impact on aquatic systems through possible increase in surface water run-off on the form and function which could also lead to erosion and or sedimentation if no adequate stormwater management is provided for | Operation | **Moderate** | (-) | **Low** | (-) |
| Terrestrial Biodiversity | Clearing of natural habitat for construction | Construction | **Moderate** | (-) | **Moderate** | (-) |
| | Establishment and spread of declared weeds and alien invader plants | Construction | **Low** | (-) | **Very Low** | (-) |
| | Continued disturbance to natural habitats due to general operational activities and maintenance | Operation | **Low** | (-) | **Low** | (-) |
| | Establishment and spread of declared weeds and alien invader plants | Operation | **Moderate** | (-) | **Very Low** | (-) |
| | Continued runoff and erosion | Operation | **Low** | (-) | **Low** | (-) |
| | Disturbance of natural habitat during infrastructure removal | Decommissioning | **Low** | (-) | **Low** | (-) |
| | Establishment and spread of declared weeds and alien invader plants | Decommissioning | **Moderate** | (-) | **Low** | (-) |
| Terrestrial Plant Species | Clearing of natural habitat for construction | Construction | **Moderate** | (-) | **Very Low** | (-) |
| Terrestrial Animal Species | Clearing of natural habitat for construction | Construction | **Moderate** | (-) | **Low** | (-) |
| | Direct mortality of fauna due to presence of traffic and heavy machinery | Construction | **Low** | (-) | **Very Low** | (-) |
| | Direct mortality of fauna due to presence of traffic and heavy machinery | Operation | **Low** | (-) | **Very Low** | (-) |
| Avifauna | Displacement due to disturbance associated with the construction | Construction | **Moderate** | (-) | **Low** | (-) |
| | Displacement due to habitat transformation associated with the construction | Construction | **Moderate** | (-) | **Low** | (-) |
| | Electrocution of priority species on the on-site substation infrastructure | Operation | **Low** | (-) | **Low** | (-) |

| ASPECT | IMPACT DESCRIPTION | PHASE | WITHOUT MITIGATION | | WITH MITIGATION | |
|---|---|---|---|---|---|---|
| | | | SIGNIFICANCE | STATUS | SIGNIFICANCE | STATUS |
| | Displacement of priority species due to disturbance associated with decommissioning of the on-site substation and 132kV overhead power line | Operation | **Moderate** | **(-)** | **Low** | **(-)** |
| | Displacement of priority species due to disturbance associated with decommissioning of the on-site substation and up to 132kv overhead power line | Decommissioning | **Moderate** | **(-)** | **Low** | **(-)** |
| Visual | Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction | Construction | **Low** | **(-)** | **Low** | **(-)** |
| | Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings | Construction | **Low** | **(-)** | **Low** | **(-)** |
| | Temporary stockpiling of soil during construction may alter the flat landscape. wind blowing over these disturbed areas could result in dust which would have a visual impact | Construction | **Low** | **(-)** | **Low** | **(-)** |
| | Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers | Construction | **Low** | **(-)** | **Low** | **(-)** |
| | Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment | Construction | **Low** | **(-)** | **Low** | **(-)** |
| | Potential visual pollution resulting from littering on the construction site | Construction | **Low** | **(-)** | **Low** | **(-)** |
| | The proposed power line and substation could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts | Operation | **Low** | **(-)** | **Low** | **(-)** |

| ASPECT | IMPACT DESCRIPTION | PHASE | WITHOUT MITIGATION | | WITH MITIGATION | |
|---|---|---|---|---|---|---|
| | | | SIGNIFICANCE | STATUS | SIGNIFICANCE | STATUS |
| | The proposed development will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts | Operation | **Low** | **(-)** | **Low** | **(-)** |
| | Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers | Operation | **Low** | **(-)** | **Low** | **(-)** |
| | The night-time visual environment could be altered as a result of operational and security lighting at the proposed substation | Operation | **Low** | **(-)** | **Low** | **(-)** |
| | Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts | Decommissioning | **Low** | **(-)** | **Low** | **(-)** |
| | Decommissioning activities may be perceived as an unwelcome visual intrusion | Decommissioning | **Low** | **(-)** | **Low** | **(-)** |
| | Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers | Decommissioning | **Low** | **(-)** | **Low** | **(-)** |
| | Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment | Decommissioning | **Low** | **(-)** | **Low** | **(-)** |
| | Temporary stockpiling of soil during decommissioning may alter the flat landscape. wind blowing over these disturbed areas could result in dust which would have a visual impact | Decommissioning | **Low** | **(-)** | **Low** | **(-)** |
| Waste | Improper Waste Management | Construction | **Moderate** | **(-)** | **Low** | **(-)** |
| Traffic | Increased Local Traffic | Construction | **Low** | **(-)** | **Low** | **(-)** |
| Heritage | Damage to Heritage Resources | Construction | **Low** | **(-)** | **Very Low** | **(-)** |

| ASPECT | IMPACT DESCRIPTION | PHASE | WITHOUT MITIGATION | | WITH MITIGATION | |
|---|---|---|---|---|---|---|
| | | | SIGNIFICANCE | STATUS | SIGNIFICANCE | STATUS |
| Palaeontology | Loss of Fossils | Construction | **Low** | **(-)** | **Very Low** | **(-)** |
| | Damage to heritage resources | Construction | **Low** | **(-)** | **Very Low (+ve)** | **(+)** |
| Socio-economic | Creation of employment and business opportunities during the construction phase | Construction | **Low** | **(+)** | **Low** | **(+)** |
| | Potential impacts on family structures and social networks associated with the presence of construction workers | Construction | **Low** | **(-)** | **Low** | **(-)** |
| | Potential risk to safety of farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site | Construction | **Moderate** | **(-)** | **Low** | **(-)** |
| | Potential loss of livestock and grazing and damage to farm infrastructure associated with increased incidence of grass fires | Construction | **Moderate** | **(-)** | **Low** | **(-)** |
| | Potential noise, dust and safety impacts associated with movement of construction related activities and movement of traffic to and from the site | Construction | **Low** | **(-)** | **Low** | **(-)** |
| | Potential impact on productive farmland due to construction related activities and movement of traffic on the site | Construction | **Moderate** | **(-)** | **Low** | **(-)** |
| | Development of infrastructure to improve energy security and reduce reliance on coal | Operation | **Moderate** | **(+)** | **Moderate** | **(+)** |
| | Creation of employment, skills development and business opportunities associated with the operational phase | Operation | **Low** | **(+)** | **Moderate** | **(+)** |
| | Generate income for affected landowners | Operation | **Low** | **(+)** | **Moderate** | **(+)** |

| ASPECT | IMPACT DESCRIPTION | PHASE | WITHOUT MITIGATION | | WITH MITIGATION | |
|---|---|---|---|---|---|---|
| | | | SIGNIFICANCE | STATUS | SIGNIFICANCE | STATUS |
| | The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed etc. | Operation | **Low** | **(+)** | **Moderate** | **(+)** |
| | Visual impact associated with the proposed grid infrastructure and the potential impact on the area's sense of place. | Operation | **Low** | **(-)** | **Low** | **(-)** |
| | Potential risk to safety to farming operations and livestock associated with the presence of maintenance workers on the site | Construction | **Low** | **(-)** | **Low** | **(-)** |
| Health and Safety | Employee Health & Safety | Construction | **Moderate** | **(-)** | **Low** | **(-)** |
| | Employee Health & Safety | Operation | **Moderate** | **(-)** | **Low** | **(-)** |

## 9.4 ALTERNATIVE ASSESSMENT

Project alternatives in terms of activity, technology, location and layout were considered as part of the BA process. Four alternatives have been assessed for the proposed project, the alternatives are discussed in **Section 5**. The no-go option would represent a lost opportunity for South Africa to improve energy security and supplement its current energy needs with renewable energy given that energy security benefits associated with the proposed 132kV OHPL connecting the proposed Camden I SEF to the ECSS substation and eventually to the existing Camden Substation are dependent upon it being able to connect to the national grid via the establishment of grid connection infrastructure. Considering South Africa's current energy security challenges and its position as one of the highest per capita producers of carbon emissions in the world, this would represent a significant socio-economic cost. Accordingly, the no-go option is not the preferred option.

**Table 9-2** outlines the alternative preferences resulting from the various specialist studies.

**Table 9-2: Specialist Alternative Preferences**

| SPECIALIST STUDY | COMMENT | PREFERENCE |
|---|---|---|
| **Geotechnical** | No preferences discussed. | ***Powerline:*** No preference ***Substation:*** No preference |
| **Agriculture** | Due to the insignificant agricultural impact of the powerline, there can be no material difference between the agricultural impacts of any of the alternative powerline routes. All proposed route alternatives are considered equally acceptable in terms of agricultural impact. In terms of the substation site, both alternatives are on non-cropland and therefore both are considered equally acceptable in terms of agricultural impact. | ***Powerline:*** No preference ***Substation:*** No preference |
| **Freshwater** | Although no preference is given to the up to 132kV line and camps or substations as these have all the potential to avoid the aquatic environments encountered. This is however based on the assumption that the grid connection towers are also placed outside of any of the delineated aquatic zones including buffers, no access tracks are located in these areas and the overhead cables span these. | ***Powerline:*** No preference ***Substation:*** No Preference |
| **Terrestrial Biodiversity Species** | Any of the four powerline alternatives is acceptable, although in principle, the shortest route would be preferred from a terrestrial biodiversity perspective, i.e., Alternative 1 or Alternative 2. | ***Powerline:*** Alternative 1 or Alternative 2 ***Substation:*** No Preference |
| **Terrestrial Plant Species** | No preferences discussed. | ***Powerline:*** No preference ***Substation:*** No preference |
| **Terrestrial Animal Species** | All route options are feasible, although Alternatives 3 and 4 affect a greater length of natural habitat. The preferred alternative (Alternative 2) is also preferred here, followed by Alternative 1. | ***Powerline:*** Alternative 2 ***Substation:*** No Preference |
| **Avifauna** | Alternatives 1 and 2 are the preferred alternatives due to them being the shortest alternatives. Alternatives 3 and 4 are the least preferred alternatives due to them being the longest and running mostly through high sensitivity grassland, and they cross two drainage lines. However, all the alternatives can be mitigated to acceptable levels and therefore are considered suitable from an avifaunal perspective. | ***Powerline:*** Alternatives 1 and 2 ***Substation:*** No Preference |
| **Visual** | No fatal flaws were identified for either of the substation alternatives or any of the grid connection infrastructure alternatives. No preference was determined for either of the substation site alternatives and both alternatives were found to be favourable. Power Line Corridor Options 1 and 2 were | ***Powerline:*** Alternatives 1 and 2 ***Substation:*** |

| SPECIALIST STUDY | COMMENT | PREFERENCE |
|---|---|---|
| | identified as the Preferred Alternatives, while Power Line Corridor Options 3 and 4 were found to be favourable. | No Preference, both Alternatives are favourable |
| **Heritage** | Four grid alternatives (Alternatives 1 - 4) including their assessment corridors are assessed in this report and are all acceptable from a heritage point of view as with mitigation they will not directly impact any known heritage sites. | ***Powerline:***<br>No preference<br>***Substation:***<br>No preference |
| **Palaeontological** | As far as the palaeontology is concerned there is no preferred Option for the grid route and type. | ***Powerline:***<br>No preference<br>***Substation:***<br>No preference |
| **Socio-economic** | The findings of the SIA indicate that the significance of the potential negative social impacts for both the construction and operational phase of the proposed grid infrastructure, including the 132 kV overhead power line are Low Negative with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The establishment of proposed grid connection for the 100 Camden I SEF is therefore supported by the findings of the SIA. Alternative 1 and 2 that link into Collector Substation 2 located on 322/1 Welgelegen are the preferred options. | ***Powerline:***<br>Alternatives 1 and 2<br>***Substation:***<br>No Preference |

Based on the table above, the specialists concluded that either Alternative 1 or 2 are the preferred options for the proposed project SEF 132 kV OHPL. Furthermore, the specialist reports did not have a preference between the proposed substation alternatives.

The OHPL Alternative 2 is the shortest, least intrusive and technically preferred, and connects the already authorised IPP substation and common collector substations. Therefore, assessment corridor for OHPL Alternative 2 is put forward for authorisation. Furthermore, both Alternative 2 substation locations (for the Grid Substation and Common Collector Switching Station) are proposed for authorisation.

## 9.5 RECOMMENDATIONS

The following recommendation are made in respect of the proposed 132kV OHPL:

- **Avifauna:**
  - If lattice type structures are used, it is imperative that a minimum vertical clearance of 1.8m is maintained between the jumper cables and/or insulator live ends, and the horizontal earthed components. Additional mitigation in the form of insulating sleeves on jumper cables present on strain poles and terminal poles is also recommended (if suitable insulation material is readily available), alternatively all jumper cables must be suspended below the crossarms.
  - During the design phase, it is recommended that a single perimeter fence is used to reduce the risk of entrapment of large-bodied birds.
  - All biodiversity recommendations regarding rehabilitation must be followed.
- **Terrestrial Biodiversity:**
  - Restrict impact to development footprint only and limit disturbance in surrounding areas.
  - Prior to commencement of construction, compile a Rehabilitation Plan including monitoring specifications, to be included into the EMPr during final approval.

- Prior to commencement of construction, compile an Alien Plant Management Plan, included in the EMPr (**Appendix G**).
- Prior to commencement of construction, compile and implement an Alien Management Plan, which highlights control priorities and areas and provides a programme for long-term control, including monitoring specifications.
- Undertake regular monitoring to detect alien invasions early so that they can be controlled.
- Prior to commencement of construction, compile and implement a stormwater management plan including monitoring specifications.
- Monitor surfaces for erosion, repair and/or upgrade, where necessary.
- The detailed recommended monitoring management plan is included in the EMPr (Appendix G).
- It is recommended that that a closure and rehabilitation plan be compiled near to the decommissioning stage, but in advance of when decommissioning is planned, and that this would be required to be implemented prior to closure of the project.
- Assessed impact with moderate significance after mitigation is "Loss of indigenous natural vegetation". However, these are only moderate because they are permanent and will happen – the extent of the impact is negligible. On this basis, the project is therefore deemed acceptable from a terrestrial biodiversity perspective, and it is recommended the Environmental Authorisation be granted.

— **Terrestrial Plant Species:**

Specific monitoring recommendations should be provided in the Plant Rescue Plan, the Alien Invasive Management Plan, and the Rehabilitation Plan. The following are broad recommendations:

- Rescued plants:
  - The location of all transplanted rescued plants must be recorded, along with the identity of the plant.
  - The health / vigour of each transplanted individual should be monitored as per the frequency and duration specified in the management plan.
  - As a scientific control, an equal number of non-transplanted individuals of the same species, within similar habitats, should be monitored in the same way as the transplanted specimens. This will provide comparative data on the survival of wild populations relative to transplanted plants.
- Threatened species:
  - If populations of threatened plant species are found to occur on site, monitoring of population health should take place as per the frequency and duration specified in the management plan. This should be appropriate to the species concerned.
- A targeted walk-through survey:
  - The target walk-through plant survey of the footprint of construction areas is required prior to the commencement of construction, to determine whether any occur in the footprint of the development. This survey can take place at the same time as the required walk-through surveys for permitting purposes, or it can be undertaken as a separate targeted survey. It is recommended that this is undertaken in optimum growing season where possible.
  - A final plant walk-through to survey conducted in Spring or Summer, where possible, is recommended to check for potential species of conservation concern within footprints of the development.

— **Terrestrial Animal Species:**

- No driving of vehicles off-road outside of construction areas.
- It is a legal requirement to obtain permits for specimens or protected species that will be lost due to construction of the project.
- Conduct a pre-construction terrestrial animal walk-through of natural habitat within the development footprint, where possible undertaken in the correct season (October to March), prior to construction activities commencing in order to move any individual animals, such as tortoises, where required. Trained snake-catchers should be contacted for relocation of snake species.
- Personnel on site should undergo environmental induction training, including the need to abide by speed limits, the increased risk of collisions with wild animals on roads in rural areas.

- Proper waste management must be implemented, ensuring no toxic or dangerous substances are accessible to wildlife. This should also apply to stockpiles of new and used materials to ensure that they do not become a hazard.
- No collecting, hunting or poaching of any plant or animal species, and no killing of snakes must be permitted.
- Personnel to be educated about protection status of species, including distinguishing features, to be able to identify protected species.
- Appropriate lighting should be installed to minimize impacts on nocturnal animals, as per visual specialist assessment.

— **Aquatic:**

- Noteworthy areas, that should be avoided, include the main riverine systems with wetlands, valley bottom wetlands, seeps and the endorheic pans. The only exception being where existing crossings may be used and/or upgraded that intersect valley bottom wetlands and riverine systems.
- All grid connections / powerlines must span aquatic systems and while no new access tracks along these grid corridors must be created within aquatic systems.
- Based on the findings of this study, the specialist finds no reason to withhold to an authorisation of any of the proposed activities for the various projects, assuming that key mitigations measures are implemented.

— **Heritage and Cultural Resources:**

The following recommendations for Environmental Authorisation apply and the project may only proceed based on approval from SAHRA:

- Implementation of a Chance Find Procedure for the Project (as outlined in Section 10.2 of the study);
- The study area should be monitored by the ECO during construction;
- Recorded heritage features should be indicated on development plans and avoided with a 30 m buffer; and
- The final alignment should be subjected to a heritage walkthrough.

— **Palaeontological:**

- There is a very small chance that fossils may occur below the ground surface in the shales of the Vryheid Formation (Ecca Group, Karoo Supergroup) so a Fossil Chance Find Protocol should be added to the EMPr.
- If fossils are found by the environmental officer, or other responsible person once excavations and drilling for foundations and amenities have commenced, then they should be rescued, and a palaeontologist called to assess and collect a representative sample.

— **SAHRA recommendations (Final Comment):**

The following comments are made as a requirement in terms of section 3(4) of the NEMA Regulations and section 38(8) of the NHRA in the format provided in section 38(4) of the NHRA and must be included in the Final BAR and EMPr:

- 38(4)a – The SAHRA has no objections to the proposed development;
- 38(4)b – The recommendations of the specialists and in the EMPr are supported and must be adhered to. Further additional specific conditions are provided for the development as follows:
- 38(4)b – The recommendations of the specialists and in the EMPr are supported and must be adhered to. Further additional specific conditions are provided for the development as follows:
  - A report providing the results of the walkdown must be submitted to SAHRA for review and comment prior to the construction phase. No construction may commence without comments from SAHRA; SAHRA reserves the right to provided additional conditions based on the results of the walkdown report;
  - SAHRA reserves the right to object to the proposed development based on the results of the walkdown report;
  - 38(4)c(i) – If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA (Natasha Higgitt 021 202 8660/ nhiggitt@sahra.org.za) must be alerted as

per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule;

- 38(4)c(ii) – If unmarked human burials are uncovered, the SAHRA DAU (Natasha Higgitt 021 202 8660), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule;
- 38(4)d – See section 51 of the NHRA regarding offences;
- If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;
- The Final BAR and EMPr must be submitted to SAHRA for record purposes;
- The decision regarding the EA Application must be communicated to SAHRA and uploaded to the SAHRIS Case application.
- 38(4)e – The following conditions apply with regards to the appointment of specialists:
- With reference to the mitigation work noted above, a qualified archaeologist must be appointed to undertake the work in terms of the permit applied for as noted above;

- **Socio-Economic:**

  In order to enhance local employment and business opportunities associated with the construction phase the following measures should be implemented:

  - Employment:
    - Stakeholder engagement processes should be put in place to make sure that all interested and affected party have buy in in the process which will be designed and followed for employment and local procurement opportunities
    - Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.
    - Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.
    - Before the construction phase commences the proponent should meet with representatives from the MM to establish the existence of a skills database for the area. If such as database exists, it should be made available to the contractors appointed for the construction phase.
    - The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.
    - Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.
    - The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.
  - Business:
    - The proponent should liaise with the MM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work.
  - It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

- **Visual:**
  - Given the relatively low number of potentially sensitive receptors and the significant level of human transformation and landscape degradation in areas near the proposed development, the project is deemed

acceptable from a visual perspective and the EA should be granted. SiVEST is of the opinion that the impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

- **Geotechnical:**
  - The detailed geotechnical investigation, is recommended to be undertaken during the detailed design phase of the project and must include the following:
    - Profiling and sampling exploratory test pits to determine founding conditions for the substation, the construction laydown areas, powerline routes and the BESS.
    - An investigation for determining the subgrade conditions for internal roads is also recommended.
    - Geotechnical materials investigation for construction sources – gravel and rock.
    - Thermal resistivity and electrical resistivity geophysical testing for electrical design and ground earthing requirements.
    - Groundwater sampling of existing boreholes to establish a baseline of the groundwater quality for construction purposes.
    - Disturbed and undisturbed sampling to be carried out across the proposed development area for laboratory analysis.
- **Agricultural:**
  - The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is only subject to the condition that the pylon locations minimize agricultural impacts by being located, wherever possible, outside of or on the edges of cropland so that they do not interfere with crop production. Pylon locations should be assessed and approved by an agricultural specialist during the final micro-siting walk-through exercise that occurs after Environmental Authorisation and prior to construction. A desktop assessment of the pylon positions using satellite imagery will be adequate for this purpose.

## 9.6 CONCLUSION AND AUTHORISATION OPINION

The overall objective of the BA is to provide sufficient information to enable informed decision-making by the authorities. This was undertaken through consideration of the proposed Project components, identification of the aspects and sources of potential impacts and subsequent provision of mitigation measures.

It is the opinion of WSP that the information contained in this document (read in conjunction the EMPr in **Appendix G**) is sufficient for DFFE to make an informed decision for the environmental authorisation being applied for in respect of this Project.

Mitigation measures have been developed, where applicable, for the above aspects and are presented within the EMPr (**Appendix G**). It is imperative that all impact mitigation recommendations contained in the EMPr, of which the environmental impact assessment took cognisance, are legally enforced.

Considering the findings of the respective studies and recommendations provided in **Section 9.5**, no fatal flaws were identified for the proposed Project. Should the avoidance and mitigation measures prescribed be implemented, the significance of the considered impacts for all negative aspects pertaining to the environmental aspects is expected to be low. It is thus the opinion of the EAP that the Project can proceed, and that all the prescribed mitigation measures and recommendations are considered by the issuing authority.

### EA AUTHORISATION PERIOD

Appendix 1(3)(1)(q) of the NEMA EIA Regulations 2014, as amended requires "where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised" must be included in the BA Report.

The EA is required to be valid for a period of ten (10) years from the date of issuance of the EA. This is considered a reasonable period to allow the Applicant time to conduct relevant internal processes which can only begin after issuance of the EA. The grid connection will be constructed during and for the WEF and therefore will coincide with the SEF construction period, i.e., 10 years.

## ALTERNATIVES

Based on Section 9.4, the specialists concluded that either Alternative 1 or 2 are the preferred options for the proposed project SEF 132 kV OHPL. Furthermore, the specialist reports did not have a preference between the proposed substation alternatives. The preferred route (alternative 2) leads between the IPP substation site (already authorised) to the common collector substation (already authorised), and there is no negating reason provided by the specialists.

It is the technically optimal Alternative (alternative 2) for connecting the SEF to the national grid and the proponent's technical preference. **Furthermore, both Alternative 2 substation locations (for the Grid Substation and Common Collector Switching Station) are proposed for authorisation.**

## GRID ASSESSMENT AND SUBSTATIONS CORRIDORS

A grid connection corridor including substation infrastructure has been identified and assessed for the placement of ALL grid connection infrastructure contemplated in this application, comprising 500 m (i.e., 250 m on either side of centre line of the OHPL) and 250m around the outer extent of the specified substation and termination works upgrade substation. **As detailed above, the entire assessment corridor for both powerline and substation is proposed for authorisation within which the proposed infrastructure may be located.**

## ASPECTS TO BE INCLUDED AS CONDITIONS IN THE EA

The following aspects are requested to be included as conditions in the EA:

- The EA is required to be valid for a period of ten (10) years from the date of issuance of the EA;
- The EMPr mitigation measures must be adhered to;
- Recommendations for the layout as provided by the relevant specialists must be implemented as far as possible;
- Approval and authorisation of the entire grid connection corridor for the substations and powerline, within which the proposed infrastructure may be located;
- Approval and authorisation of the preferred OHPL route alternative 2, grid operator substation alternative 2 and termination works substation upgrades alternative 2 (collector substation), to be located within the approved grid connection corridor;
- The final EMPr must form part of all contractual documents with contractors during construction and operational phases of the project.
- A dedicated Environmental Control Officer (ECO) must be appointed to ensure compliance to all EA conditions and EMPr commitments throughout the construction phase;
- Applications for all relevant and required permits must be submitted prior to construction; and
- Where required, water use authorisation under the NWA is to be obtained from the Department of Water and Sanitation prior to construction.
- No pylons must be placed in areas delineated as very high sensitivity wetlands (No-Go Areas).

# 10 WAY FORWARD

This report provides a description of the proposed Project and details the aspects associated with the construction and operation of the Camden I SEF up to 132kV Grid Connection and associated infrastructure. The report also includes the methodology followed to undertake the BA process. A detailed description on the existing environment (biophysical as well as socio-economic) is provided based on findings from the specialist surveys and existing information. Stakeholder engagement undertaken from the onset of the assessment to date, has been conducted in a transparent and comprehensive manner. This report will be subjected to a public review period in line with NEMA EIA Regulations, 2014 as amended. Outcomes of all comments received from the public review period will be recorded and responded to in the Final BAR. Based on the environmental description, specialist surveys as well as the stakeholder engagement undertaken to date, a detailed impact assessment was undertaken and, where relevant, the necessary management measures have been recommended.

In summary, the BA process assessed both biophysical and socio-economic environments and identified appropriate management and mitigation measures. The biophysical impact assessment revealed that there are no environmental fatal flaws and no significant negative impacts associated with the proposed Project should mitigation and management measures be implemented. In addition, it should be noted that there are positive socio-economic impacts associated with the Project.

The Final BAR (this report) was made available for public review from **11 May 2023 to 12 June 2023**. All comments have been incorporated in the Comments and Response Report (CRR) which is attached as an Appendix D to this, the Final BAR.

The final BAR will be submitted to the competent authorities. It is the opinion of WSP that the information contained in this document is sufficient for the DFFE to make an informed decision for the EA being applied for in respect of this Project.

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