ENERTRAG SOUTH AFRICA (PTY) LTD

CAMDEN I WIND ENERGY FACILITY UP TO 132 KV GRID CONNECTION AND ASSOCIATED INFRASTRUCTURE NEAR ERMELO MPUMALANGA (REFERENCE: 14/12/16/3/3/1/2769)

FINAL BASIC ASSESSMENT REPORT

02 AUGUST 2023 FINAL

CAMDEN I WIND ENERGY FACILITY UP TO 132 KV GRID CONNECTION AND ASSOCIATED INFRASTRUCTURE NEAR ERMELO MPUMALANGA(REFERENCE: 14/12/16/3/3/1/2769)

DRAFT 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

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
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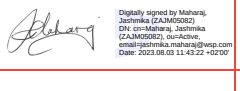
Prepared by	Jashmika Maharaj	Jashmika Maharaj		
Signature		 Digitally signed by Maharaj, Jashmika (ZAJM0582) DN: cn=Maharaj, Jashmika (ZAJM0582), ou=Active, email=jashmika.maharaj@wsp.com Date: 2023.08.03 11:43:22 +02'00'		
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Principal Associate (Environmental Assessment Practitioner)

This Draft Basic Assessment Report (Report) for the proposed Camden I Wind Energy Facility up to 132 kV grid connection transmission line Project has been prepared by WSP Group Africa Proprietary Limited (WSP) on behalf and at the request of by 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 Wind Energy Facility up to 132 kV Grid Connection and associated infrastructure, near Ermelo Mpumalanga

REPORT TYPE

Final Basic Assessment Report

DFFE REFERENCE:

14/12/16/3/3/1/2769

WSP PROJECT NUMBER

41103247

PRODUCTION TEAM

ENERTRAG SOUTH AFRICA PTY LTD

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WSP

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Senior Consultant	Jashmika Maharaj

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Aquatic Specialist	Brian Colloty (EnviroSci Pty Ltd)
Avifauna Specialist	Chris van Rooyen (Chris van Rooyen Consulting)
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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

ABBREVIATION	DEFINITION
IFC	International Finance Corporation
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

ABBREVIATION	DEFINITION
PICC	Presidential Infrastructure Coordinating Commission
POSA	Plants of South Africa
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

ABBREVIATION	DEFINITION
VU	Vulnerable
WBG	World Bank Group
WMA	Water Management Area
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 draft 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 3.5**
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 WIND ENERGY FACILITY UP TO 132KV GRID CONNECTION OVERHEAD POWERLINE 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 of Welgelen Farm No. 322 Portion 2 of Welgelen Farm No. 322
SG Codes	— T0IT00000000032200001 — T0IT00000000032200002
Size of Buildable Area i.e. project infrastructure footprint (only preferred layout, inclusive of all associated infrastructure). Co-ordinates:	**Alternative 1 (Preferred corridor route)** Approximate length of transmission line = 3.6 km. Servitude width = 40m. Assessment corridor width = 500m (250m on either side of the centreline) **Alternative 2** Approximate length of transmission line = 5.69km Servitude with = 40m. Assessment corridor width = 500m (250m on either side of the centreline) **Alternative 3** Approximate length of transmission line = 1.94km Servitude width = 40m. Assessment corridor width = 500m (250m on either side of the centreline) **Alternative 4** Approximate length of transmission line = 1km. Servitude width = 40m 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 (Preferred Route)** — Start – 26°39'46.81"S 30° 2'41.39"E — Middle – 26°39'10.27"S 30° 3'12.67"E — End - 26°38'53.65"S 30° 4'1.67"E **Alternative 2** — Start - 26°40'34.47"S 30° 2'1.02"E — Middle - 26°39'52.87"S, 30° 3'31.30"E — End - 26°38'52.29"S 30° 4'1.60"E **Alternative 3** — Start - 26°40'29.35"S 30° 2'26.66"E — Middle - 26°40'18.67"S 30° 2'49.83"E

	— End - 26°39'48.14"S 30° 2'42.98"E **Alternative 4** — Start - 26°40'35.01"S 30° 2'0.42"E — Middle - 26°40'23.86"S 30° 2'13.16"E — End - 26°40'29.32"S 30° 2'26.46"E **Alternative 1: Grid Substation & BESS** — S1-1: 26° 40' 49.449"S 30° 1' 59.660"E — S1-2: 26°40'48.20"S 30° 1'52.75"E — S1-3: 26°40'32.25"S 30° 1'58.21"E — S1-4: 26°40'33.43"S 30° 2'5.76"E **Alternative 2- Preferred: Grid Substation & BESS** — S2-1: 26°39'38.72"S 30° 2'40.43"E — S2-2: 26°39'49.36"S 30° 2'49.77"E — S2-3: 26°39'55.16"S 30° 2'43.24"E — S2-4: 26°39'44.40"S 30° 2'33.87"E **Alternative 1 – Collector and switching substation:** — S3-1: 26°40'39.57"S 30° 2'19.88"E — S3-2: 26°40’36.77”S 30° 2’26.09”E — S3-3: 26°40'29.11"S 30° 2’29.58”E — S3-4: 26°40'27.64"S 30° 2'23.60"E **Alternative 2 – Collector and switching substation (Preferred):** — S4-1: 26°38’57.67”S 30° 4’3.08”E — S4-2: 26°38’54.03”S 30° 3’59.66”E — S4-3: 26°38'44.10"S 30° 4'10.49"E — S4-4: 26°38'47.63"S 30° 4'14.24"E

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APPENDICES

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 (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 WEF Grid Connection (up to 132kV) (subject to a Basic Assessment (BA) Process); (this application);**
- 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 (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);
- Camden II Wind Energy Facility (up to 200MW) (subject to a S&EIR process) (DFFE Ref: 14/12/16/3/3/2/2135);
- Camden II Wind Energy Facility 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 proposed Camden I Wind Facility will be connected to the nearby Camden Collector substation (which in turn will connect to the Camden Power Station), through an up to 132kV powerline (either single or double circuit) between the grid connection substation portion (immediately adjacent the Camden I Wind Facility on-site IPP substation portion) and that of the Camden Collector substation.

The focus of this Application is the proposed Camden I WEF 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 Wind Facility to the nearby Camden Collector substation (which in turn will connect to the Camden Power Station). The approximate lengths of the powerline alternatives are listed below, and is dependent on the authorized location of the collector substation:

- Alternative 1: ~3.9km (Preferred) (Preferred substation to Preferred collector)
- Alternative 2: ~5.69km
- Alternative 3: ~1.94km
- Alternative 4: ~1km

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 the 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: Proposed key components of the project (132kV OHPL)

OVERHEAD POWERLINE	DESCRIPTION
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 500m (i.e.250m 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 40m
Minimum conductor clearance	8.1m
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: – Up to 132kV (single or double circuit) – Intermediate self-supporting monopole – Inline or angle-strain self-supporting monopole – Suspension self-supporting monopole – Triple pole structure – Cross rope suspension; – Guyed “V” Structure – Steel lattice structure; or – Similar pylon design at 132kV specification 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.

OVERHEAD POWERLINE	DESCRIPTION
Substation (and Collector Substation connection components)	
Substation Footprint	1.5ha each, for both onsite substation and terminating works upgrade
Substation Capacity	33/132kV
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: – 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. – The control building, telecommunication infrastructure, oil dam(s) – Workshop and office area within the substation footprint – Fencing around the substation – Lighting and security infrastructure – All the access road infrastructure to and within the substation – 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.

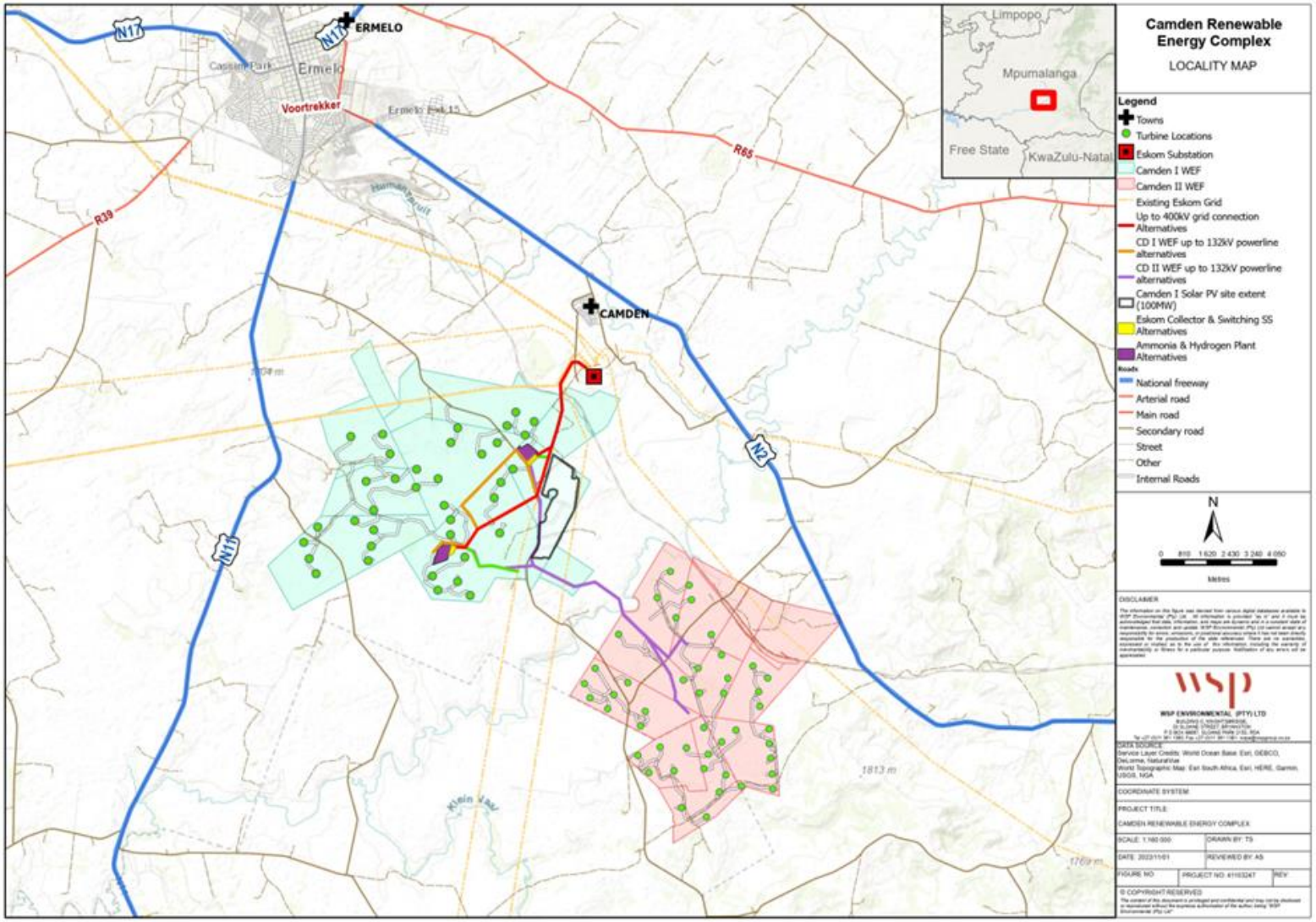


Figure 1-1: Locality map for the proposed Camden Renewable Energy Complex, near Camden in the Mpumalanga Province

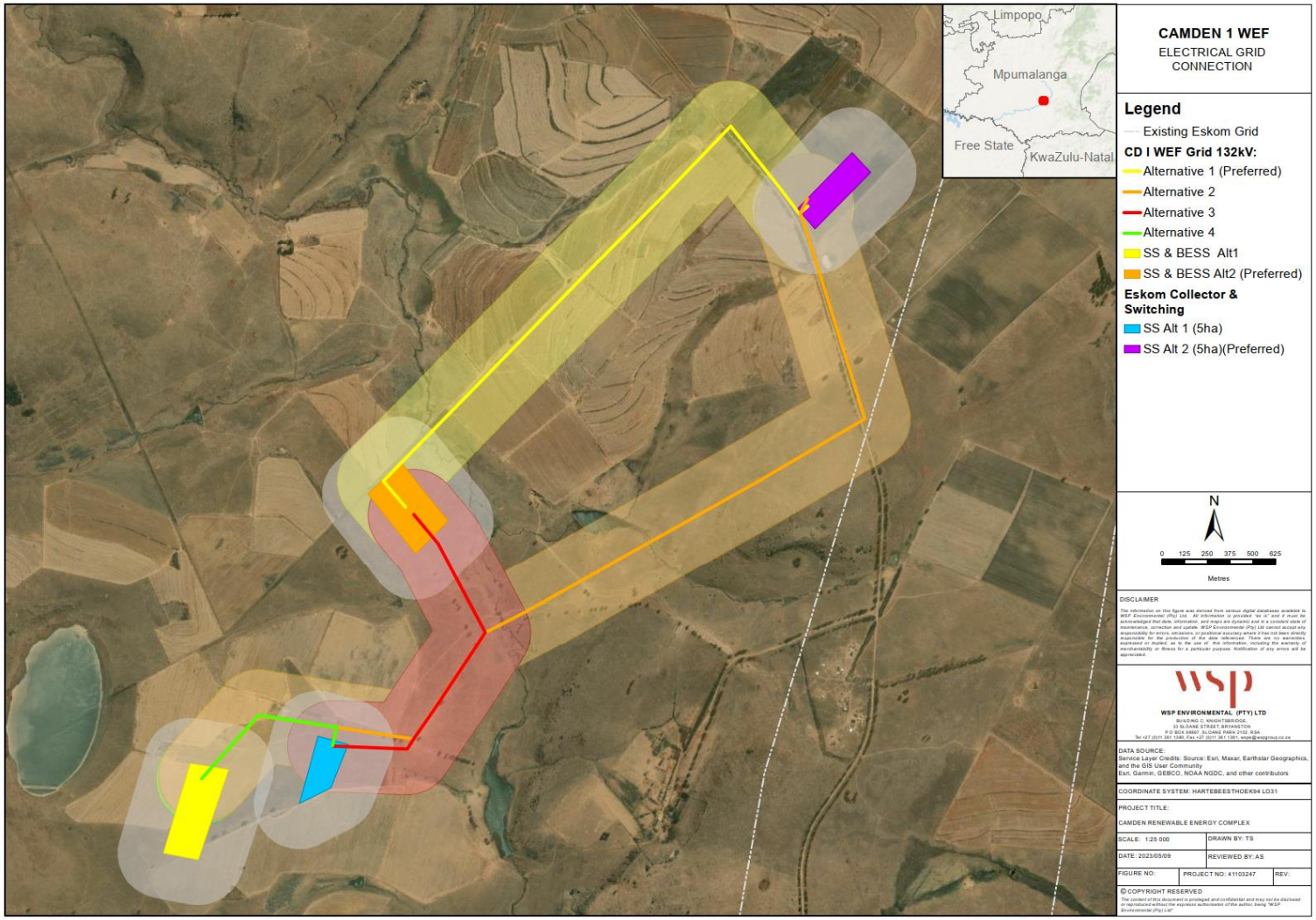


Figure 1-2: Locality map for the proposed Camden I WEF up to 132kV OHPL project, showing the respective grid route corridors around the substation and OHPL infrastructure

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

Enertrag South Africa (Pty) Ltd (hereafter referred as **"Enertrag"**) is the project proponent (Applicant) with regards to this application for the construction and operation of the proposed Camden I Wind Energy Facility up to 132 kV Grid Connection transmission line 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 competent authority 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 proposed Camden I solar 132 kV Grid Connection project.

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

The commenting authorities for the project include:

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

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 Integrated Environmental Authorisations Email: MYeni@dffe.gov.za Current Ref no: 2021-10-0008

1.3.3 Environmental Assessment Practitioner

WSP was appointed in the role of Independent EAP to undertake the BA processes for the proposed construction of the grid connection transmission line. 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 C, Knightsbridge, 33 Sloane Street, Bryanston, Johannesburg
Postal Address	P.O. Box 98867, Sloane Park 2151, Johannesburg
Telephone	011 361 1392
Fax	011 361 1301
Email	Ashlea.Strong@wsp.com
EAP Qualifications	– Masters in Environmental Management, University of the Free State – B Tech, Nature Conservation, Technikon SA – 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
Agriculture	Johann Lanz	Independent consultant	Section 6.14 Section 7.15 Section 8.4 Section 9.1.1 Section 9.2.2 Appendix F-7	**Appendix F-7**
Avifauna	Chris van Rooyen	Chris van Rooyen Consulting	Section 6.2.4 Section 7.8 Section 8.2 Section 9.1.5 Section 9.2.1 Appendix F-1	**Appendix F-1**
Terrestrial Ecology (including Plant and Animal Species Assessments)	David Hoare	David Hoare Consulting (Pty) Ltd	Section 6.2.1, 6.2.2 and 6.2.3 Section 7.5, 7.6 and 7.7 Section 8.5, 8.6 and 8.7 Section 9.1.2, 9.1.3 and 9.1.4 Section 9.2.3, 9.2.4 and 9.2.5 Appendix F-2	**Appendix F-2**
Aquatic Ecology	Brian Colloty	EnviroSci Pty Ltd	Section 6.2.5 Section7.4 Section 8.3 Section 9.1.6 Section 9.2.7 Appendix F-3	**Appendix F-3**
Heritage and Palaeontology	Jaco van der Walt	Beyond Heritage	Section 6.3.3 and 6.3.4 Section 7.11 and 7.12 Section 9.1.7 and 9.1.8 Section 9.2.6 Appendix F-4 and F-5	**Appendix F-4 and F-5**

ASSESSMENT	NAME OF SPECIALIST	COMPANY	SECTIONS IN REPORT	SPECIALIST REPORT ATTACHED AS
Socio-economic	Tony Barbour	Tony Barbour Environmental Consulting	Section 6.3.6 Section 7.13 Section 8.8 Section 9.2.8 Appendix F-6	**Appendix F-6**
Visual	Kerry Schwartz	SLR Consulting (Pty) Ltd	Section 6.3.5 Section 7.9 Section 8.1 Section 9.2.9 Appendix F-8	**Appendix F-8**
Geotechnical	Muhammad Osman	SLR Consulting (Pty) Ltd	Section 6.1.3 Appendix F-9	**Appendix F-9**

1.5 BASIC ASSESSMENT REPORT STRUCTURE

The structure of this BAR 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 Statement	Provides the Environmental Impacts Statement including principal findings as well as recommendations and the authorisation opinion.
7.15 - Cumulative Impact 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	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.
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. **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)*** *The development of facilities or infrastructure for the transmission and distribution of electricity—* *(ee) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;* *excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —* *(a) temporarily required to allow for maintenance of existing infrastructure;* *(b) 2 kilometres or shorter in length;* *(c)within an existing transmission line servitude; and* *(d) will be removed within 18 months of the commencement of development.* **Applicability:** 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 Wind Energy Facility (WEF) to the Camden Common Collector substation.

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	In addition, the development of the OHPL infrastructure will have the following exclusions: (a) The proposed project will be permanent. (b) Grid connection corridors for Alternative 1 (preferred option) and Alternative 2 and 3 will be more than 2km in length. (c) The proposed grid connection corridor is not within an existing transmission line servitude. (d) The proposed project will not be removed within 18 months and is permanent.
	Activity 12 (ii), (a) and (c): *The development of—* *(ii) infrastructure or structures with a physical footprint of 100 square metres or more;* *where such development occurs—* *(a) within a watercourse; or* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse* *excluding—* *(aa) the development of infrastructure or structures within existing ports or harbours* *that will not increase the development footprint of the port or harbour;* *(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;* **Applicability:** 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 m^2 (~1.5ha). In addition, the development of the OHPL infrastructure will have the following exclusions: (aa) the development of infrastructure or structures will not take place within existing ports or harbours and will not increase the development footprint of the port or harbour; (bb) The development activities are not related to the development of a port or harbour, therefore case activity 26 in Listing Notice 2 of 2014 does not apply; (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.
	Activity 19: *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.* *but excluding where such infilling, depositing, dredging, excavation, removal or moving—* *(a) will occur behind a development setback;*

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	(b) is for maintenance purposes undertaken in accordance with a maintenance management plan; [or] *(c)falls within the ambit of activity 21 in this Notice, in which case that activity applies;* **Applicability:** 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. The powerline will traverse watercourses. In addition, the development of the OHPL infrastructure will have the following exclusions: (a) The project will not occur behind a development setback; (b) The project is not intended for maintenance purposes undertaken in accordance with a maintenance management plan; (c) The project does not falls within the ambit of activity 21 in this Notice and therefore, activity 19 of LN 1 applies; (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 (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): *The development of a road—* *(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;* *but excluding a road—* *(a) which is identified and included in activity 27 in Listing Notice 2 of* *2014;* *(b) where the entire road falls within an urban area; or* *(c) which is 1 kilometre or shorter.* **Applicability:** 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. In addition, the development of the OHPL infrastructure will have the following exclusions: Excluding a road— (a) The proposed road infrastructure does not trigger activity 27 in Listing Notice 2 of 2014. (b) The proposed road infrastructure will fall outside an urban area. (c) The proposed road will be more than 1 kilometre in length.
	Activity 27:

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan.* **Applicability:** 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. 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. Exclusions: Both substations are only considered due to linear exclusion, no maintenance management plan relevant at this time.
	Activity 28(ii): *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:* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.* *excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.* **Applicability:** 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. In addition, the development of the OHPL infrastructure will have the following exclusions: The land has not been developed for residential, mixed, retail, commercial, industrial or institutional purposes.
	Activity 30: *Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).* **Applicability:** 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 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.

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	Activity 48(i)(a)(c): *The expansion of—* *(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or* *where such expansion occurs—* *(a) within a watercourse;* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;* *excluding—* *(aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;* *(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;* *(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;* *(dd) where such expansion occurs within an urban area; or* *(ee) where such expansion occurs within existing roads, road reserves or railway line reserves.* **Applicability:** 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. In addition, the development of the OHPL infrastructure will have the following exclusions: (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; (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; (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; (dd) does not occur within an urban area; or (ee) where such expansion occurs within existing roads, road reserves or railway line reserves.
	Activity 56(ii): *The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre—* *(ii) where no reserve exists, where the existing road is wider than 8 metres;* *excluding where widening or lengthening occur inside urban areas.* **Applicability:** 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. ***Exclusions:*** *The proposed road will be developed outside an urban area.*

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
Listing Notice 3: GNR 324 (as amended)	***Activity 4(f)(i)(aa)(bb)(cc)(ee)(gg)*** *The development of a road wider than 4 metres with a reserve less than 13,5 metres.* *f. Mpumalanga* *i. Outside urban areas:* *(aa) A protected area identified in terms of NEMPAA, excluding disturbed areas;* *(bb) National Protected Area Expansion Strategy Focus areas;* *(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;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(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*; **Applicability:** The proposed Camden WEF I 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. 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. 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). 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). 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).
	10 (f)(i)(aa)(bb)(cc)(ee)(gg)(hh) *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.* *f. Mpumalanga* *i. Outside urban areas:* *(aa) A protected area identified in terms of NEMPAA, excluding conservancies;* *(bb) National Protected Area Expansion Strategy Focus areas;* *(cc) Sensitive areas as identified in an environmental management framework as*

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	contemplated in chapter 5 of the Act and as adopted by the competent authority; *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(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;* *(hh) Areas within a watercourse or wetland, or within 100 metres of a watercourse or wetland;* **Applicability:** 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 79m^3 combined. 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. 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). 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). 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). Similarly, the development activity contemplated will be located within 100 metres of a watercourse or wetland (hh).
	Activity 12(f)(i)(ii)(iii) *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.* *f. Mpumalanga* *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;* *ii. Within critical biodiversity areas identified in bioregional plans; or* *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.;* **Applicability:**

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	The construction of the up to 132 kV Powerline and grid connection substations will require the clearance of indigenous vegetation. 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). 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). 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)(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)(c)(f)(i)(aa)(bb)(dd)(ff)(hh): *The development of—* *(ii) infrastructure or structures with a Physical footprint of 10 Square metres or more;* *where such development occurs—* *(a) within a watercourse;* *(c) if no development setback has been adopted,* *within 32 metres of a watercourse, measured from the edge of a watercourse;* ***f. Mpumalanga*** *i. Outside urban areas:* *(aa) A protected area identified in terms of NEMPAA, excluding conservancies;* *(bb) National Protected Area Expansion Strategy Focus areas;* *(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;* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(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.* **Applicability:** 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. 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 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 & 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.

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	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). 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). 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): *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.* **d. Mpumalanga** *ii. A protected area identified in terms of NEMPAA, excluding conservancies.* **Applicability:** The Facility is considered a commercial and/or industrial development, and will require the transformation of a footprint of approximately 19ha (within several farm portions outside an urban area zoned for agriculture, while being partly 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) *The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.* *f. Mpumalanga* *i. Outside urban areas:* *(aa) A protected area identified in terms of NEMPAA, excluding conservancies* *(bb) National Protected Area Expansion Strategy Focus areas;* *(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;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(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;* **Applicability:**

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	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. Such widening and lengthening will be occur partly within a National Protected Area Expansion Strategy Focus area (bb) and 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. 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). 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) *The expansion of—* *(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; where such expansion occurs —* *(a) within a watercourse;* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *f. Mpumalanga* *i. Outside urban areas:* *(aa) A protected area identified in terms of NEMPAA, excluding conservancies* *(bb) National Protected Area Expansion Strategy Focus areas;* *(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;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(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;* **Applicability:** 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. 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 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
	or deproclaimed (partially or wholly) as part of ongoing province-wide reserve verification efforts by the provincial authorities. 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). 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). The following environmental themes were applicable to the proposed project (refer to Section 3.2 of this report examining each theme): – Agriculture Theme – Animal Species Theme – Aquatic Biodiversity Theme – Archaeological and Cultural Heritage Theme – Avian Theme – Civil Aviation (Solar PV) Theme – Defence Theme – Landscape (Solar) Theme – Palaeontology Theme – Plant Species Theme – 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). 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. 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. 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). Based on the preliminary desktop assessment and the terrestrial ecology report, a significant part of the Project Area falls within CBA (Irreplaceable and Optimal)

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	and a large wetland area adjacent and to the north of the Vaal River (near the southern part of the site) is mapped as an Ecological Support Area (ESA). 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: — Irreplaceable (parts of the site are within this sub-category), and — Optimal (northern parts of the site are within this sub-category). 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. 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." 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. The protected area 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. 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). 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.

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	Proof of the de-proclamation/withdrawal process has been included in **Appendix J**.
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. 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. 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: a) *Taking water from a water resource;* *c) Impeding or diverting the flow of water in a watercourse;* *g) Disposing of waste in a manner which may detrimentally impact on a water resource;* *i) Altering the bed, banks, course or characteristics of a watercourse*; 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. 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: - Section 35 (4) - No person may, without a permit issued by the responsible heritage resources authority- - destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite; - destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite. - Section 38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as- - any development or other activity which will change the character of a site—(i) exceeding 5 000 m2 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. 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

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	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 of significance be affected by this proposed project, 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). A Heritage and Palaeontological Report (**Appendix F-4 and Appendix F-5** respectively) has been carried out by a suitably qualified specialist, revealing: – Heritage finds in the area are limited to burial sites and the demolished remains of structures in the greater area. None of the recorded features are located closer than 100 meters from the proposed infrastructure and will not be directly impacted on. – A site visit and walk down along the proposed routes for the Camden I WEF facility in April showed that there were no fossils visible on the surface. The whole area has been cultivated for decades and the land is fairly flat with no rocky or shale outcrops and no fossils. – No fossils were seen on the Vryheid Formation as the soils are deep and well-formed. The proposed project will be loaded onto the SAHRIS portal for comment by SAHRA.
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. The proposed project does not constitute a Listed Activity requiring a Waste Management Licence (WML) as defined in GNR 921. 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. 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. A Section 53 approval will be required due to the fact that the project is located on various mining right areas. A conditional no-objection letter was received on 24 April 2023 for the proposed project (Reference number: MP30/5/4/2/11096SU) following submission of a Section 53 application to the DMRE, thereby addressing the requirement.
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

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	39 of 2004 (NEMAQA) was published in line with NEMA and contains noise control provisions under Section 34: *(1) The minister may prescribe essential national standards –* *(a) for the control of noise, either in general or by specific machinery or activities or in specified places or areas; or* *(b) for determining –* *(i) a definition of noise; and* *(ii) the maximum levels of noise.* *(2) When controlling noise, the provincial and local spheres of government are bound by any prescribed national standards.* 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. 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. 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. 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). 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.

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	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. 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/CAA 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 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. The main objectives of the Act are to: – Ensure uninterrupted supply of energy to the Republic; – Promote diversity of supply of energy and its sources; – Facilitate effective management of energy demand and its conservation; – Promote energy research; – Promote appropriate standards and specifications for the equipment, systems and processes used for producing, supplying and consuming energy; – Ensure collection of data and information relating to energy supply, transportation and demand; – 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; – Provide for certain safety, health and environment matters that pertain to energy; – Facilitate energy access for improvement of the quality of life of the people of Republic; – Commercialise energy-related technologies; – Ensure effective planning for energy supply, transportation, and consumption; and – Contribute to sustainable development of South Africa's economy. 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: – Achieve the efficient, effective, sustainable, and orderly development and operation of electricity supply infrastructure in South Africa; – 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

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	industry within the broader context of economic energy regulation in the Republic: — Facilitate investment in the electricity supply industry; — Facilitate universal access to electricity; — Promote the use of diverse energy sources and energy efficiency; — Promote competitiveness and customer and end user choice; and — Facilitate a fair balance between the interests of customers and end users, licensees, investors in the electricity supply industry and the public. 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
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. 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. 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. 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: — 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. — 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. 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

Applicable Policy	Description of Policy
	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. The IRP recognises that solar PV, wind and 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 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 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 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. 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. 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

Applicable Policy	Description of Policy
	clean and modern forms of energy at an affordable price. As part of the Integrated Energy Planning process, eight key objectives are identified, namely: Objective 1: Ensure security of supply. Objective 2: Minimise the cost of energy. Objective 3: Promote the creation of jobs and localisation. Objective 4: Minimise negative environmental impacts from the energy sector. Objective 5: Promote the conservation of water. Objective 6: Diversify supply sources and primary sources of energy. Objective 7: Promote energy efficiency in the economy. Objective 8: Increase access to modern energy. 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. 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. As part of the analysis four key scenarios were developed, namely the Base Case, Environmental Awareness, Resource Constrained and Green Shoots scenarios: — 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. — 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. — The Resource Constrained Scenario in which global energy commodity prices (i.e. coal, crude oil and natural gas) are high due to limited supply. — 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. 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. 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

Applicable Policy	Description of Policy
	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. An assessment of each scenario against the eight 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 and associated infrastructure identified as one of the key opportunities in the Mpumalanga Economic sectors.

APPLICABLE PLAN	DESCRIPTION OF PLAN
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. 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. The Gert Sibande Municipality (GSM) IDP Review (2019/ 2020) and Final IDP (2020/2021) has identified the following development priorities: - Municipal Transformation and Organisational Development - Basic Service Delivery and Infrastructure Development - Local Economic Development - Municipal Financial Viability and Management - Good Governance and Public Participation - Spatial Development Analysis and Rationale 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

APPLICABLE PLAN	DESCRIPTION OF PLAN
	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: - Revenue collection. - Access to basic services by communities. - Job creation and economic development. - Infrastructure maintenance and upgrading. - Community participation in the affairs of the municipality. - Fight against fraud and corruption. - Capable and responsive organizational structure. - Capabilities of the municipal ICT. - Integrated human settlements 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: - Providing a spatial structure that facilitates access to services for all communities. - Protecting strategic water sources and sensitive eco-systems. - Providing space for the diversification of the local economy. - Eliminating past spatial settlement patterns. The provision of space of the diversification of the local economy is of specific relevance to the proposed development. 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

2.4 IFC Performance 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. – 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. – To promote improved environmental and social performance of clients through the effective use of management systems. – To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately. – 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	

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
	1.2	Identification of Risks and Impacts	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.
	1.3	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. — To establish, maintain, and improve the worker-management relationship. — To promote compliance with national employment and labour laws. — 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. — To promote safe and healthy working conditions, and the health of workers. — To avoid the use of forced labour.		
Aspects	2.1	— Working Conditions and Management of Worker Relationship — Human Resources Policy and Management — Working Conditions and terms of Engagement — Workers organisation — Non- Discrimination and Equal Opportunity — Retrenchment — Grievance Mechanism	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. 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. 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 — Child Labour — Forced Labour	
	2.3	Occupational health and Safety	
	2.4	Workers Engaged by Third Parties	
	2.5	Supply Chain	

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
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. – To promote more sustainable use of resources, including energy and water. – To reduce project related GHG emissions.		
Aspects	3.1	– Policy Resource Efficiency – Greenhouse Gases – Water Consumption	PS3-related impacts, such as the management of construction waste, hazardous substances, and stormwater are assessed in **Section 7** of this report. There are no material resource efficiency issues associated with the Project. Refer to the EMPr for general resource efficiency measures. 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 WEF, the OHPL and substation seeks to facilitate resource efficiency and pollution prevention by contributing to the South African green economy. Dust air pollution in the construction phase will be addressed in the EMPr. The Project will not result in the release of industrial effluents. Potential pollution associated with sanitary wastewater is low and mitigation measures are included in the EMPr (**Appendix G**). Land contamination of the site from historical land use (i.e., low intensity agricultural / grazing) is not considered to be a cause for concern. The waste generation profile of the project is not complex. Waste mitigation and management measures will be included in EMPr. 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
	3.2	– Pollution Prevention – Air Emissions – Stormwater – Waste Management – Hazardous Materials Management – Pesticide use and Management	
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. – 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 – Infrastructure and Equipment Design and Safety	The requirements included in PS 4 will be addressed in the BA process and the development of the EMPr. 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

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
		– Hazardous Materials Management and Safety – Ecosystem Services – Community Exposure to Disease – Emergency Preparedness and Response	qualitatively evaluated in the BA process and the clients' standard safety and security measures, as well as potential additional measures recommended by WSP is be 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. – To avoid forced eviction. – 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. – To improve, or restore, the livelihoods and standards of living of displaced persons. – 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 – Physical Displacement – Economic Displacement – Private Sector Responsibilities under Government Managed Resettlement	PS5 is not applicable to the proposed Camden I WEF Grid Connection as no physical or economic displacement or livelihood restoration will be required. 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. – To maintain the benefits from ecosystem services. – 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) and a large wetland area adjacent and to the north of the Vaal River (near the southern part of the site) is 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. 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

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
			habitat sensitivity was undertaken within the legal and best practice reference framework for South Africa. 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. — 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. — To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner. — 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. — 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. — To respect and preserve the culture, knowledge, and practices of Indigenous Peoples.		
Aspects	7.1	General — Avoidance of Adverse Impacts — 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.
	7.2	Circumstances Requiring Free, Prior, and Informed Consent — Impacts on Lands and Natural Resources Subject to Traditional Ownership or Under Customary Use — Critical Cultural Heritage — 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.		

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
	– 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 desktop Heritage assessment (**Appendix F-4**) has been carried out by a suitably qualified specialist and the findings are discussed in Section 6.3.3 of this report. A Chance Find Procedure is included in the EMPr (**Appendix G**).

2.5 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.

2.6 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. 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. The categories are: – Category A: Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented; – 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 – Category C: Projects with minimal or no adverse environmental and social risks and/or impacts.	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.
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. 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. The client is expected to include assessments of potential adverse Human Rights impacts and climate change risks as	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.

REQUIREMENT		PROJECT SPECIFIC APPLICABILITY
	part of the ESIA or other Assessment, with these included in the Assessment Documentation.	
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. 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. 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 PS. In addition, this BAR 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). 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 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.	A formal 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 serve as the basis for an 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. 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. 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. All Projects affecting Indigenous Peoples will be subject to a process of Informed Consultation and Participation, and will need to comply with the rights and protections for Indigenous Peoples contained in relevant national law, including those laws implementing host country obligations under international law.	The BA process includes an extensive stakeholder engagement process which complies with the South African EIA Regulations. 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 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. The stakeholder engagement process is detailed in **Section 3.6**.

REQUIREMENT		PROJECT SPECIFIC APPLICABILITY
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. 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 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.
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 that the project is developed in the future.
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 that the project is developed in the future.

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 14 September 2021 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				✓
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:

- 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);
- Aquatic Biodiversity Assessment;
- Avifauna Impact Assessment;
- Social Impact Assessment; and
- Desktop Geotechnical Assessment.

Four of the identified specialist studies will not be undertaken as part of the BA process for the proposed Camden I WEF. 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.

- **Radio Frequency Interference (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. No major or other types of civil aviation aerodromes. Therefore, a compliance statement is not required as per the protocol specifications. 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. An application for the Approval of Obstacles has been submitted to ATNS/CAA and the required permits will be obtained prior to the development of the project.

- **Defence**

  According to the DFFE Screening Tool Report, Defence is regarded as having low sensitivity. Therefore, a compliance statement is not required as per the protocol specifications. 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.

ASSESSMENT PROTOCOLS

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. The outcome of the site sensitivity verification can be found in Section 7 of the Agricultural Compliance Statement (**Appendix F-7** of this final BA report). The specialist confirmed that the development could potentially have 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 25 of the Visual Impact Assessment (**Appendix F-8** of this final BA report) outlines the specific sections of the specialist report which align with Appendix 6 of the EIA regulations. No preliminary visual/landscape sensitivities or sensitivity rating was identified in the relevant Screening Tools. However, an impact assessment is provided in Section 9.1 of the specialist report.
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. Section 8 of the study outlines the outcome of the site sensitivity verification. The specialist confirmed the overall impact of the project is considered to be medium but can be mitigated to an acceptable level.
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 8 and 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. 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**).

SPECIALIST ASSESSMENT	ASSESSMENT PROTOCOL	SITE SENSITIVITY VERIFICATIONS
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 & 7 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). 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.
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.	Pages 4 to 8 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). 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 5 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).
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. 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.

SPECIALIST ASSESSMENT	ASSESSMENT PROTOCOL	SITE SENSITIVITY VERIFICATIONS
Avifaunal 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 19 to 20 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. The site sensitivity verification can be found in Section 6 of the Avifaunal Impact Assessment (**Appendix F-1** 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. No preliminary geotechnical sensitivities or sensitivity rating was identified in the relevant Screening Tools.
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. 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). 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,[1] indirect,[2] secondary[3] as well as cumulative[4] 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[5] presented in **Table 3-3**.

Table 3-3: Risk Assessment Methodology

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

[1] Impacts that arise directly from activities that form an integral part of the Project.
[2] Impacts that arise indirectly from activities not explicitly forming part of the Project.
[3] Secondary or induced impacts caused by a change in the Project environment.
[4] Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.
[5] 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.

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
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 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 will be updated in 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 Regional 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, the 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 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 Zulu;
- 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 2. 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 the proponent, 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 (related to the SEF and WEF facilities of the energy complex) which was conducted over 12 months.
  - To date, only one peer-reviewed scientific paper has been published on the impacts wind farms have on birds in South Africa (Perold et al. 2020). The precautionary principle was therefore applied throughout. The World Charter for Nature, which was adopted by the UN General Assembly in 1982, was the first international endorsement of the precautionary principle. The principle was implemented in an international treaty as early as the 1987 Montreal Protocol and, among other international treaties and declarations, is reflected in the 1992 Rio Declaration on Environment and Development. Principle 15 of the 1992 Rio Declaration states that: "in order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall be not used as a reason for postponing cost-effective measures to prevent environmental degradation."

- According to the specifications received from the proponent, the 33kV medium-voltage lines will be buried where practically feasible. It was therefore assumed that there could be 33kV overhead lines which could pose an electrocution risk to priority species.
- It is assumed that the up to 132kV overhead line will be built on poles/towers designed to 132kV specifications.

- **Terrestrial Biodiversity:**
  - The assessment is based on a single reconnaissance site visit from 3-7 February 2020 (summer season). 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. If necessary, additional surveys will be recommended to compensate for any short-coming related to describing seasonal floristic patterns on site in detail.
  - 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. In order 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 Biodiversity:**
  - Inventory surveys of animal species occurring on a site are difficult to achieve within the timeframes associated with a BA. To compile a comprehensive site-specific list of the biota on site, studies would be required that would include different seasons and be undertaken a much longer timeframe including 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 Biodiversity:**
  - 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 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 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.
  - Based on the project description provided by the Proponent, all analysis for this VIA is based on a worst-case scenario where turbine heights are assumed to be 300-m at the blade tip. On-site substations, Battery Energy Storage (BESS) facilities and office building heights are assumed to be less than 25m in height.
  - Visual analysis in respect of the power lines is based on a worst-case scenario where power line tower heights are assumed to be 35m.
  - 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 BA).
  - At the time of undertaking the visual study no detailed information was available regarding the design and layout of services and infrastructure associated with the proposed development. The potential visual impact of the typical infrastructure associated with a wind farm has therefore been assessed.

- 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 WEFs.
- Although the grid connection and on-site infrastructure associated with the WEF has not been included in the models, this is not considered to be a major limitation as the visual impact of associated infrastructure would be minor when considering the scale of these infrastructural elements in relation to wind turbines.
- 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, broad 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.
- The overall weather conditions in the study area have certain visual implications and are expected to affect the visual impact of the proposed development to some degree. In clear weather conditions, the wind turbines and power lines would present a greater contrast with the surrounding environment than they would on an overcast day. Although the field investigation was conducted during clear weather conditions. However, localised pollution in the study area results in relatively hazy skies which would reduce the visibility of the turbines.

- **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, pre-construction walkthrough and monitoring of the study area by the Environmental Control Officer (ECO). This report only deals with the footprint area of the proposed development (including the assessment corridor for linear features) and consisted of non-intrusive surface surveys. 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 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.
- **Agricultural:**
  - 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 of 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. 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 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 details of the properties associated with the proposed Project (substation and powerline), including the 21-digit Surveyor General (SG) codes for the cadastral land parcels are outlined in **Table 4-1**. The coordinates of the OHPL route alternatives and substation alternatives are presented in **Table 4-2**.

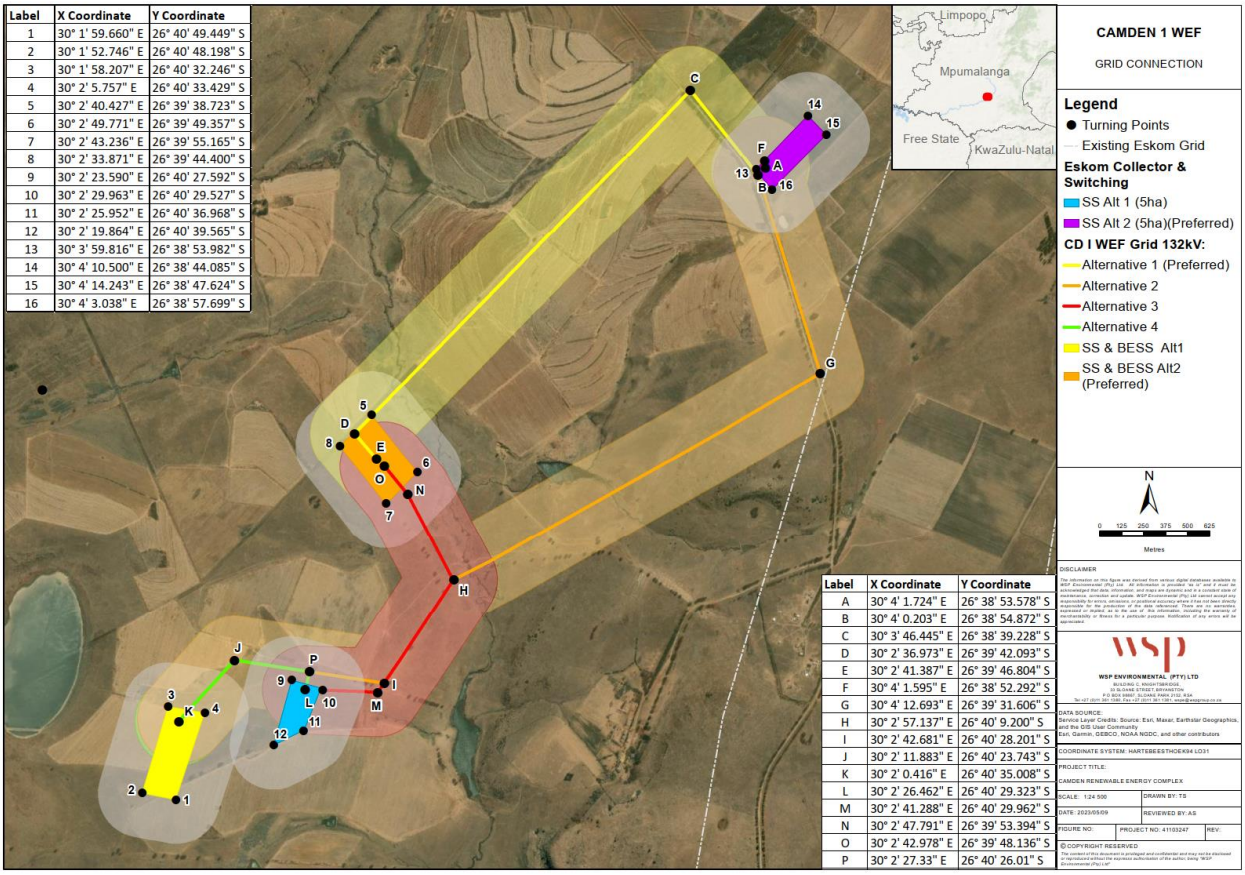


Figure 4-1: Locality map for the proposed Camden Renewable Energy Complex, near Camden n the Mpumalanga Province, showing preferred route, including assessment corridors proposed for authorisation.

Table 4-1: Farm portions on which the proposed powerline is located

FARM NAME & NUMBER	21 DIGIT SG CODE	MUNICIPALITY / PROVINCE
Portion 1 farm Welgelegen 322: – Powerline Alternative One (Preferred); – Powerline Alternative Two; and – Terminating works location (common collector alternative 2) (Preferred).	T0IT00000000032200001	Msukaligwa Local Municipality/ Gert Sibande District Municipality/ Mpumalanga Province
Portion 2 of the farm Welgelegen 322 – Powerline Alternative One (Preferred); – Powerline Alternative Two; – Powerline Alternative Three; – Powerline Alternative Four; – Substation Alternative One; – Substation Alternative Two (Preferred); and – Terminating works location (common collector alternative 1).	T0IT00000000032200002	Msukaligwa Local Municipality/ Gert Sibande District Municipality/ Mpumalanga Province

Table 4-2: Co-ordinates of the OHPL route alternatives

POINT	CENTRE POINT CO-ORDINATES	
132kV OHPL: Alternative 1(Preferred)		
A	26° 38' 53.578" S	30° 4' 1.724" E
C	26° 38' 39.228" S	30° 3' 46.445" E
D	26° 39' 42.093" S	30° 2' 36.973" E
E	26° 39' 46.804" S	30° 2' 41.387" E
132kV OHPL: Alternative 2		
B	26° 38' 54.872" S	30° 4' 0.203" E
F	26° 38' 52.292" S	30° 4' 1.595" E
G	26° 39' 31.606" S	30° 4' 12.693" E
H	26° 40' 9.200" S	30° 2' 57.137" E
I	26° 40' 28.201" S	30° 2' 42.681" E
J	26° 40' 23.743" S	30° 2' 11.883" E

POINT	CENTRE POINT CO-ORDINATES	
K	26° 40' 35.008" S	30° 2' 0.416" E
132kV OHPL: Alternative 3		
L	26° 40' 29.323" S	30° 2' 26.462" E
M	26° 40' 29.962" S	30° 2' 41.288" E
H	26° 40' 9.200" S	30° 2' 57.137" E
N	26° 39' 53.394" S	30° 2' 47.791" E
O	26° 39' 48.136" S	30° 2' 42.978" E
132kV OHPL: Alternative 4		
J	26° 40' 23.743" S	30° 2' 11.883" E
K	26° 40' 35.008" S	30° 2' 0.416" E
L	26° 40' 29.323" S	30° 2' 26.462" E
P	26°40'26.01"S	30° 2'27.33"E

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 Wind Energy Facility to the nearby Camden Collector substation (which in turn will connect to the Camden Power Station). The powerline will be approximately 6km 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). A technical summary of the 132 kV grid connection and its associated infrastructure is included in **Table 4-3**.

Table 4-3: Details of the proposed Camden I WEF 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: – Up to 132kV (single or double circuit) — Intermediate self-supporting monopole — Inline or angle-strain self-supporting monopole — Suspension self-supporting monopole — Triple pole structure — Cross rope suspension; — Guyed “V” Structure — Steel lattice structure; or — Similar pylon design at 132kV specification 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

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: – 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. – The control building, telecommunication infrastructure, oil dam(s) – Workshop and office area within the substation footprint – Fencing around the substation – Lighting and security infrastructure – All the access road infrastructure to and within the substation 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 WEF 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 differ 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).

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 5.2.

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 4-2 provides an illustration of a typical substation layout.

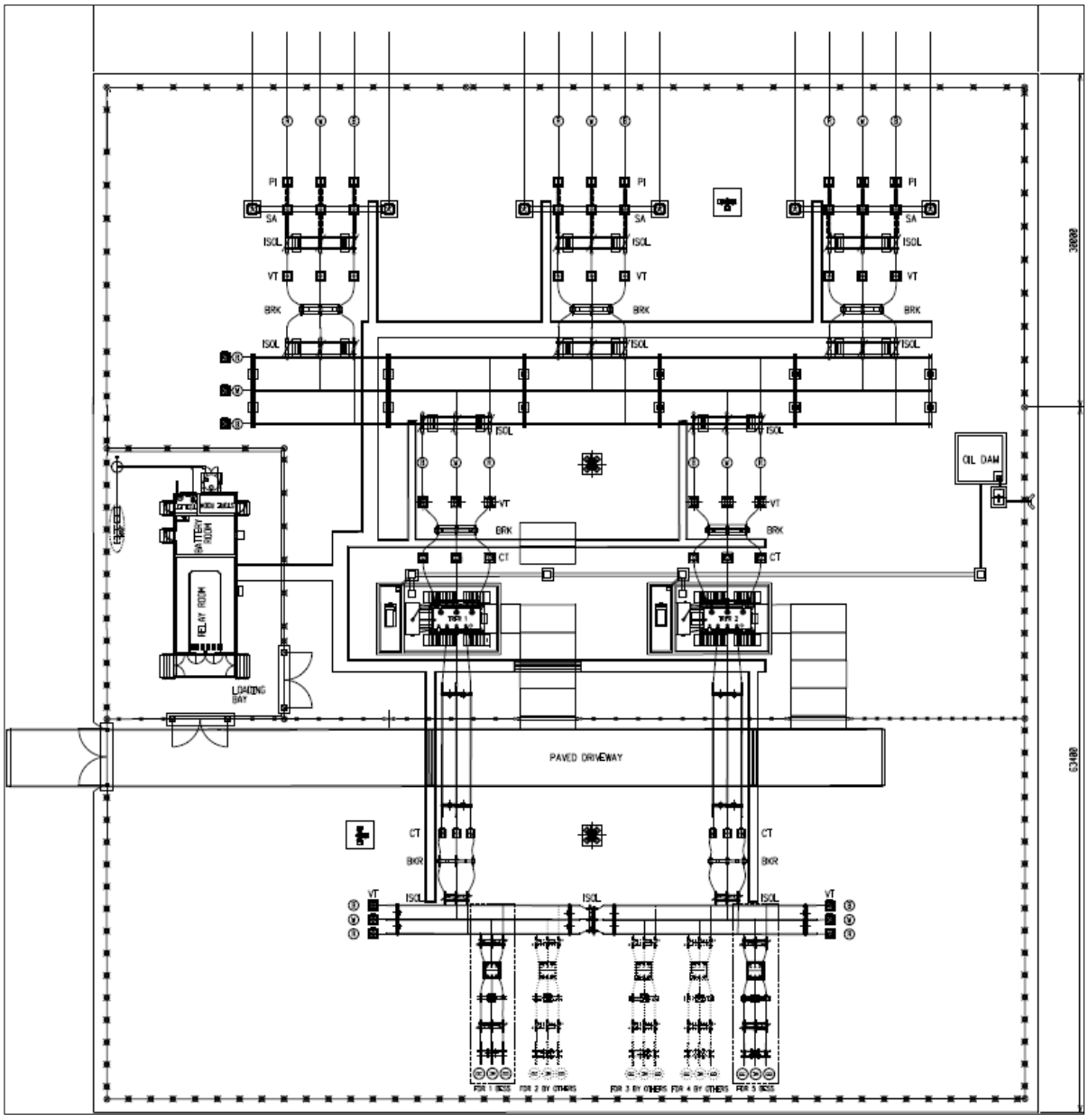


Figure 4-2 : Typical Substation Layout (illustrative only)

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.

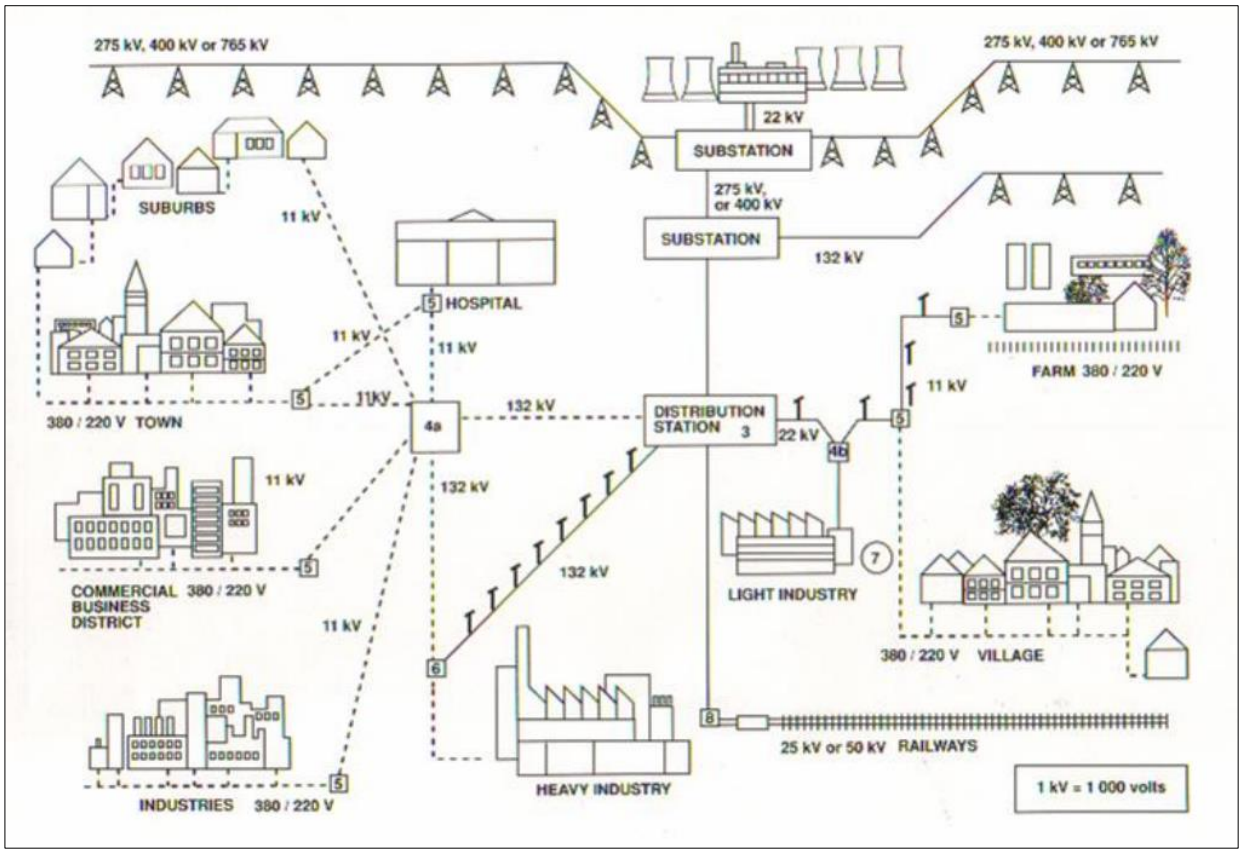


Figure 4-3: Typical Distribution System

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;
  - Step 4: Assembly and erection of infrastructure on site;
  - Step 5: 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. Large mobile plant including mechanical/hydraulic augers, mobile cranes, bucket trucks/cherry pickers will be used during installation of the OHPL.

LABOUR REQUIREMENTS

During site preparation and installation of Project related infrastructure the selected Contractor, working on behalf of Camden I WEF, 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 excavations for foundations, planting of tower (concrete casting may be required) and stringing of the conductors.

A number of tower options could be utilised with a maximum height 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 WEF. The Camden I WEF substation environmental authorisation 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 OHPL. 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 WEF 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 WEF 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 (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 WEF 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 WEF to the national grid. Therefore, the OHPL is required to be located between the grid on-site IPP substation for the Wind 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 Camden I WEF IPP Substation (DFFE Ref: 14/12/16/3/3/2/2137).

Table 5-1: Substation Alternative co-ordinates

POINT	LATITUDE	LONGITUDE
Alternative 1: Grid Substation & BESS		
		
S1-1	26° 40' 49.449"S	30° 1' 59.660"E
S1-2	26°40'48.20"S	30° 1'52.75"E
S1-3	26°40'32.25"S	30° 1'58.21"E
S1-4	26°40'33.43"S	30° 2'5.76"E
Alternative 2- Preferred: Grid Substation & BESS		
		
S2-1	26°39'38.72"S	30° 2'40.43"E
S2-2	26°39'49.36"S	30° 2'49.77"E
S2-3	26°39'55.16"S	30° 2'43.24"E
S2-4	26°39'44.40"S	30° 2'33.87"E

POINT	LATITUDE	LONGITUDE
Alternative 1 – Collector and switching substation		
		
S3-1	26°40'39.57"S	30° 2'19.88"E3
S3-2	26°40’36.77”S	30° 2’26.09”E
S3-3	26°40'29.11"S	30° 2’29.58”E
S3-4	26°40'27.64"S	30° 2'23.60"E
Alternative 2 – Collector and switching substation (Preferred)		
		
S4-1	26°38’57.67”S	30° 4’3.08”E
S4-2	26°38’54.03”S	30° 3’59.66”E

POINT	LATITUDE	LONGITUDE
S4-3	26°38'44.10"S	30° 4'10.49"E
S4-4	26°38'47.63"S	30° 4'14.24"E

5.3 LAYOUT ALTERNATIVES

As mentioned before, four (4) alternatives powerline corridors have been identified 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 Camden I WEF IPP Substation (DFFE Ref: 14/12/16/3/3/2/2137).

5.3.1 ALTERNATIVE 1: PREFERRED OPTION

The Preferred powerline corridor for this project will exit Alternative 1 substation (preferred option) from the Eskom switching station section of the substation, in a northern direction before turning towards the northeast and bend towards the south before eventually entering the Alternative 2 ECSS. The centre point of this transmission line is located at 26°39'12.73"S, 30° 3'9.76"E and **Figure 5-1 and** Table 5-2 illustrates the co-ordinates of all the bend points along the proposed powerline route. The total length of the Preferred Option transmission line is approximately 3.9 km.

Table 5-2: Alternative 1 route coordinates (Preferred)

LABLE	LATITUDE	LONGITUDE
A	26° 38' 53.578" S	30° 4' 1.724" E
C	26° 38' 39.228" S	30° 3' 46.445" E
D	26° 39' 42.093" S	30° 2' 36.973" E
E	26° 39' 46.804" S	30° 2' 41.387" E

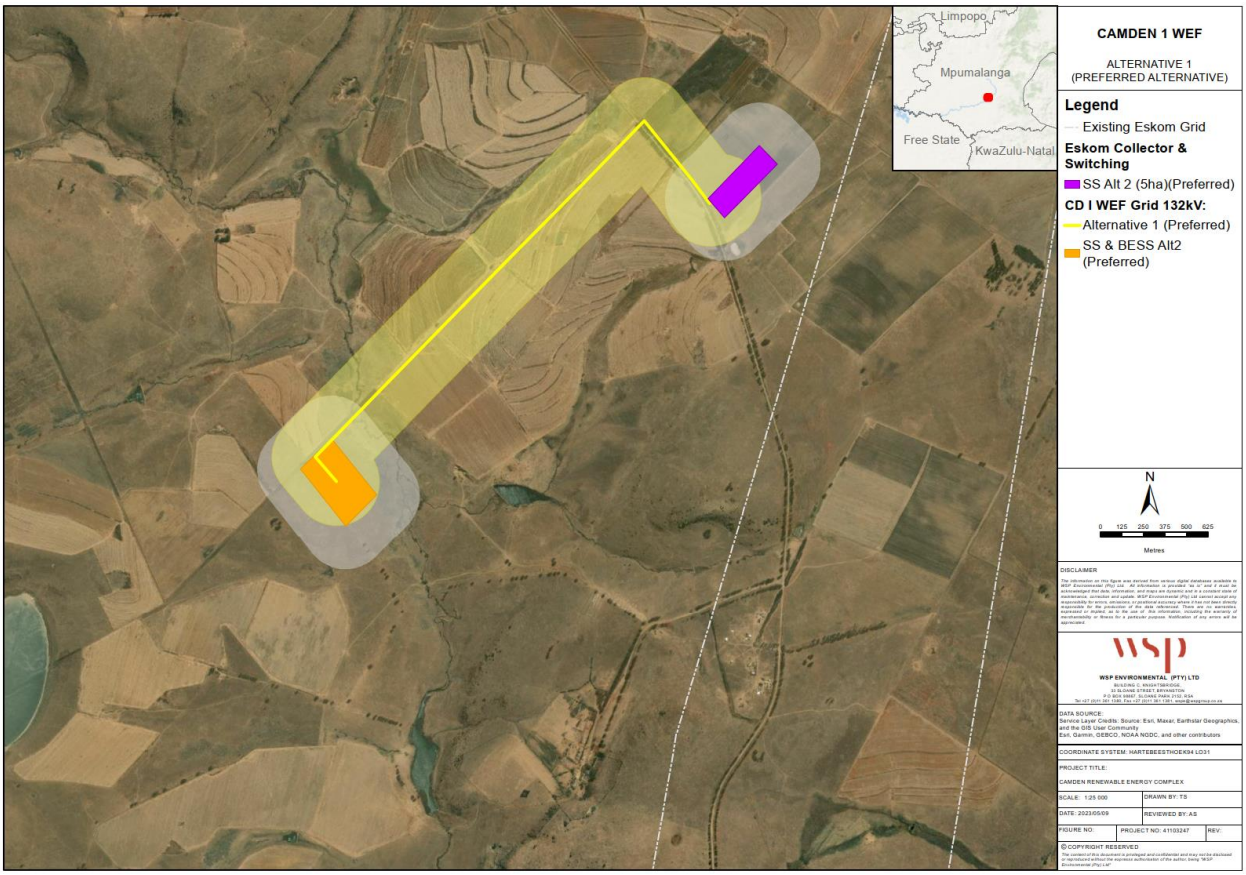


Figure 5-1: Locality Map indicating the proposed Alternative 1 up to 132kv powerline corridor, showing assessment corridors for powerline and substations.

5.3.2 ALTERNATIVE 2

Powerline corridor Alternative 2 runs from the Camden I WEF Alternative 1 substation in a northly direction into the preferred option 2 ECSS. The transmission line will be approximately 5.69 km in length and will run parallel to a secondary road that runs through the study area. The centre point of powerline corridor route is located at 26°39'56.82"S 30° 3'22.63"E. **Figure 4-1**, **Figure 5-2** and **Table 4-2** below provides the powerline route as well as bend points coordinates.

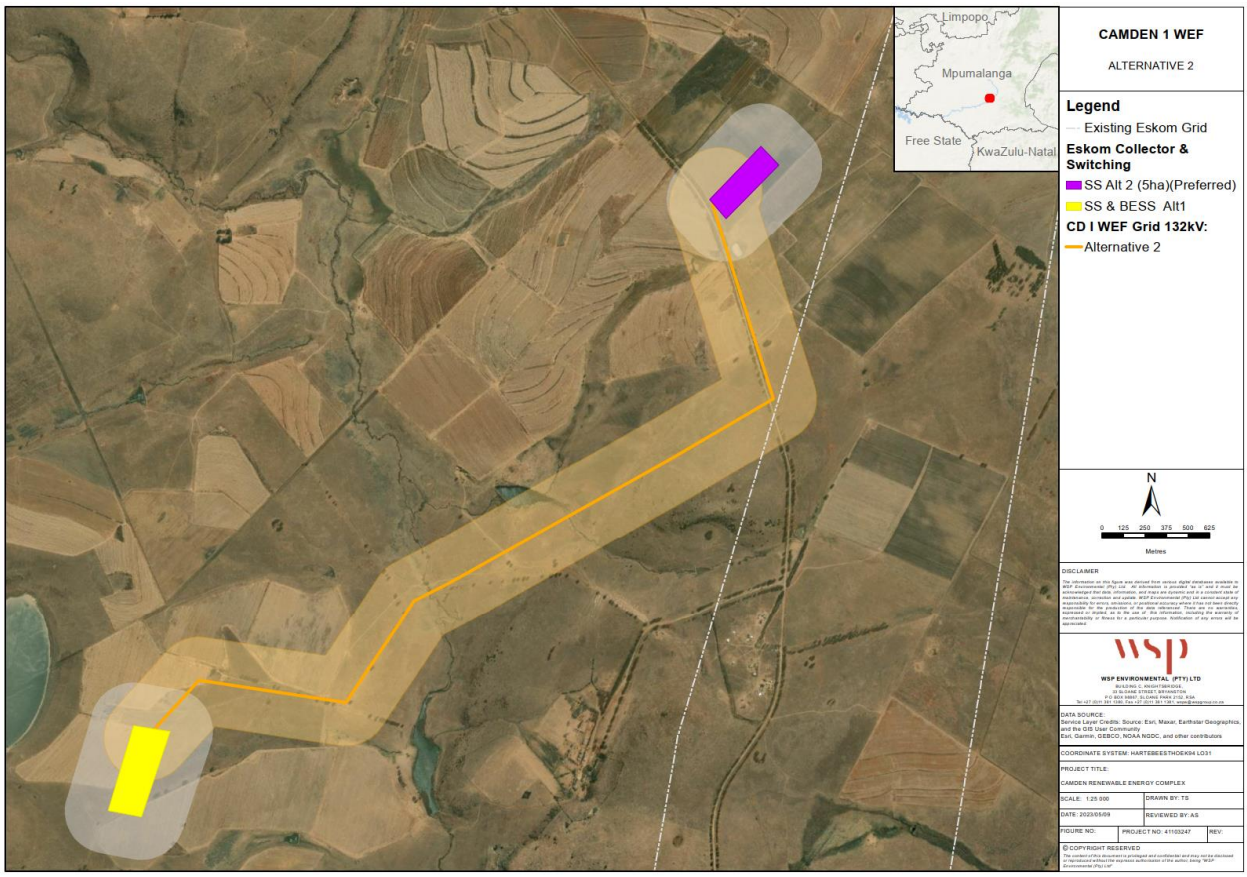


Figure 5-2: Locality Map indicating the proposed Alternative 2 up to 132kV powerline corridor, , showing assessment corridors for powerline and substations.

5.3.3 ALTERNATIVE 3

Powerline corridor Alternative 3 will be constructed from the Camden I WEF Alternative 2 (Preferred) substation to the Alternative 1 ECSS. The length of this powerline corridor is approximately 1.94km.

The centre point of this powerline corridor route is located at 26°40'17.05"S 30° 2'51.37"E. **Figure 4-1**, **Figure 5-3** and **Table 4-2** illustrates the co-ordinates of all the bend points along the proposed powerline route.

Figure 5-3: Locality Map indicating the proposed Alternative 3 up to 132kV powerline corridor, showing assessment corridors for powerline and substations.

5.3.4 ALTERNATIVE 4

Powerline corridor Alternative 4 will be constructed from the Camden I WEF Alternative 1 substation to the Alternative 1 ECSS. The length of this powerline corridor route is approximately1km.

The centre point of this powerline corridor is located at 26°40'23.76"S 30° 2'11.94"E. **Figure 4-1**, **Figure 5-4** and **Table 4-2** illustrates the co-ordinates of all the bend points along the proposed powerline corridor route.

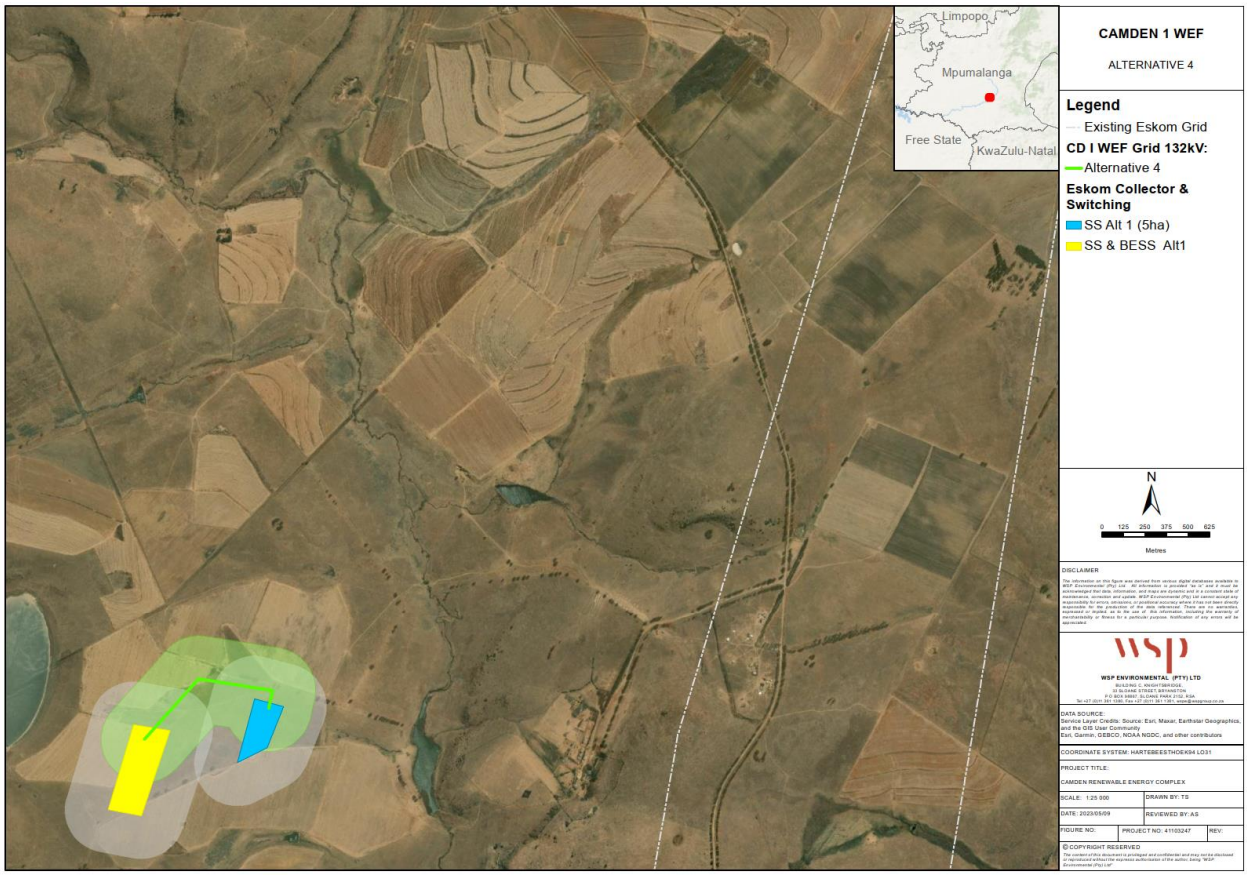


Figure 5-4: Locality Map indicating the proposed Alternative 4 up to 132kV powerline corridor, showing assessment corridors for powerline and substations.

Table 5-3 below show all aspects of the alternative powerline routes.

Table 5-3: Powerline routes alternative aspects.

ASPECT	ALTERNATIVE 1 (PREFERRED OPTION)	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
Approximate Length	3.9 km	5.69km	1.94km	1km
Starting point	Eskom switching station (Alt 2) (Preferred)	Eskom switching station (Alt 1)	Eskom switching station (Alt 2) (Preferred)	Eskom switching station (Alt 1)
End point	ECSS (Alt 2) (Preferred)	ECSS (Alt 2) (Preferred)	ECSS (Alt 1)	ECSS (Alt 1)
Number of bend points	3	5	3	2
Number of road crossings	1	3	1	0
Number of water crossing	1	2	0	0

ASPECT	ALTERNATIVE 1 (PREFERRED OPTION)	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
General	Majority of this alternative route will be on cultivated land. The route will result to stream crossing and road crossing. This alternative route will result in minimal disturbance when compared to the other alternatives. This route terminates at the preferred ECSS site, with shortest grid connection contemplated therefrom.	Majority of the Land use is grass land (used for livestock grazing). This alternative is the longest of all the options with two stream crossings and two road crossings. This route terminates at the preferred ECSS site, with shortest grid connection contemplated therefrom.	This route will be constructed on grassland areas, this route will not result in any stream crossings and road crossings. Access to this route might result in construction of access roads. This route terminates at the least preferred ECSS site.	This is the shortest alternative. Majority of the route will be on grass land with no stream crossings or road crossings. This route will require construction of access roads. This route terminates at the least preferred ECSS site.

5.4 TECHNOLOGY ALTERNATIVES

There are two 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.

The 132kV OHPL is a more viable option for the proposed activity and more emphasis, 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.

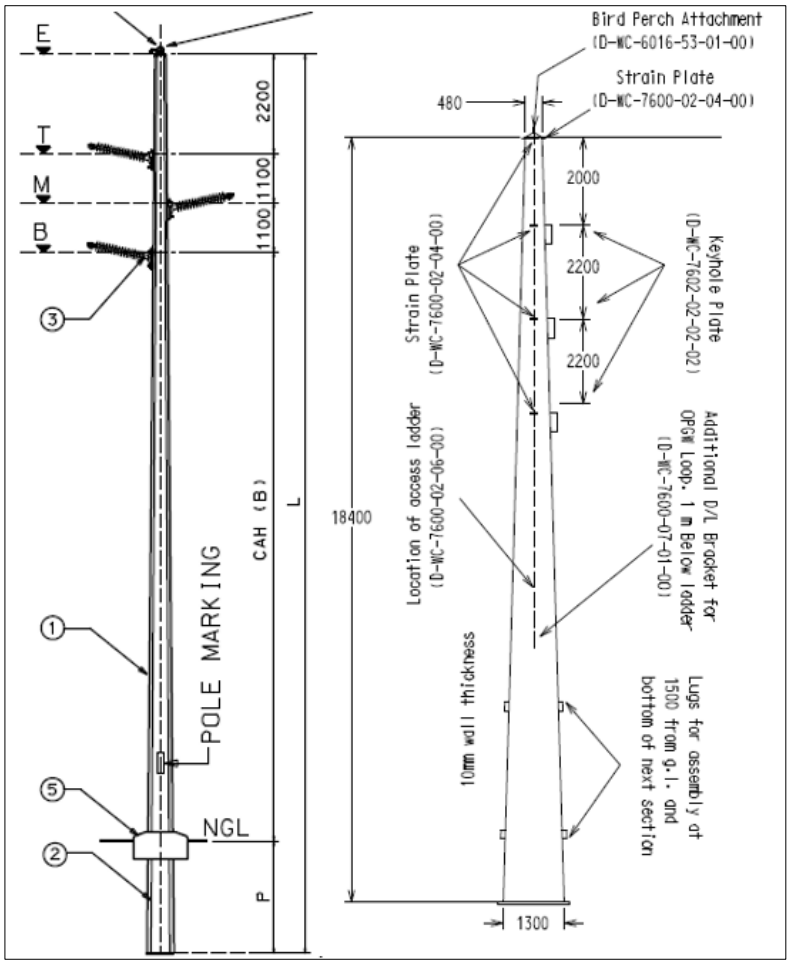


Figure 5-5: 132kV intermediate self-supporting double circuit monopole

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

Self-supporting galvanised steel Monopole lnline 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.

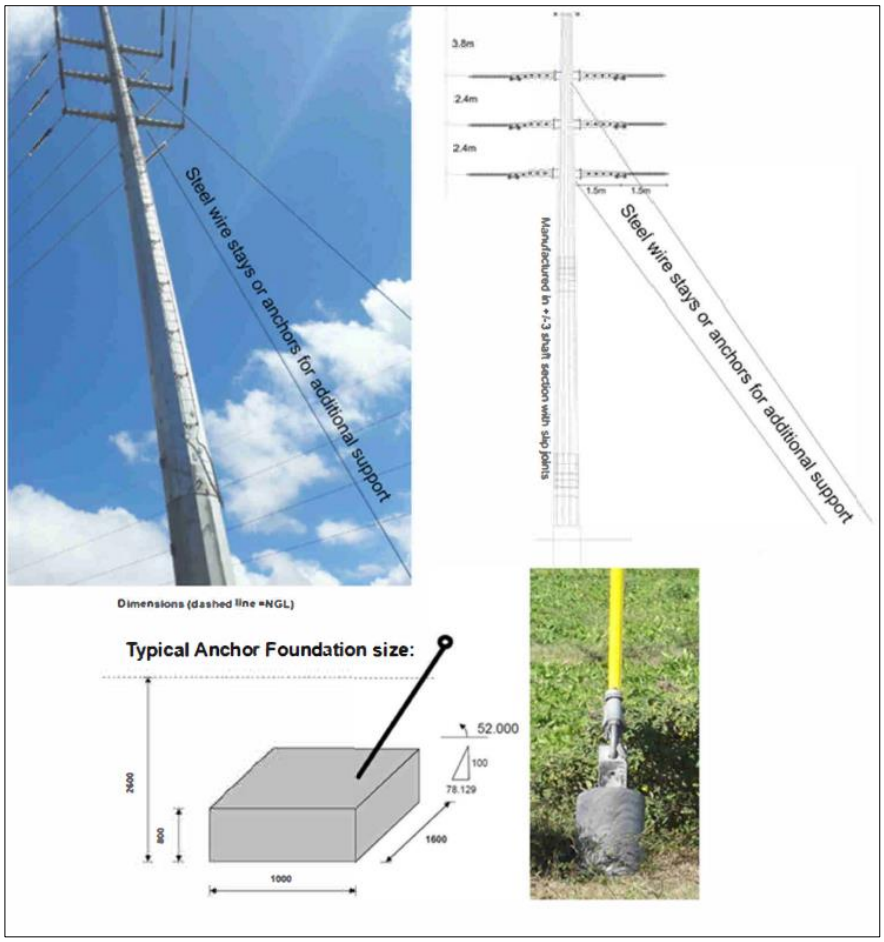


Figure 5-6: 132kV inline or angle strain self-supporting double circuit monopole

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.

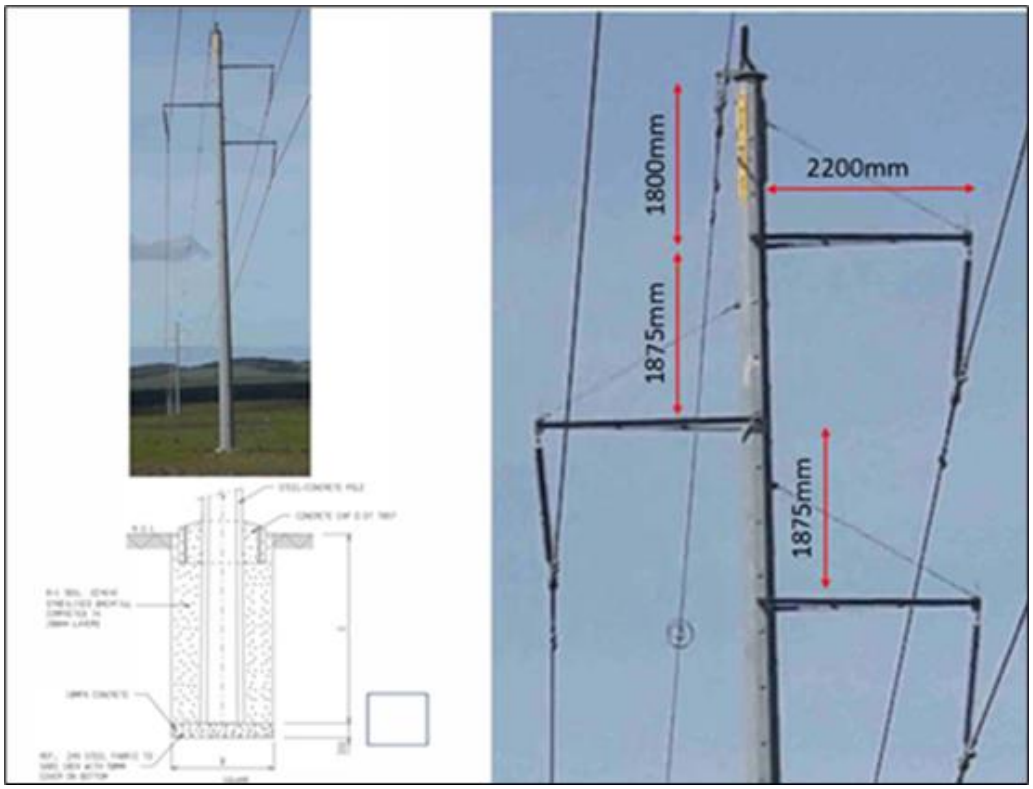


Figure 5-7: 32kV suspension self-supporting single circuit monopole with single conductor

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.

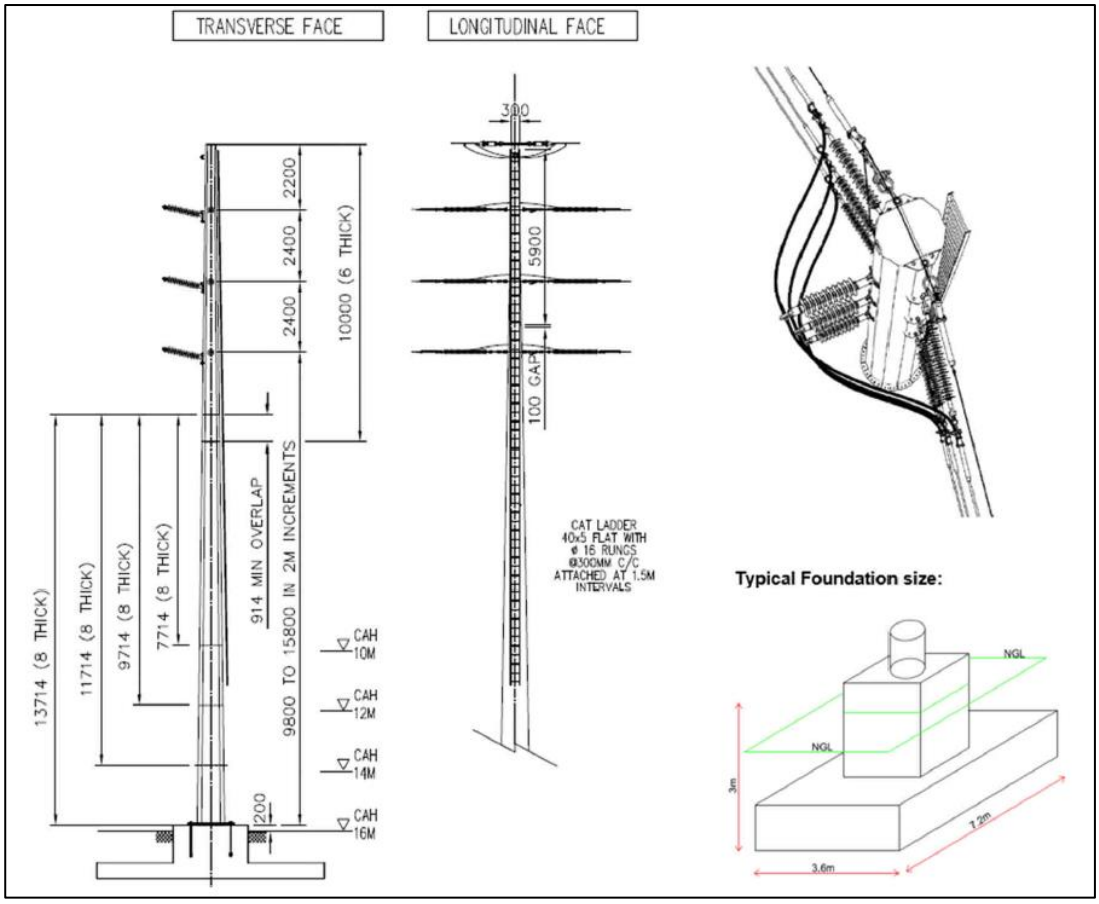


Figure 5-8: 132kV inline or angle strain self-supporting single circuit monopole with single conductor

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.

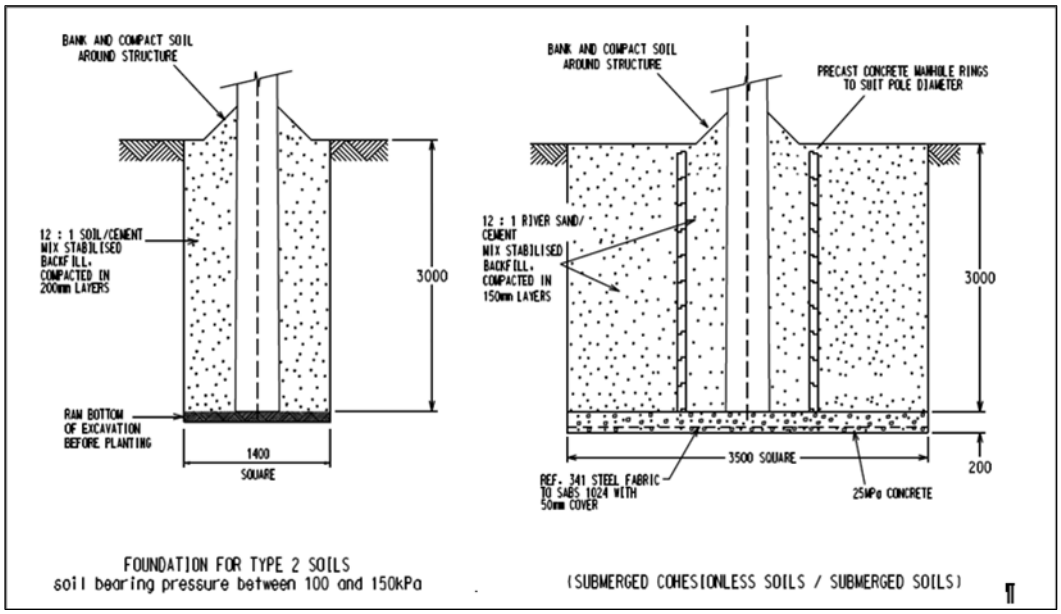


Figure 5-10: type of foundation required for each pylon

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 200MW of Wind Energy 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 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 – Topography and Land Use – Geology – Agriculture and Soils – Terrestrial Biodiversity – Avifauna – Aquatic – Groundwater
Social and Economic	– Socio-Economic – Heritage – Palaeontology – Landscape and Visual – Traffic

6.1 PHYSICAL ENVIRONMENT

6.1.1 CLIMATE AND METEOROLOGY

*The following is extracted from the Wetland Assessment compiled by WSP and included as **Appendix F-7**.*

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)[6] 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[7], 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 AAQMl 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%

[6] 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.

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

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. 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 the region average at 17.8°C while winter temperatures average at 11.0°C. Ermelo received 1 806 mm of rainfall over the three-year period, with approximately 49% of that received during the summer months and 3% during the winter months.

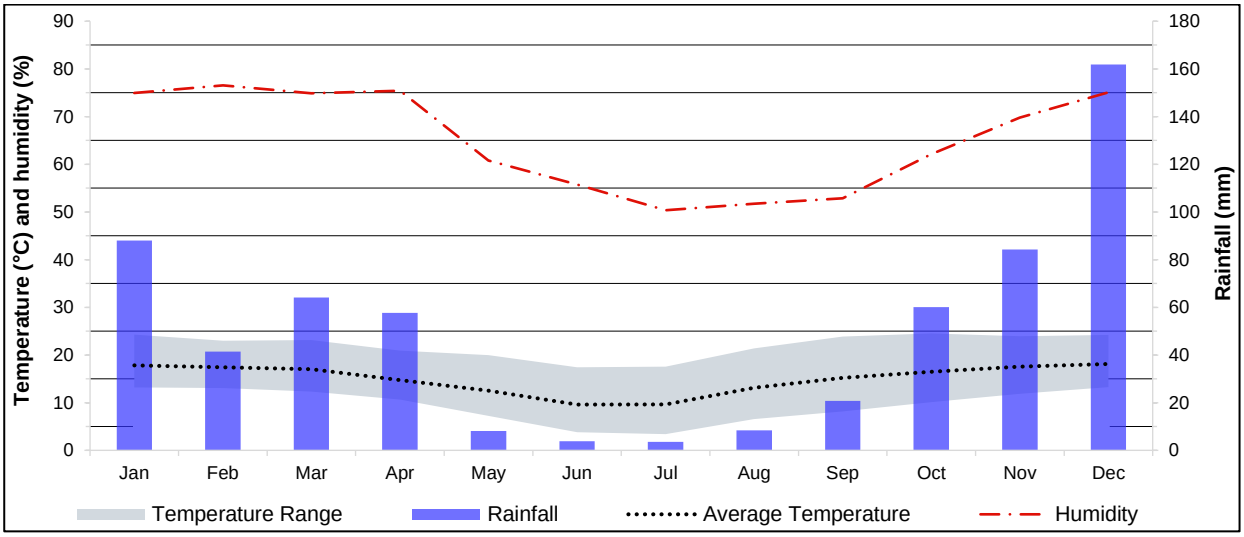


Figure 6-1: Meteorological summary for Ermelo (January 2018 - December 2020)

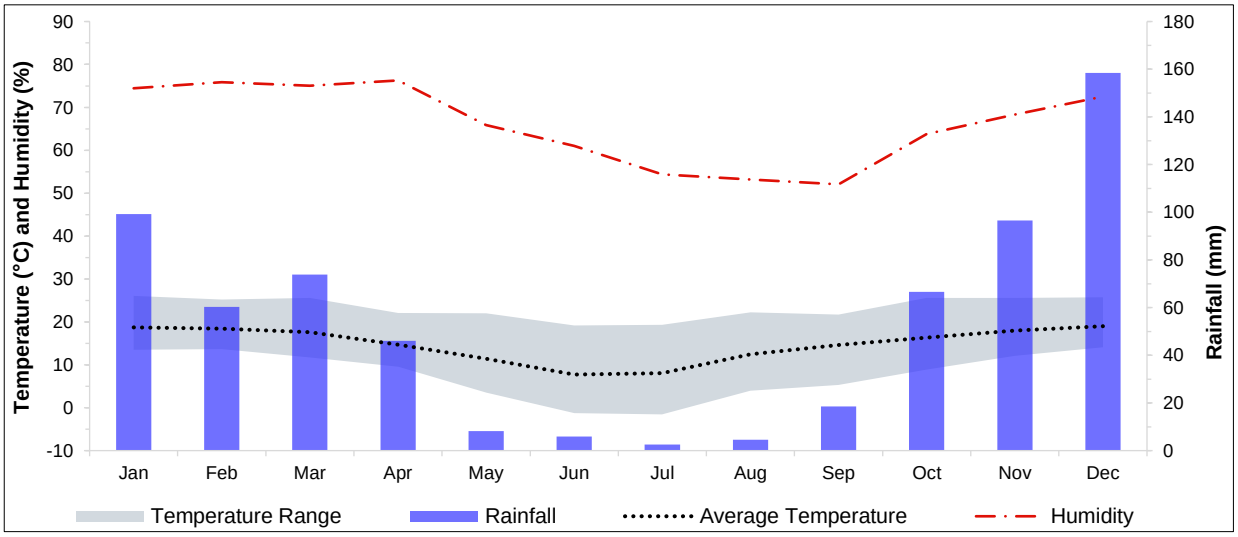


Figure 6-2: Meteorological summary for Camden (January 2018 - December 2020)

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 WRPlot 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.

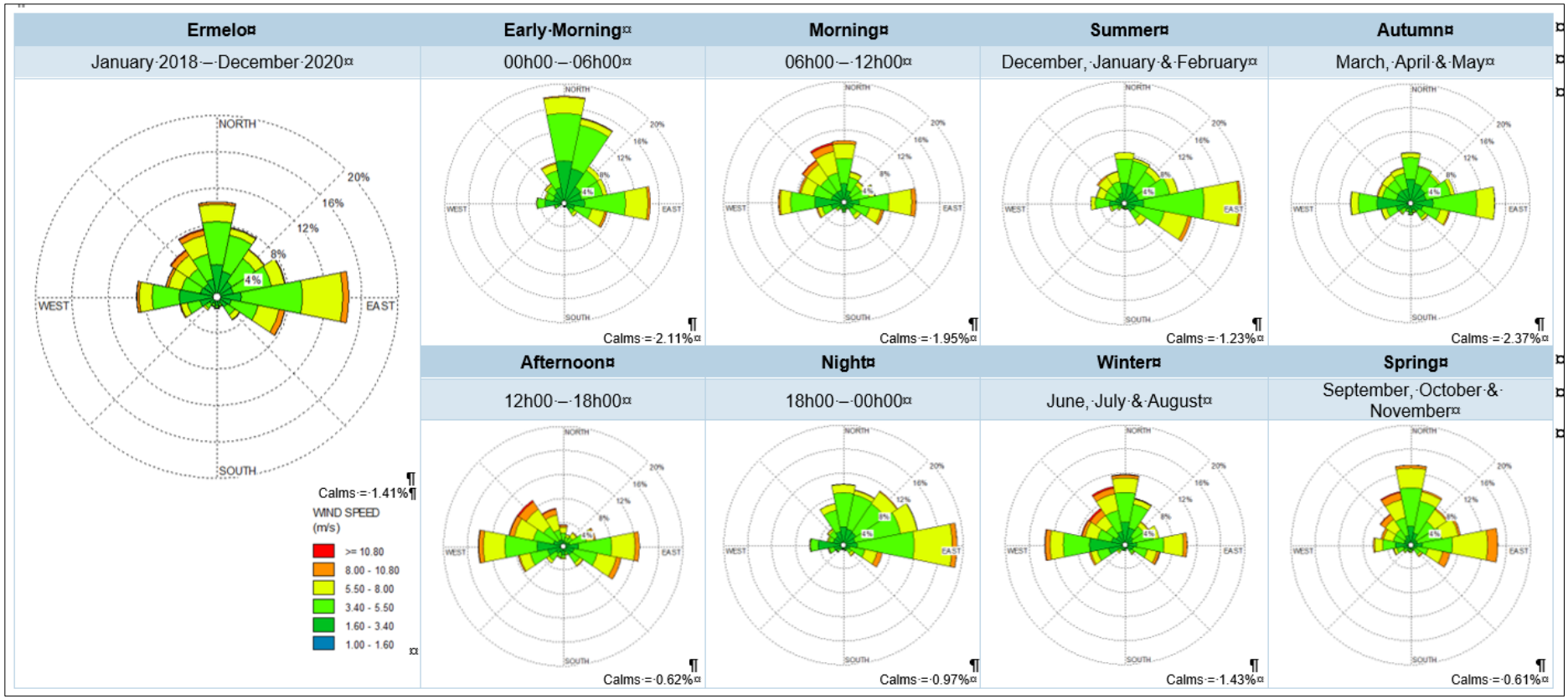


Figure 6-3: Local Wind Conditions at Ermelo

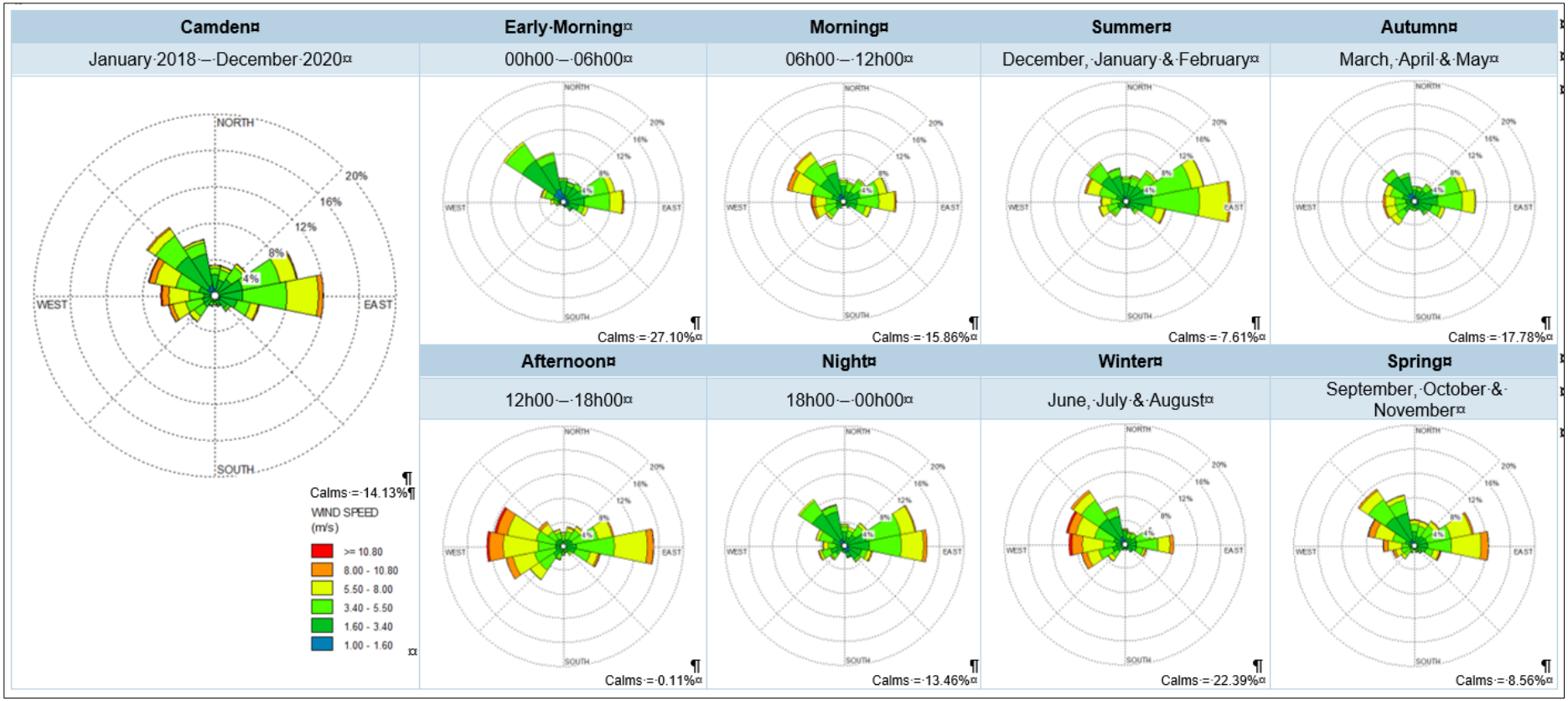


Figure 6-4: Local Wind Conditions at Camden

6.1.2 TOPOGRAPHY

The following is extracted from the Visual Impact Assessment, compiled by SLR Consulting (Pty) Ltd (April, 2022) and included as ***AppendixF-8.***

The site proposed for the Camden 1 WEF development and associated grid connection infrastructure is located in an area 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. The main water course in the broader study area (not within the proposed facility footprint) is the Vaal River in the south-eastern portion of the study area.

Gently undulating terrain prevails across much of the WEF 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** and **Figure 6-6**.

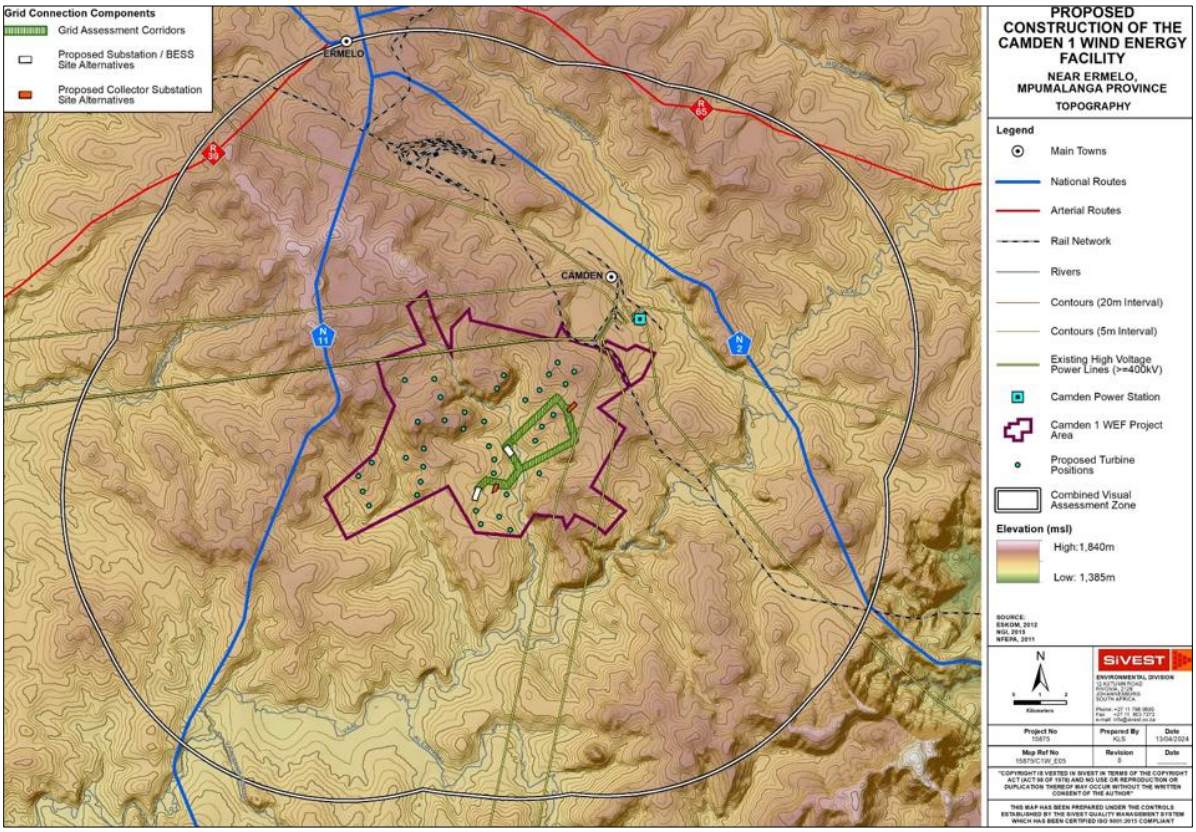


Figure 6-5: Topographical map of the combined study area, showing grid assessment corridors in green

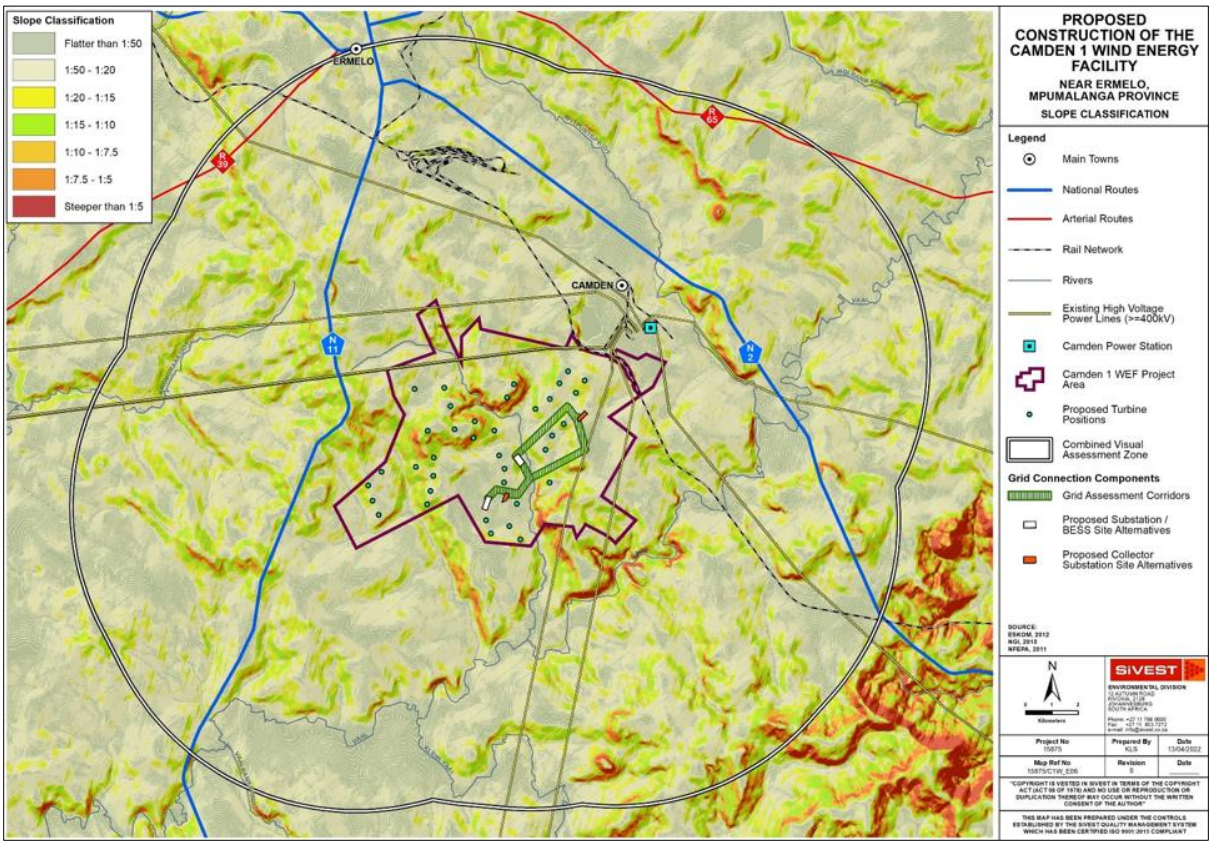


Figure 6-6: Slope classification of Project Area, showing grid assessment corridors in green.

6.1.3 GEOLOGY

The following is extracted from the Palaeontological Impact Assessment (Phase 2), compiled by Professor Marion Bamford (May,2022) and included as ***Appendix F-5.***

The site lies in the northern part of the Karoo basin where the older Karoo Supergroup strata are exposed (**Figure 6-7)**. Along the rivers and streams much younger reworked sands and alluvium overly the older strata. Extrusive dolerite of Jurassic age is abundant. The Karoo Supergroup rocks cover a very large proportion of South Africa and extend from the northeast (east of Pretoria) to the southwest and across to almost the KwaZulu Natal south coast. It is bounded along the southern margin by the Cape Fold Belt and along the northern margin by the much older Transvaal Supergroup rocks. Representing some 120 million years (300 – 183Ma), the Karoo Supergroup rocks have preserved a diversity of fossil plants, insects, vertebrates and invertebrates.

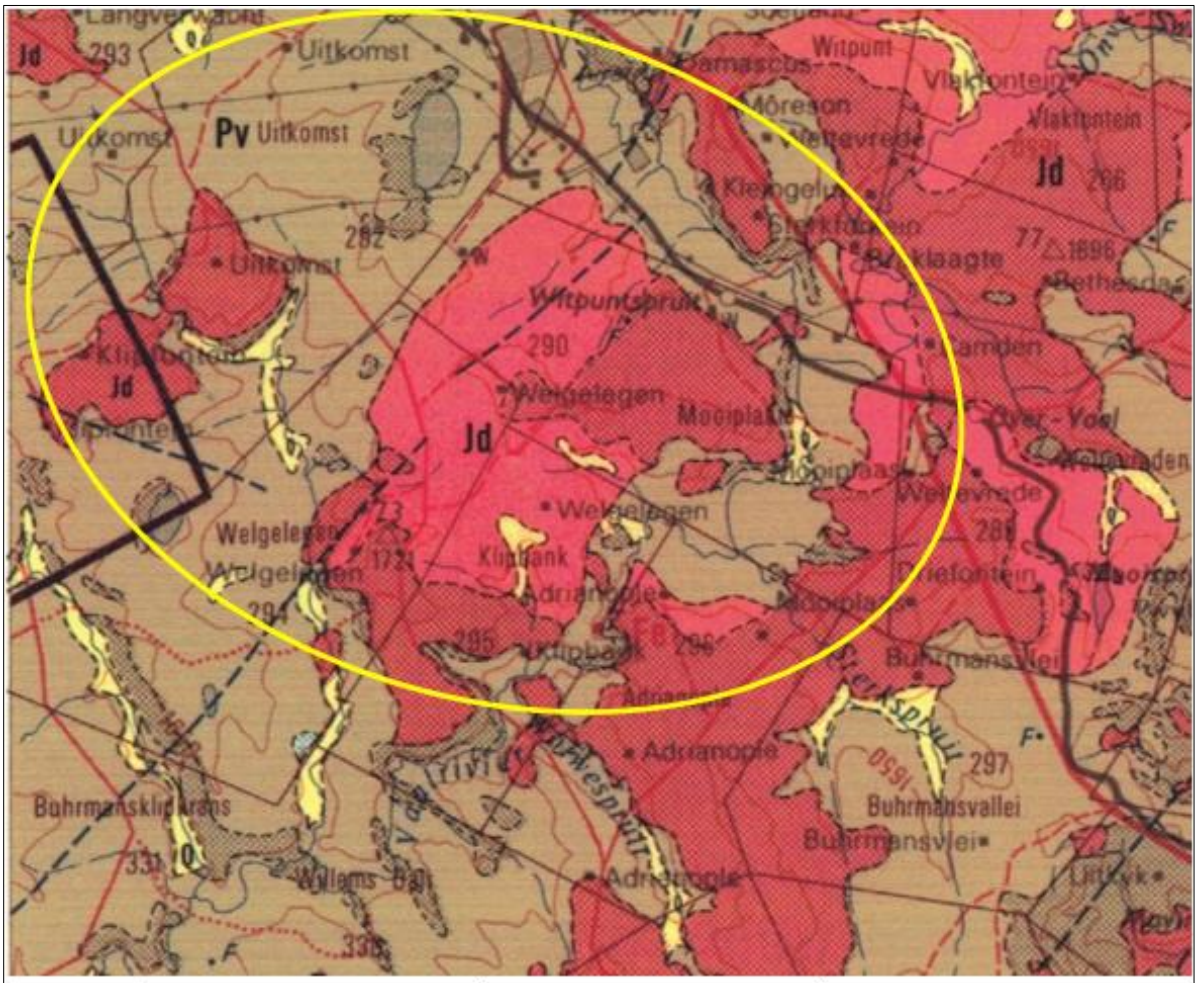
The Karoo Supergroup rocks cover a very large proportion of South Africa and extend from the northeast (east of Pretoria) to the southwest and across to almost the KwaZulu Natal south coast. It is bounded along the southern margin by the Cape Fold Belt and along the northern margin by the much older Transvaal Supergroup rocks. Representing some 120 million years (300 – 183Ma), the Karoo Supergroup rocks have preserved a diversity of fossil plants, insects, vertebrates and invertebrates.

During the Carboniferous Period South Africa was part of the huge continental landmass known as Gondwanaland and it was positioned over the South Pole. As a result, there were several ice sheets that formed and melted, and covered most of South Africa. Gradual melting of the ice as the continental mass moved northwards and the earth warmed, formed fine-grained sediments in the large inland sea. These are the oldest rocks in the system and are exposed around the outer part of the ancient Karoo Basin and are known as the Dwyka Group.

Overlying the Dwyka Group rocks are rocks of the Ecca Group that are Early Permian in age. There are eleven formations recognised in this group, but they do not all extend throughout the Karoo Basin. In the Free State, Mpumalanga and KwaZulu Natal, from the base upwards are the Pietermaritzburg Formation, Vryheid Formation and the Volksrust Formation. All of these sediments have varying proportions of sandstones, mudstones, shales

and siltstones and represent shallow to deep water settings, deltas, rivers, streams and overbank depositional environments.

Overlying the Ecca Group are the rocks of the Beaufort Group that has been divided into the lower Adelaide Subgroup for the Upper Permian strata, and the Tarkastad Subgroup for the Early to Middle Triassic strata. As with the older Karoo sediments, the formations vary across the Karoo Basin. Large exposures of Jurassic dolerite dykes occur throughout the area. These intruded through the Karoo sediments around 183 million years ago at about the same time as the Drakensberg basaltic eruption. Along the rivers and streams much younger transported sediments have been deposited. They were sourced from older weathered strata upstream.



Symbol	Group/Formation	Lithology	Approximate Age
Q	Quaternary	Alluvium, sand, calcrete	Neogene, ca 2.5 Ma to present
Jd	Jurassic dykes	Dolerite dykes, intrusive	Jurassic, approx. 180 Ma
Pv	Vryheid Fm, Ecca Group, Karoo SG	Shales, siltstone, sandstone, coal seams	Early Permian

Figure 6-7: Geological map of the area around the Camden Renewable Energy Cluster with the Camden I WEF area shown within the oval outline

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***

Based on the Land Type information, the site is located in Land Types Ca3 and BA51. 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 6-8: Satellite image map of all proposed alternative powerline routes (light blue lines) and alternative substation sites (dark blue outlines)

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****.*

There is one regional vegetation type occurring in the study area, namely Eastern Highveld Grassland. The vegetation types that occur in the study area and nearby areas are briefly described below.

EASTERN HIGHVELD GRASSLAND

DISTRIBUTION

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 AND 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*).

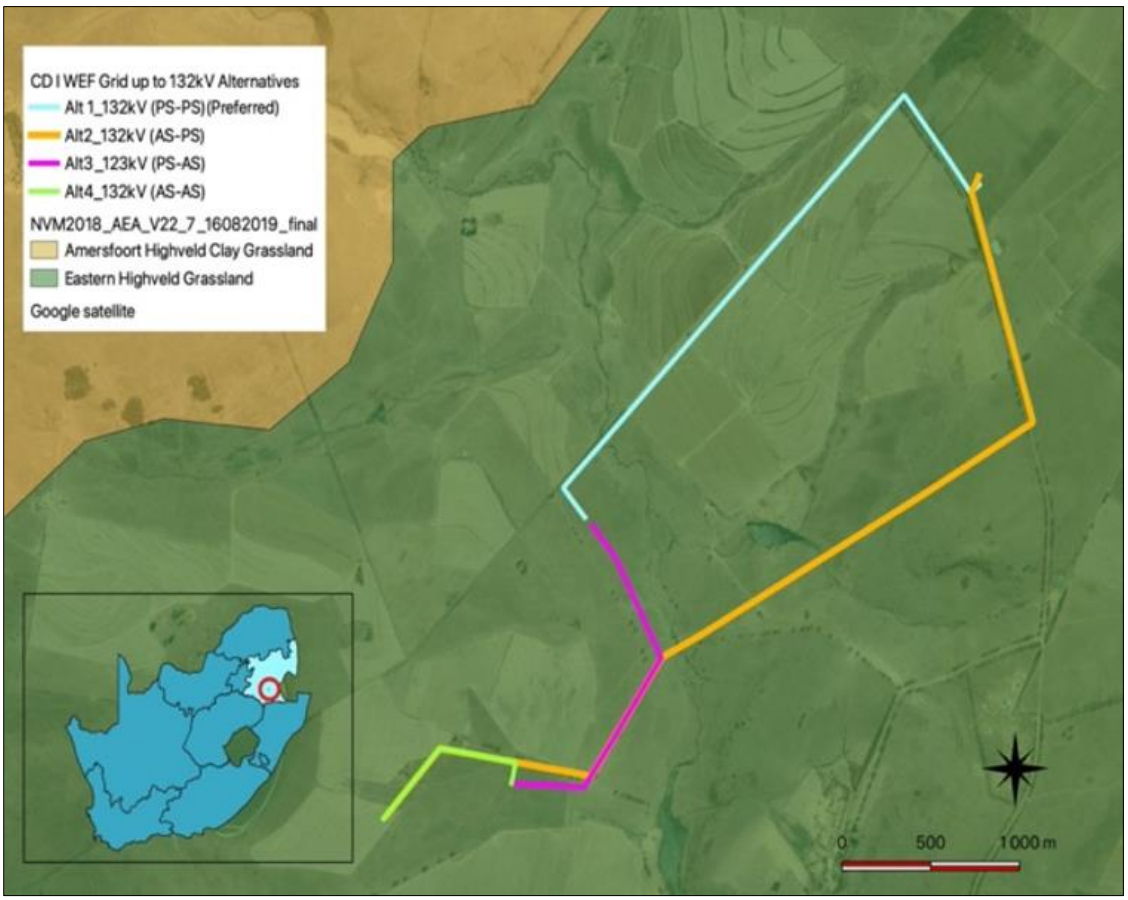


Figure 6-9: Regional vegetation types of the study area

Figure 6-9 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 6-3: 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, 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 6-10,** as determined by best available scientific approaches. 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 6-4**, Eastern Highvbeld Grassland is listed as Endangered.

Determining ecosystem status (Driver *et al*., 2005). *BT = biodiversity target (the minimum conservation requirement).

Habitat remaining (%)			
80–100	least threatened	LT
60–80	vulnerable	VU
*BT–60	endangered	EN
0–*BT	critically endangered	CR

Figure 6-10: Ecosystem Status (Driver et al., 2005)

Table 6-4: 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 (**Table 6-4**). This covers the entire site (**Figure 6-11**). It spatially co-incides partially with Eastern Highveld Grassland, but is defined on different criteria.

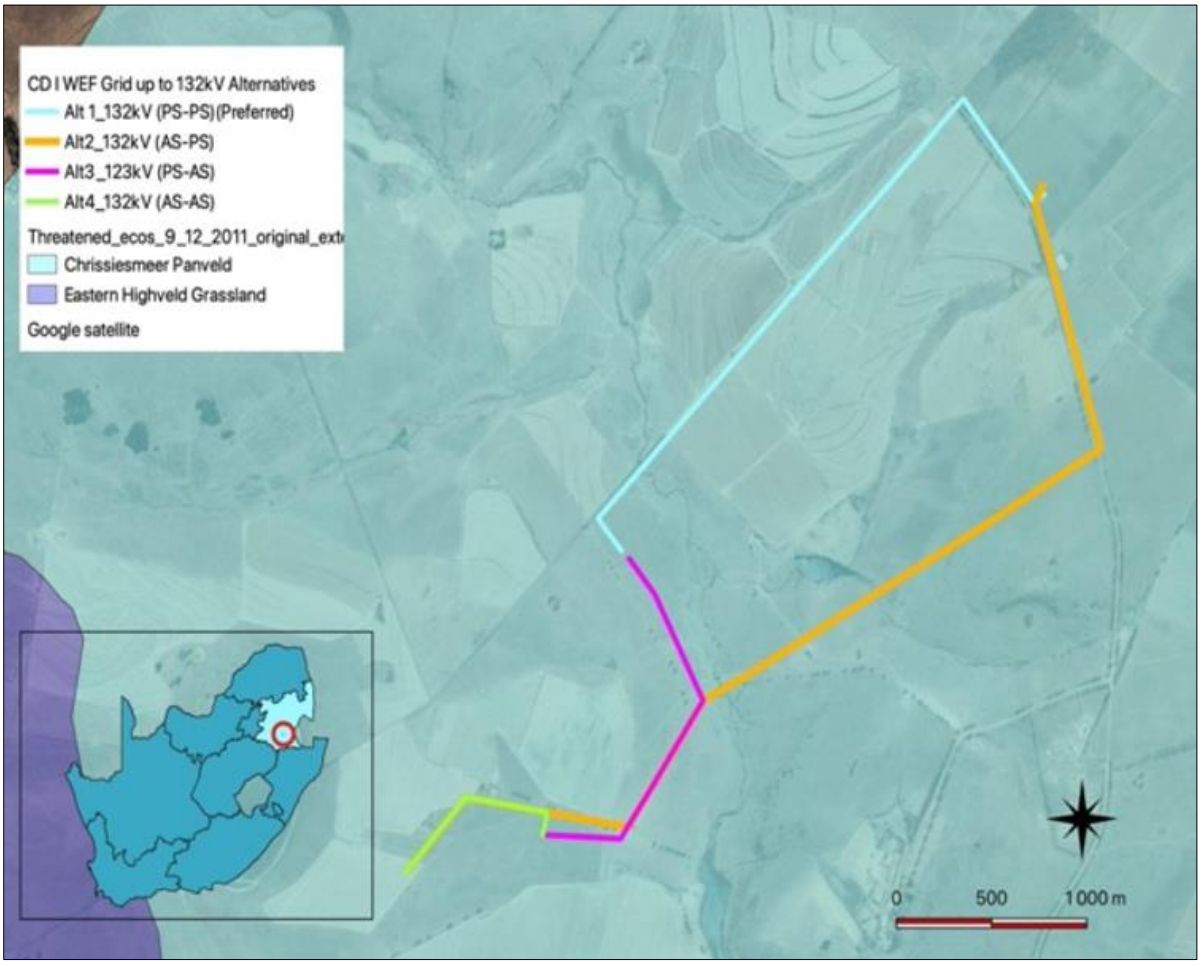


Figure 6-11: Distribution of listed ecosystems relative to the site

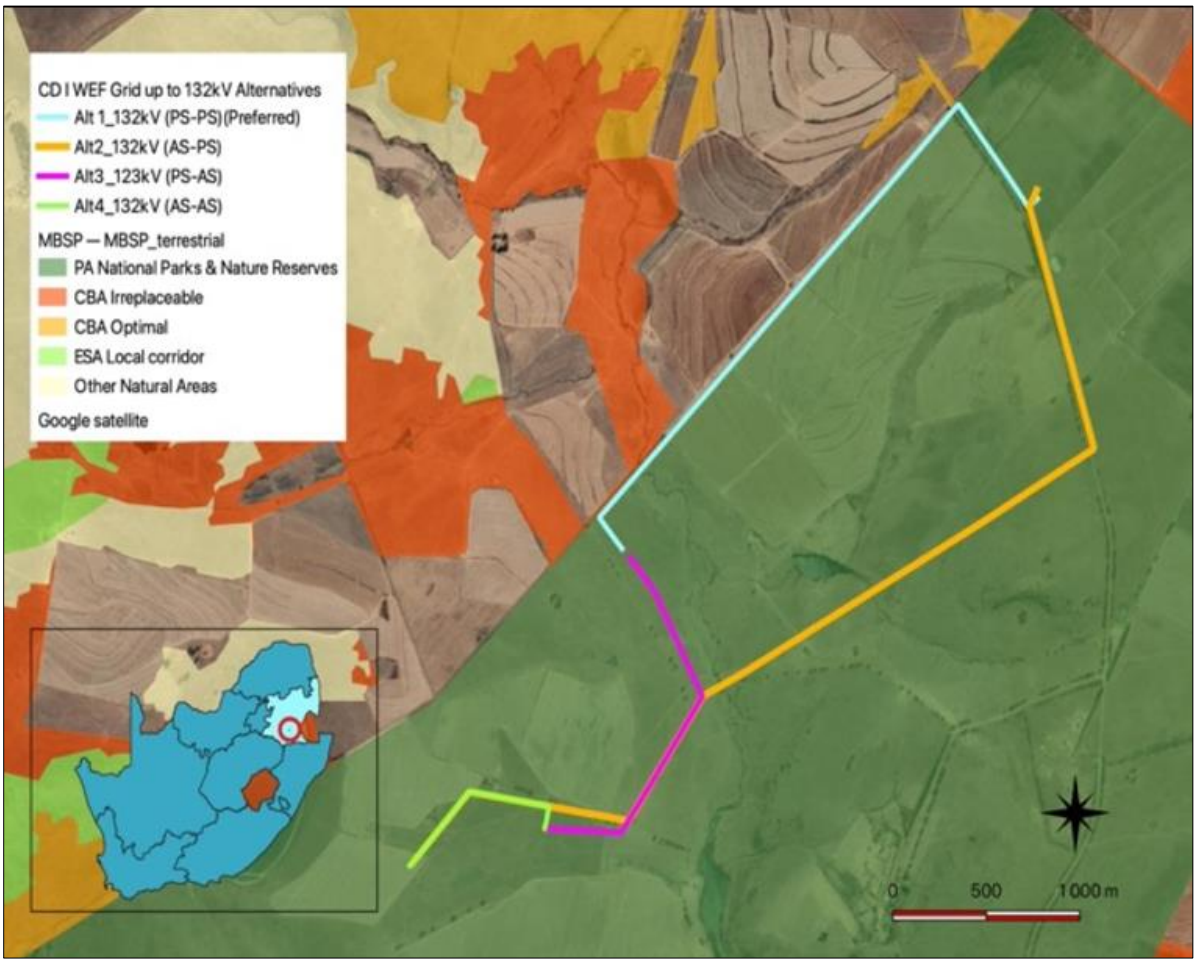


Figure 6-12: Mpumalanga CBA map for the study area

The part of the site shown as a Protected Area occupies the parts of the site on the Farm Welgelegen 322 IT (green area in **Figure 6-12**). This is the Langcarel Private Nature Reserve, proclaimed in 1967. This is not being managed as a nature reserve and 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. No evidence was observed on site of any conservation activities during the field assessment.

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).

HABITATS ON SITE

A map of habitats within the study area is provided in **Figure 6-13**. 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 6-13: 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 five 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 Critical Biodiversity Area (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 6-12**).

- 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 6-14**.

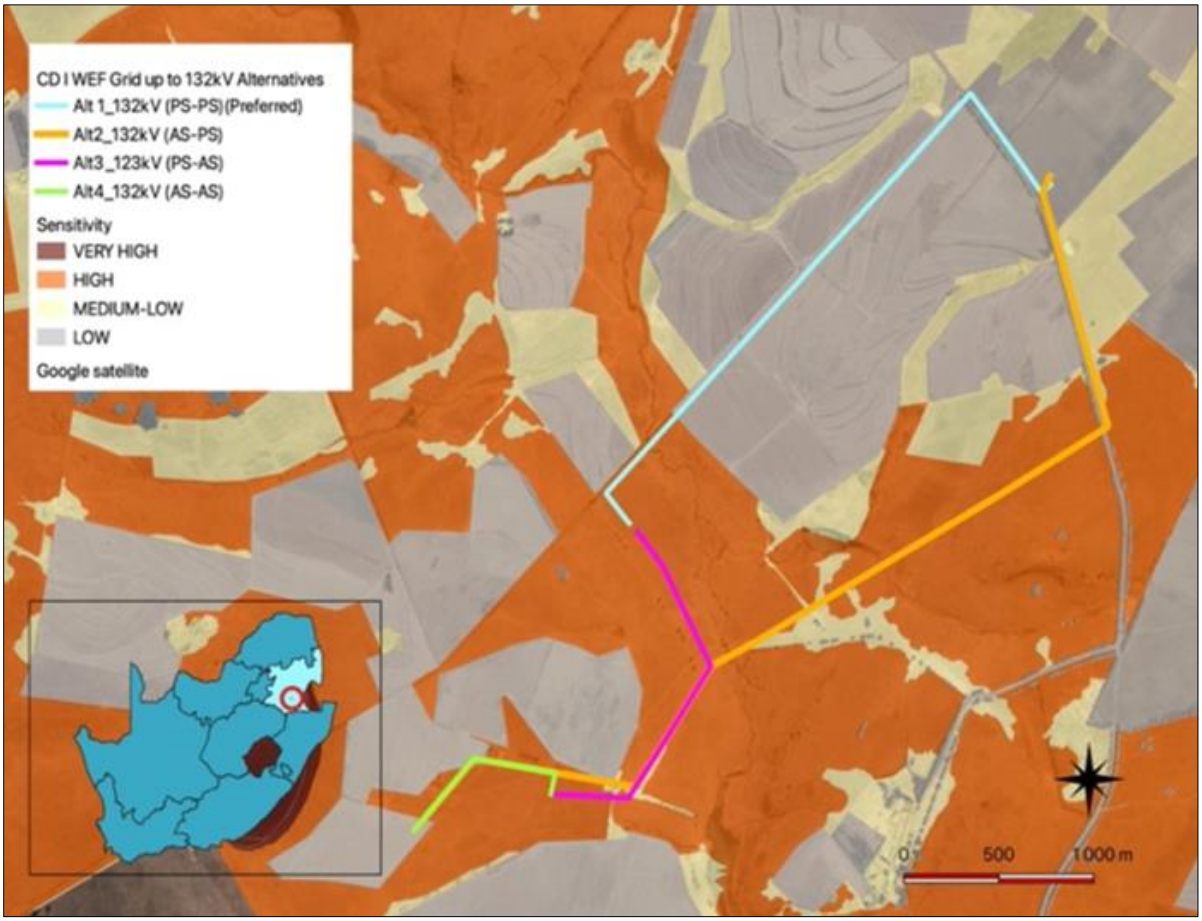


Figure 6-14: Habitat sensitivity of the study area, including consideration of CBAs

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 (**Table 6-5**).

Table 6-5: Additional listed plant species for the study area

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)
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**

TAXON	RED LIST STATUS	HABITAT AND DISTRIBUTION	FLOWERING TIME	PROBABILITY OF OCCURRENCE
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
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) 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, is given in Appendix 2 of the Terrestrial Plant Species report.

There are several species recorded on site that are protected under the Mpumalanga Nature Conservation Act No. 10 of 1998 (Appendix 3). 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 Plant Species Assessment, compiled by David Hoare Consulting (Pty) Ltd (September, 2022) and included as ***Appendix F-2****.*

LISTED SPECIES THAT OCCUR ON SITE

The following species have been flagged for the site in the DFFE Screening Tool Report and is summarised in **Table 6-6**.

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 can 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. It depends on moist habitats and the calculation of extent of occurrence uses wetland habitats as a proxy for suitable habitat. 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 be affected by construction activities. Due to it being rare, the likelihood of detecting this species during a short field survey, even with suitable trapping methods, is relatively low.

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.

Table 6-6: Animal species flagged for the site in the DFFE Screening Tool Report

SCIENTIFIC NAME	COMMON NAME	STATUS	LIKELIHOOD OF OCCURRENCE
Ourebia ourebi	Oribi	Endangered	Low
Pelea capreolus	Grey Rhebok	Near Threatened, protected	Medium
Felis nigripes	Black-footed Cat	Vulnerable, protected	High
Panthera pardus	Leopard	Vulnerable, protected	Low
Aonyx capensis	Cape Clawless Otter	Near Threatened, protected	Medium
Hydrictus maculicollis	Spotted-necked Otter	Vulnerable, protected	Medium
Poecilogale albinucha	African Striped Weasel	Near Threatened	Medium
Parahyaena brunnea	Brown hyaena	Near Threatened	Low
Atelerix frontalis	South African Hedgehog	Near Threatened, protected	High
Crocidura maquassiensis	Maquassie Musk Shrew	Vulnerable	Low
Crocidura mariquensis	Swamp Musk Shrew	Near Threatened	High
Amblysomus septentrionalis	Highveld Golden Mole	Near Threatened	Medium
Mystromys albicaudatus	White-tailed Rat	Vulnerable	Low
Otomys auratus	Vlei Rat	Near Threatened	High

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. 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 (**Table 6-7**).

Table 6-7: All threatened (Critically Endangered, Endangered or Vulnerable) or near threatened vertebrate animals that could occur in the study area

LISTED SPECIES	DESCRIPTION
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 habitat. It is likely to move away from the path of any construction and development of parts of the study area.
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 could occur there.
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 km2 and females 20 km2. 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 *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**.

LISTED SPECIES	DESCRIPTION
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 *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 *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 *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 *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 *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.**

LISTED SPECIES	DESCRIPTION
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 *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 (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 *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 *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 north-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.

LISTED SPECIES	DESCRIPTION
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 occurs 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 *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.
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. 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

The following protected species were identified:

- Black Wildebeest (does not occur on site),
- Oribi (unlikely to occur on site),
- White Rhinoceros (does not 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 terrestrial animals species report). 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 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 5km from the site to the west. The Grasslands IBA SA020 is located 6-7km to the east of the site. The Chrissies Pans IBA SA019 is located 16-17km 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:

- Secretary bird
- Pied Avocet
- 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
- White-winged Tern

BIRD HABITAT

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 influence 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 area comprises grassland. The grassland varies from dense stands of relatively high grass to areas of heavily grazed short grass.

Table 6-8: Bird species that could potentially occur within the grassland habitat

GRASSLAND

Wind Priority Species	– 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 – 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
Powerline Priority Species	– Denham's Bustard – Martial Eagle – Black Harrier – Cape Vulture – Black-bellied Bustard – Brown Snake Eagle – Peregrine Falcon – Montagu's Harrier – Yellow-billed Kite – Northern Black Korhaan

DRAINAGE LINES AND WETLANDS

There are several wetlands in the project area, most of which are associated with drainage lines. Wetlands are characterised by static or slow flowing water and are extensively covered by tall emergent wetland vegetation.

Table 6-9: Bird species that could potentially occur within the drainage lines and wetlands habitat

DRAINAGE LINES AND WETLANDS

Wind Priority Species	– Blue Crane – Grey Crowned Crane – African Grass Owl – Marsh Owl – African Marsh Harrier – Wattled Crane
Powerline Priority Species	– African Grass Owl – Blue Crane – Grey Crowned Crane – Hamerkop – African Black Duck – Great Egret – Intermediate Egret – Little Egret – Glossy Ibis – Hadada Ibis – Marsh Owl – 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:

Table 6-10: Bird species that could potentially occur within the agricultural habitat

AGRICULTURAL LANDS

Wind Priority Species	– Blue Crane – Grey Crowned Crane – Common Buzzard – Spotted Eagle-Owl – Amur Falcon – Lanner Falcon – Southern Bald Ibis – Black-winged Kite – Peregrine Falcon – African Marsh Harrier – Montagu's Harrier – Wattled Crane – Black Harrier – Black-bellied Bustard

	— Denham's Bustard — Brown Snake Eagle — Martial Eagle — Northern Black Korhaan — Cape Vulture
Powerline Priority Species	— Amur Falcon — Blue Crane — Egyptian Goose — Grey Crowned Crane — Helmeted Guineafowl — Lanner Falcon — Southern Bald Ibis — Spur-winged Goose — Black-bellied Bustard — Brown Snake Eagle — Cape Vulture — Denham's Bustard — Martial Eagle — Montagu's Harrier — Northern Black Korhaan — Peregrine Falcon — Wattled Crane — Yellow-billed Kite

ALIEN TREES

The development area 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.

Table 6-11: Bird species that could potentially occur within alien trees

ALIEN TREES

Wind Priority Species	— Grey Crowned Crane — Common Buzzard — Spotted Eagle-Owl — Amur Falcon — Lanner Falcon — Southern Bald Ibis — Black-winged Kite — Jackal Buzzard — Black-chested Snake Eagle — Long-crested Eagle — African Harrier-Hawk — Black Sparrowhawk — African Fish Eagle — Peregrine Falcon — Brown Snake Eagle — Martial Eagle — Cape Vulture

DAMS

There are many ground dams at the project site, located in drainage lines.

Table 6-12: Bird species that could potentially occur within dams

DAMS

Wind Priority Species	– African Fish Eagle – Western Osprey
Powerline Priority Species	– African Darter – African Sacred Ibis – African Swamphen – Common Moorhen – Egyptian Goose – Great Egret – Grey Heron – Hamerkop – Intermediate Egret – Little Egret – Little Grebe – Purple Heron – Red-billed Teal – Red-knobbed Coot – Reed Cormorant – South African Shelduck – Southern Pochard – Spur-winged Goose – White Stork – White-breasted Cormorant – Black Heron – Black-crowned Night Heron – Black-necked Grebe – Blue-billed Teal – Cape Teal – Goliath Heron – Mallard – Squacco Heron – Western Osprey

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 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.

Table 6-13: Bird species that could potentially occur within pans

PANS

Wind Priority Species	– Common Buzzard – Jackal Buzzard – Blue Crane – Black-chested Snake Eagle – Long-crested Eagle – Lanner Falcon – Greater Flamingo – Lesser Flamingo – African Harrier-Hawk – Brown Snake Eagle – Martial Eagle – Peregrine Falcon – African Marsh Harrier – Montagu's Harrier – Black Harrier – Cape Vulture – Black-bellied Bustard – Denham's Bustard – Wattled Crane – Northern Black Korhaan – Western Osprey
Powerline Priority Species	– Black-chested Snake Eagle – Blue Crane – Egyptian Goose – Greater Flamingo – Grey Crowned Crane – Hamerkop – Lanner Falcon – Lesser Flamingo – Red-knobbed Coot – Secretary bird – South African Shelduck – Brown Snake Eagle – Cape Teal – Cape Vulture – Mallard – Martial Eagle – Peregrine Falcon – Yellow-billed Kite

The project area is transected by several high voltage lines which originating at the nearby Camden power station and substation. High voltage lines are used by a variety of avifauna for perching, roosting and in some cases, breeding These include raptors, vultures, ibis and also cranes.

Table 6-14: Bird species that could potentially occur on high voltage lines

HIGH VOLTAGE LINES

Wind Priority Species	— African Fish Eagle — Amur Falcon — Black-chested Snake Eagle — Black-winged Kite — Common Buzzard — Grey Crowned Crane — Lanner Falcon — Long-crested Eagle — Southern Bald Ibis — Brown Snake Eagle — Cape Vulture — Martial Eagle — Peregrine Falcon
Powerline Priority Species	— Amur Falcon — Black-chested Snake Eagle — Black-winged Kite — Cape Crow — Common Buzzard — Jackal Buzzard — Lanner Falcon — Long-crested Eagle — Pied Crow — Rock Kestrel — Southern Bald Ibis — Brown Snake Eagle — Cape Vulture — Martial Eagle — Peregrine Falcon — Western Osprey

SOUTH AFRICAN BIRD ATLAS PROJECT 2

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 6-15** 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 6-15: Wind priority species potentially occurring at the project area

SPECIES NAME	SCIENTIFIC NAME	SABAP2 REPORTING RATE		STATUS			RECORDED DURING MONITORING	LIKELIHOOD OF REGULAR OCCURRENCE	HABITAT							IMPACTS				
		FULL PROTOCOL	AD HOC PROTOCOL	GLOBAL STATUS	REGIONAL STATUS	IBA TRIGGER SPECIES			GRASSLAND	DRAINAGE LINES & WETLANDS	ALIEN TREES	PANS	AGRICULTURE	DAMS	HV LINES	COLLISION WITH TURBINES	DISPLACEMENT - HABITAT TRANSFORMATION	DISPLACEMENT - DISTURBANCE	ELECTROCUTION MV LINES	COLLISION MV LINES
African Fish Eagle	*Haliaeetus vocifer*	12.12	0.88	-	-		x	H			x			x	x	x			x	
African Grass Owl	*Tyto capensis*	2.42	0.00	-	VU	x	x	M	x	x						x	x	x	x	x
African Harrier-Hawk	*Polyboroides typus*	11.52	1.76	-	-		x	M	x		x	x				x			x	
African Marsh Harrier	*Circus ranivorus*	0.61	0.00	-	EN	x		L	x	x		x				x			x	
Amur Falcon	*Falco amurensis*	29.09	6.61	-	-		x	H	x		x		x		x	x				
Black Harrier	*Circus maurus*	0.00	0.88	EN	EN	x		L	x			x				x			x	
Black Sparrowhawk	*Accipiter melanoleucus*	12.12	0.88	-	-		x	M	x		x					x			x	
Black-bellied Bustard	*Lissotis melanogaster*	0.61	0.00	-	-			L	x							x	x	x		x
Black-chested Snake Eagle	*Circaetus pectoralis*	3.03	0.44	-	-		x	M	x		x	x			x	x			x	

SPECIES NAME	SCIENTIFIC NAME	SABAP2 REPORTING RATE		STATUS			RECORDED DURING MONITORING	LIKELIHOOD OF REGULAR OCCURRENCE	HABITAT							IMPACTS				
		FULL PROTOCOL	AD HOC PROTOCOL	GLOBAL STATUS	REGIONAL STATUS	IBA TRIGGER SPECIES			GRASSLAND	DRAINAGE LINES & WETLANDS	ALIEN TREES	PANS	AGRICULTURE	DAMS	HV LINES	COLLISION WITH TURBINES	DISPLACEMENT - HABITAT TRANSFORMATION	DISPLACEMENT - DISTURBANCE	ELECTROCUTION MV LINES	COLLISION MV LINES
Black-winged Kite	*Elanus caeruleus*	60.61	12.78	-	-		x	H	x		x		x		x	x			x	
Black-winged Lapwing	*Vanellus melanopterus*	14.55	0.00	-	-		x	H	x							x	x			
Blue Crane	*Grus paradisea*	11.52	0.44	VU	NT	x	x	H	x	x		x	x			x	x	x		x
Blue Korhaan	*Eupodotis caerulescens*	6.06	0.00	NT	LC	x	x	M	x							x	x	x		x
Brown Snake Eagle	*Circaetus cinereus*	1.82	0.00	-	-			L	x		x	x			x	x			x	
Buff-streaked Chat	*Campicoloides bifasciatus*	5.45	0.44	-	-	x		M	x								x	x		
Cape Vulture	*Gyps coprotheres*	0.00	0.00	EN	EN		x	L	x		x	x			x	x			x	x
Common Buzzard	*Buteo buteo*	27.88	9.25	-	-		x	H	x		x	x	x		x	x			x	
Denham's Bustard	*Neotis denhami*	1.82	0.00	NT	VU	x		L	x							x	x	x		x
Greater Flamingo	*Phoenicopterus roseus*	3.64	4.41	-	NT	x	x	M				x				x				x

SPECIES NAME	SCIENTIFIC NAME	SABAP2 REPORTING RATE		STATUS			RECORDED DURING MONITORING	LIKELIHOOD OF REGULAR OCCURRENCE	HABITAT							IMPACTS				
		FULL PROTOCOL	AD HOC PROTOCOL	GLOBAL STATUS	REGIONAL STATUS	IBA TRIGGER SPECIES			GRASSLAND	DRAINAGE LINES & WETLANDS	ALIEN TREES	PANS	AGRICULTURE	DAMS	HV LINES	COLLISION WITH TURBINES	DISPLACEMENT - HABITAT TRANSFORMATION	DISPLACEMENT - DISTURBANCE	ELECTROCUTION MV LINES	COLLISION MV LINES
Grey Crowned Crane	*Balearica regulorum*	5.45	0.00	EN	EN	x	x	M	x	x	x		x		x	x	x	x	x	x
Grey-winged Francolin	*Scleroptila afra*	27.27	2.20	-	-		x	H	x							x	x	x		
Jackal Buzzard	*Buteo rufofuscus*	19.39	2.20	-	-		x	H	x		x	x				x			x	
Lanner Falcon	*Falco biarmicus*	7.27	0.00	-	VU	x	x	M	x		x	x	x		x	x			x	
Lesser Flamingo	*Phoeniconaias minor*	3.64	1.32	NT	NT	x	x	M				x				x				x
Long-crested Eagle	*Lophaetus occipitalis*	6.67	9.25	-	-		x	M	x		x	x			x	x			x	
Marsh Owl	*Asio capensis*	5.45	0.44	-	-		x	H	x	x						x	x	x	x	x
Martial Eagle	*Polemaetus bellicosus*	2.42	0.00	EN	EN	x	x	L	x		x	x			x	x			x	
Montagu's Harrier	*Circus pygargus*	1.21	0.00	-	-			L	x	x		x				x			x	
Northern Black Korhaan	*Afrotis afraoides*	0.61	0.00	-	-			L	x							x	x	x		x

SPECIES NAME	SCIENTIFIC NAME	SABAP2 REPORTING RATE		STATUS			RECORDED DURING MONITORING	LIKELIHOOD OF REGULAR OCCURRENCE	HABITAT							IMPACTS				
		FULL PROTOCOL	AD HOC PROTOCOL	GLOBAL STATUS	REGIONAL STATUS	IBA TRIGGER SPECIES			GRASSLAND	DRAINAGE LINES & WETLANDS	ALIEN TREES	PANS	AGRICULTURE	DAMS	HV LINES	COLLISION WITH TURBINES	DISPLACEMENT - HABITAT TRANSFORMATION	DISPLACEMENT - DISTURBANCE	ELECTROCUTION MV LINES	COLLISION MV LINES
Peregrine Falcon	*Falco peregrinus*	1.21	0.00	-	-		x	L	x		x	x	x		x	x			x	
Secretarybird	*Sagittarius serpentarius*	13.33	0.00	EN	VU	x	x	H	x							x	x			x
Southern Bald Ibis	*Geronticus calvus*	23.03	3.08	VU	VU	x	x	H	x		x		x		x	x			x	x
Spotted Eagle-Owl	*Bubo africanus*	9.09	0.88	-	-		x	H	x		x		x			x		x	x	x
Wattled Crane	*Grus carunculata*	0.61	0.00	VU	CR	x		L		x						x				x
Western Osprey	*Pandion haliaetus*	0.61	0.00	-	-			L						x		x			x	
White Stork	*Ciconia ciconia*	7.27	1.32	-	-		x	M	x							x				x
White-bellied Bustard	*Eupodotis senegalensis*	7.88	0.00	-	VU	x	x	M	x							x	x	x		x

Table 6-16: Powerline sensitive species potentially occurring at the project area

SPECIES NAME	SCIENTIFIC NAME	SABAP2 REPORTING RATE		STATUS			RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE	HABITAT							IMPACTS			
		SABAP2 PROTOCOL FULL	SABAP2 PROTOCOL AD HOC REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	IBA TRIGGER SPECIES			GRASSLAND	DRAINAGE LINES AND WETLANDS	DAMS	PANS	ALIEN TREES	HV LINES	AGRICULTURE	COLLISIONS: POWERLINE	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT	ELECTROCUTIONS: SUBSTATION AND MV
African Black Duck	*Anas sparsa*	11	0	-	-		x	H		x						x			
African Darter	*Anhinga rufa*	16	2.2	-	-		x	H			x		x			x			
African Fish Eagle	*Haliaeetus vocifer*	12	0.9	-	-		x	H					x						x
African Grass Owl	*Tyto capensis*	2.4	0	-	VU		x	M	x	x						x	x	x	x
African Harrier-Hawk	*Polyboroides typus*	12	1.8	-	-		x	M	x				x						
African Marsh Harrier	*Circus ranivorus*	0.6	0	-	EN			L		x									
African Sacred Ibis	*Threskiornis aethiopicus*	48	6.2	-	-		x	H			x		x			x			
African Spoonbill	*Platalea alba*	16	2.2	-	-		x	H								x			
African Swamphen	*Porphyrio madagascariensis*	6.1	2.2	-	-		x	M			x								
Amur Falcon	*Falco amurensis*	29	6.6	-	-		x	H	x				x	x	x				x

SPECIES NAME	SCIENTIFIC NAME	SABAP2 REPORTING RATE		STATUS			RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE	HABITAT							IMPACTS			
		SABAP2 FULL PROTOCOL	SABAP2 AD HOC PROTOCOL REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	IBA TRIGGER SPECIES			GRASSLAND	DRAINAGE LINES AND WETLANDS	DAMS	PANS	ALIEN TREES	HV LINES	AGRICULTURE	COLLISIONS: POWERLINE	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT	ELECTROCUTIONS: SUBSTATION AND MV
Black Harrier	*Circus maurus*	0	0.9	EN	EN			L	x										
Black Heron	*Egretta ardesiaca*	0.6	0	-	-			L			x					x			
Black Sparrowhawk	*Accipiter melanoleucus*	12	0.9	-	-		x	H					x						x
Black-bellied Bustard	*Lissotis melanogaster*	0.6	0	-	-			L	x						x	x	x	x	
Black-chested Snake Eagle	*Circaetus pectoralis*	3	0.4	-	-		x	M	x			x	x	x					x
Black-crowned Night Heron	*Nycticorax nycticorax*	0.6	0	-	-			L			x					x			
Black-headed Heron	*Ardea melanocephala*	52	4	-	-		x	H	x							x			x
Black-necked Grebe	*Podiceps nigricollis*	0.6	0.4	-	-			L			x					x			
Black-winged Kite	*Elanus caeruleus*	61	13	-	-		x	H	x				x	x					x
Blue Crane	*Grus paradisea*	12	0.4	VU	NT		x	H	x	x		x			x	x	x	x	
Blue Korhaan	*Eupodotis caerulescens*	6.1	0	NT			x	H	x							x	x	x	

SPECIES NAME	SCIENTIFIC NAME	SABAP2 REPORTING RATE		STATUS			RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE	HABITAT							IMPACTS			
		SABAP2 PROTOCOL FULL	SABAP2 PROTOCOL AD HOC REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	IBA TRIGGER SPECIES			GRASSLAND	DRAINAGE LINES AND WETLANDS	DAMS	PANS	ALIEN TREES	HV LINES	AGRICULTURE	COLLISIONS: POWERLINE	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT	ELECTROCUTIONS: SUBSTATION AND MV
Blue-billed Teal	*Spatula hottentota*	1.2	0	-	-			L			x					x			
Brown Snake Eagle	*Circaetus cinereus*	1.8	0	-	-			L	x			x	x	x	x				x
Cape Crow	*Corvus capensis*	18	0.4	-	-		x	H	x				x	x					x
Cape Shoveler	*Spatula smithii*	19	0	-	-		x	H								x			
Cape Teal	*Anas capensis*	3	0	-	-		x	L			x	x				x			
Cape Vulture	*Gyps coprotheres*	0	0	EN	EN		x	L	x			x	x	x	x	x			x
Common Buzzard	*Buteo buteo*	28	9.3	-	-		x	H	x				x	x					x
Common Moorhen	*Gallinula chloropus*	33	1.8	-	-		x	H			x								
Denham's Bustard	*Neotis denhami*	1.8	0	NT	VU			L	x						x	x	x	x	
Egyptian Goose	*Alopochen aegyptiaca*	78	6.2	-	-		x	H			x	x			x	x			
Fulvous Whistling Duck	*Dendrocygna bicolor*	0	0.4	-	-			L								x			

SPECIES NAME	SCIENTIFIC NAME	SABAP2 REPORTING RATE		STATUS			RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE	HABITAT							IMPACTS			
		SABAP2 PROTOCOL FULL	SABAP2 PROTOCOL AD HOC REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	IBA TRIGGER SPECIES			GRASSLAND	DRAINAGE LINES AND WETLANDS	DAMS	PANS	ALIEN TREES	HV LINES	AGRICULTURE	COLLISIONS: POWERLINE	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT	ELECTROCUTIONS: SUBSTATION AND MV
Glossy Ibis	*Plegadis falcinellus*	4.2	1.8	-	-			M		x						x			
Goliath Heron	*Ardea goliath*	2.4	0	-	-			L			x					x			
Great Egret	*Ardea alba*	7.9	1.3	-	-			M		x	x					x			
Greater Flamingo	*Phoenicopterus roseus*	3.6	4.4	-	NT		x	M				x				x			
Grey Crowned Crane	*Balearica regulorum*	5.5	0	EN	EN		x	M	x	x		x	x		x	x	x	x	
Grey Heron	*Ardea cinerea*	25	3.5	-	-		x	H			x					x			
Hadada Ibis	*Bostrychia hagedash*	90	14	-	-		x	H	x	x			x			x			x
Hamerkop	*Scopus umbretta*	12	0	-	-		x	H		x	x	x				x			
Helmeted Guineafowl	*Numida meleagris*	49	3.1	-	-		x	H	x				x		x		x	x	x
Intermediate Egret	*Ardea intermedia*	14	1.8	-	-		x	H		x	x					x			
Jackal Buzzard	*Buteo rufofuscus*	19	2.2	-	-		x	H	x				x	x					x

SPECIES NAME	SCIENTIFIC NAME	SABAP2 REPORTING RATE		STATUS			RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE	HABITAT							IMPACTS			
		SABAP2 FULL PROTOCOL	SABAP2 AD HOC PROTOCOL REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	IBA TRIGGER SPECIES			GRASSLAND	DRAINAGE LINES AND WETLANDS	DAMS	PANS	ALIEN TREES	HV LINES	AGRICULTURE	COLLISIONS: POWERLINE	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT	ELECTROCUTIONS: SUBSTATION AND MV
Lanner Falcon	*Falco biarmicus*	7.3	0	-	VU		x	M	x			x	x	x	x				x
Lesser Flamingo	*Phoeniconaias minor*	3.6	1.3	NT	NT		x	M				x				x			
Little Egret	*Egretta garzetta*	4.2	1.3	-	-			H		x	x					x			
Little Grebe	*Tachybaptus ruficollis*	39	3.1	-	-		x	H			x					x			
Long-crested Eagle	*Lophaetus occipitalis*	6.7	9.3	-	-		x	M	x				x	x					x
Mallard	*Anas platyrhynchos*	0.6	0.4	-	-			L			x	x				x			
Marsh Owl	*Asio capensis*	5.5	0.4	-	-		x	M	x	x						x	x	x	x
Martial Eagle	*Polemaetus bellicosus*	2.4	0	EN	EN		x	L	x			x	x	x	x				x
Montagu's Harrier	*Circus pygargus*	1.2	0	-	-			L	x						x				
Northern Black Korhaan	*Afrotis afraoides*	0.6	0	-	-			L	x						x	x	x	x	
Peregrine Falcon	*Falco peregrinus*	1.2	0	-	-		x	L	x			x	x	x	x				x

SPECIES NAME	SCIENTIFIC NAME	SABAP2 REPORTING RATE		STATUS			RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE	HABITAT							IMPACTS			
		SABAP2 FULL PROTOCOL	SABAP2 AD HOC PROTOCOL REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	IBA TRIGGER SPECIES			GRASSLAND	DRAINAGE LINES AND WETLANDS	DAMS	PANS	ALIEN TREES	HV LINES	AGRICULTURE	COLLISIONS: POWERLINE	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT	ELECTROCUTIONS: SUBSTATION AND MV
Pied Crow	*Corvus albus*	12	3.5	-	-		x	H	x				x	x					x
Purple Heron	*Ardea purpurea*	4.2	0	-	-			M			x					x			
Red-billed Teal	*Anas erythrorhyncha*	17	1.3	-	-		x	H			x					x			
Red-knobbed Coot	*Fulica cristata*	58	4.8	-	-		x	H			x	x				x			
Reed Cormorant	*Microcarbo africanus*	64	4.8	-	-		x	H			x		x			x			
Rock Kestrel	*Falco rupicolus*	5.5	0.9	-	-		x	M					x	x					
Secretarybird	*Sagittarius serpentarius*	13	0	EN	VU		x	H	x			x	x			x	x	x	
South African Shelduck	*Tadorna cana*	30	3.5	-	-		x	H			x	x				x			
Southern Bald Ibis	*Geronticus calvus*	23	3.1	VU	VU		x	H	x				x	x	x	x			x
Southern Pochard	*Netta erythrophthalma*	9.1	0	-	-		x	M			x					x			
Spotted Eagle-Owl	*Bubo africanus*	9.1	0.9	-	-		x	M	x				x			x	x	x	x

SPECIES NAME	SCIENTIFIC NAME	SABAP2 REPORTING RATE		STATUS			RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE	HABITAT							IMPACTS			
		SABAP2 FULL PROTOCOL	SABAP2 AD HOC PROTOCOL REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	IBA TRIGGER SPECIES			GRASSLAND	DRAINAGE LINES AND WETLANDS	DAMS	PANS	ALIEN TREES	HV LINES	AGRICULTURE	COLLISIONS: POWERLINE	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT	ELECTROCUTIONS: SUBSTATION AND MV
Spur-winged Goose	*Plectropterus gambensis*	44	1.8	-	-		x	H			x				x	x			
Squacco Heron	*Ardeola ralloides*	1.2	0	-	-			L			x					x			
Wattled Crane	*Grus carunculata*	0.6	0	VU	CR			L		x					x	x			
Western Barn Owl	*Tyto alba*	3	0.4	-	-			M	x				x			x			x
Western Cattle Egret	*Bubulcus ibis*	45	12	-	-		x	H	x				x			x			
Western Osprey	*Pandion haliaetus*	0.6	0	-	-			L			x		x	x					x
White Stork	*Ciconia ciconia*	7.3	1.3	-	-		x	M	x		x					x			
White-backed Duck	*Thalassornis leuconotus*	6.7	0	-	-		x	M								x			
White-bellied Bustard	*Eupodotis senegalensis*	7.9	0	-	VU		x	M	x							x	x	x	
White-breasted Cormorant	*Phalacrocorax lucidus*	12	0.9	-	-		x	H			x		x			x			
White-faced Whistling Duck	*Dendrocygna viduata*	0.6	0	-	-			L								x			

SPECIES NAME	SCIENTIFIC NAME	SABAP2 REPORTING RATE		STATUS			RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE	HABITAT							IMPACTS			
		SABAP2 PROTOCOL FULL	SABAP2 PROTOCOL AD HOC REPORTING RATE	GLOBAL STATUS	REGIONAL STATUS	IBA SPECIES TRIGGER			GRASSLAND	DRAINAGE LINES AND WETLANDS	DAMS	PANS	ALIEN TREES	HV LINES	AGRICULTURE	COLLISIONS: POWERLINE	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT	ELECTROCUTIONS: SUBSTATION AND MV
Yellow-billed Duck	*Anas undulata*	62	4.4	-	-		x	H								x			
Yellow-billed Kite	*Milvus aegyptius*	2.4	0	-	-		x	L	x			x	x		x				x

6.2.5 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 6-15**). **Table 6-17** provides a summary of the aquatic ecoregion and subregion of the Project area.

Table 6-17: 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

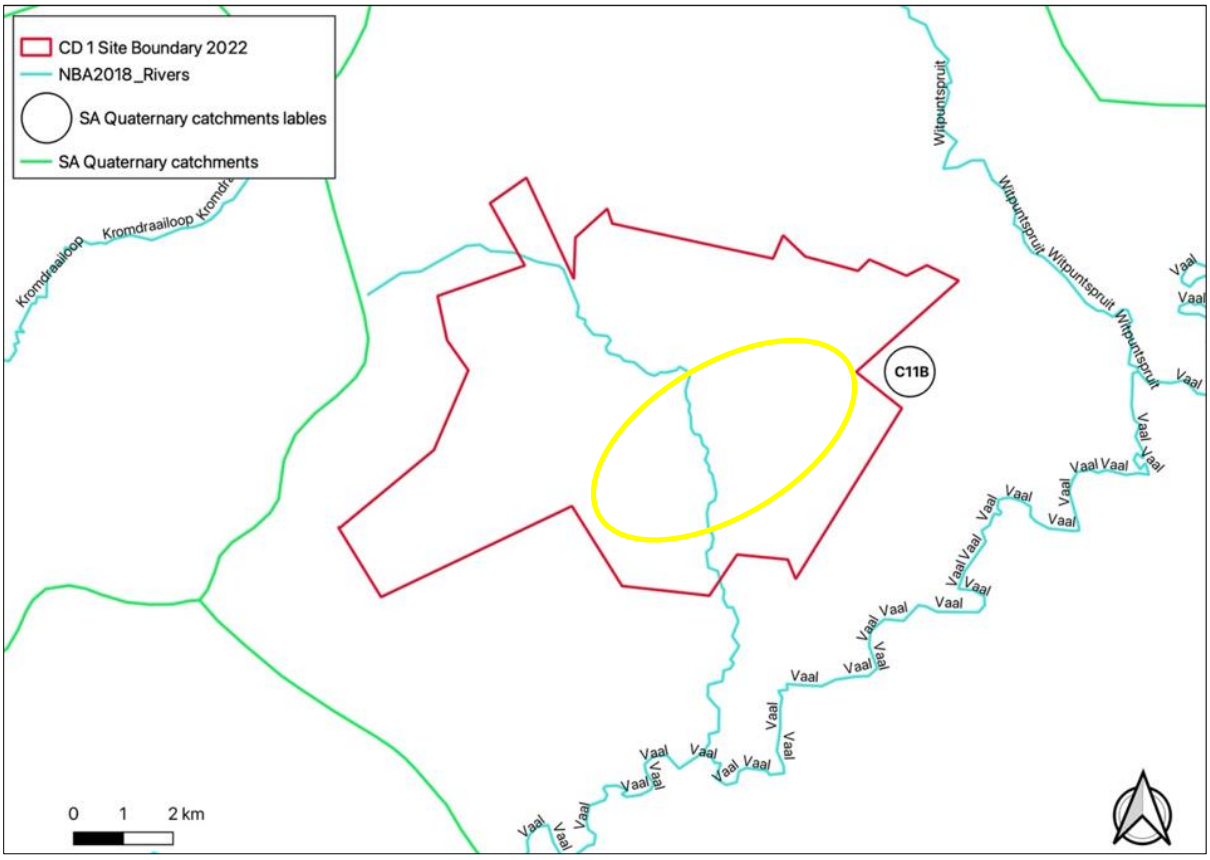


Figure 6-15: Mainstream rivers associated with the broader project area (Approximate location of the Grid Connection indicated by the Yellow Oval)

LOCAL AQUATIC FEATURES

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

- Mainstem Rivers - Floodplain dominated systems with oxbow wetlands (**Figure 6-15**). 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 6-16**)
- Endorheic pans (**Figure 6-17**)
- Seep wetlands (**Figure 6-18**)
- One minor watercourse (**Figure 6-19**), that was previously part of a wetland systems, but now contains severe head cut and has eroded into a channel / watercourse.

Figure 6-16: Wetlands associated with the unknown tributary that bisects the broader study area (West of the Camden I WEF Footprint)

Figure 6-17: Channelled Valley Bottom wetland (Northwest of the Camden I WEF footprint)

Figure 6-18: Endorheic Pan, one of three such large systems within the study area (north and west of the Camden I WEF footprint)

Figure 6-19: A medium sized seep wetland within the central portion of the site (immediately west and south of the Camden I WEF footprint)

Figure 6-20: A view of a minor water course, with a view of an earth wall farm dam upstream (west of the Camden I WEF 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 6-21**), 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 6-22**).

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).

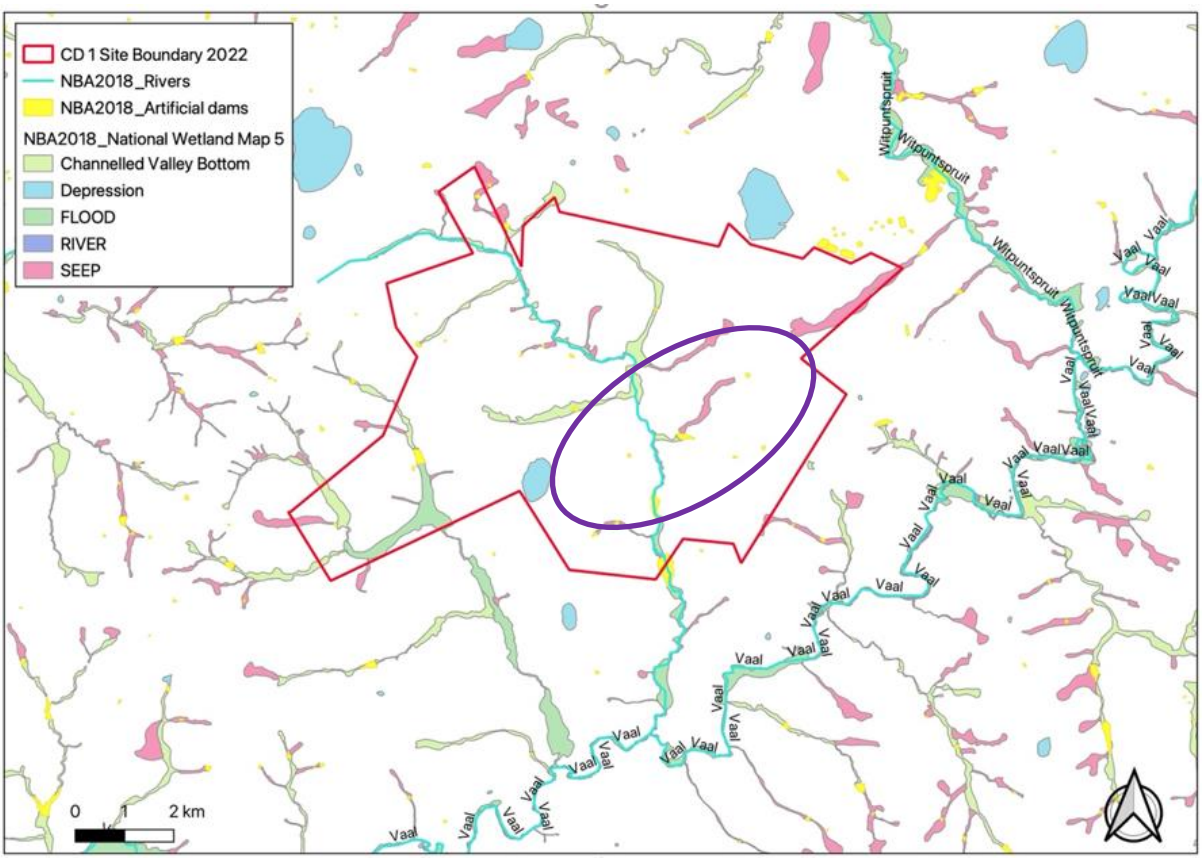


Figure 6-21: National Wetland Inventory wetlands and waterbodies within the broader project area (Approximate location of the Grid Connection indicated by the Purple Oval)

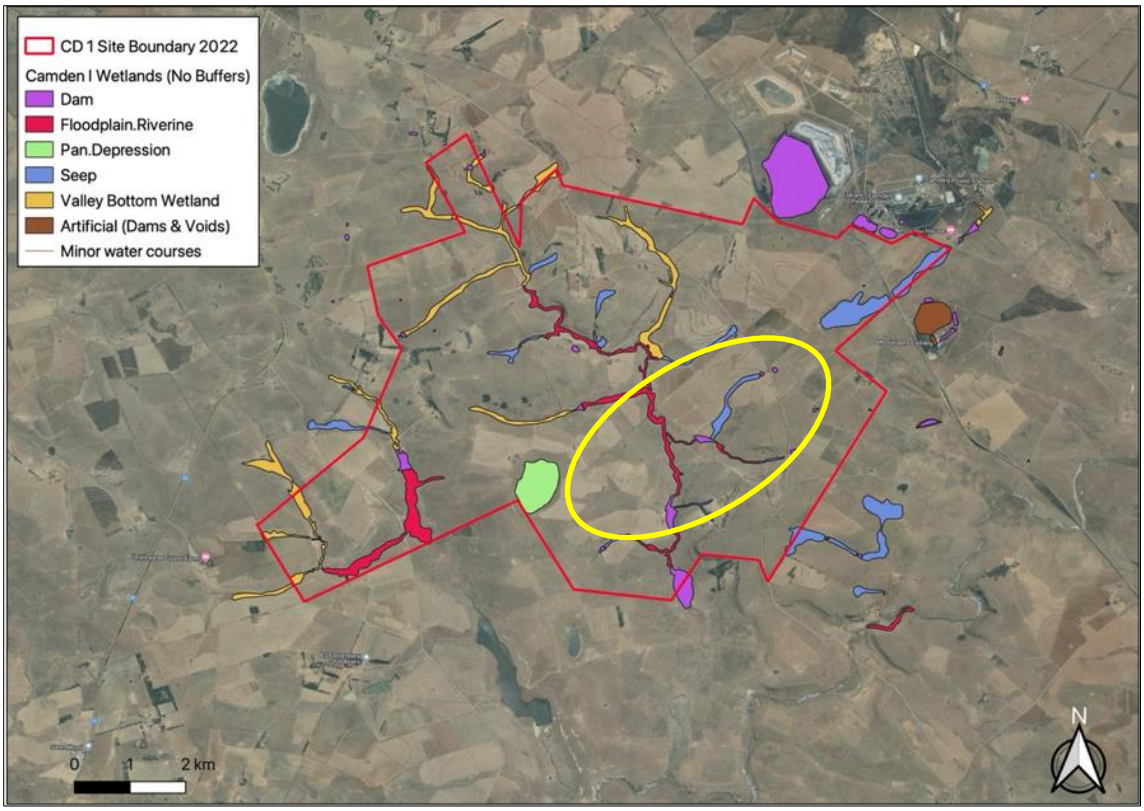


Figure 6-22: Delineated Wetlands within the broader project footprint based on ground-truthing information collected (Approximate location of the Grid Connection indicated by the Yellow Oval)

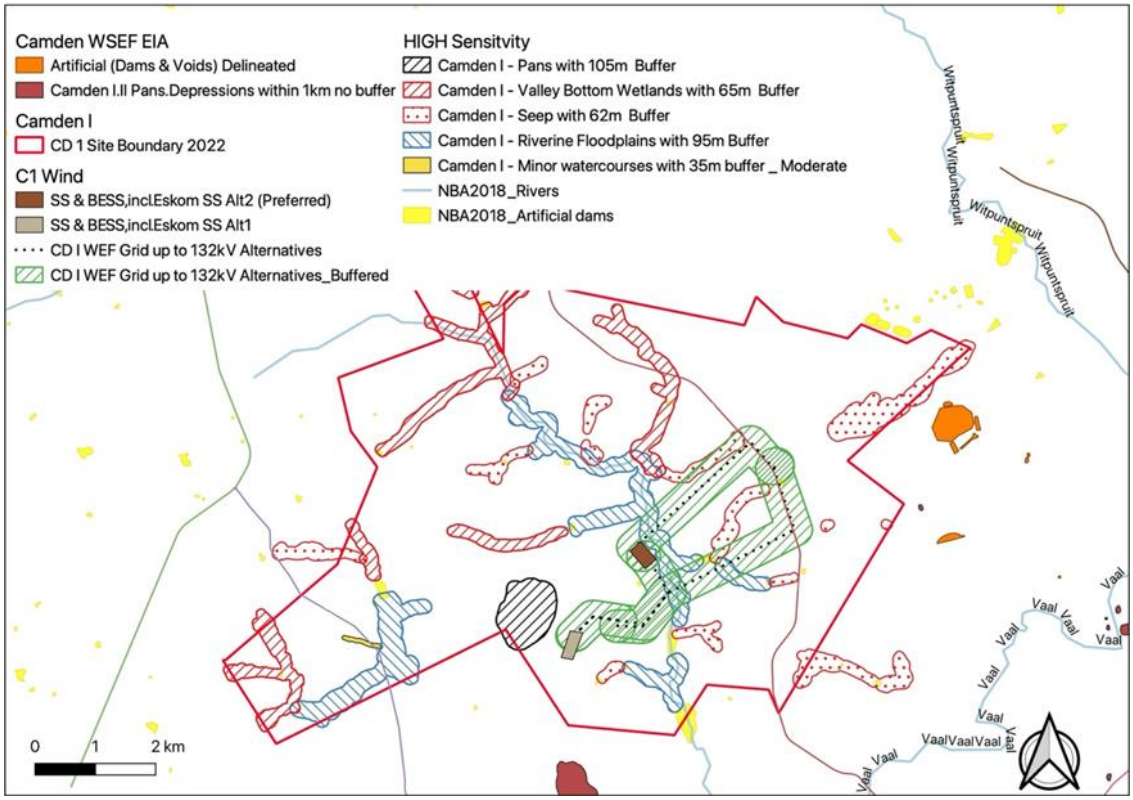


Figure 6-23: Camden 1 Solar Energy Facility, associated 132kV Grid and Eskom portion of substation including alternatives in relation to buffered aquatic systems delineated in this assessment

PRESENT ECOLOGICAL STATE AND CONSERVATION IMPORTANCE

The Present Ecological State (PES) of a river, watercourse or wetland represents the extent to which it has changed from the reference or near pristine condition (Category A) towards a highly impacted system where there has been an extensive loss of natural habit and biota, as well as ecosystem functioning (Category E).

The PES scores have been revised for the country and based on the new models, aspects of functional importance as well as direct and indirect impacts have been included (DWS, 2014). The new PES system incorporates Ecological Importance (EI) and Ecological Sensitivity (ES) separately as opposed to Ecological Importance and Sensitivity (EIS) in the old model, although the new model is still heavily centred on rating rivers using broad fish, invertebrate, riparian vegetation, and water quality indicators. The Recommended Ecological Category (REC) is still contained within the new models, with the default REC being B, when little or no information is available to assess the system or when only one of the above-mentioned parameters are assessed or the overall PES is rated between a C or D.

All of the systems assessed by DWS (2014) on a Subquaternary level within the study area were rated as PES = C or Moderately Modified and PES = D or Largely Modified. While these were also rated as High in terms of Ecological Sensitivity and Ecological Importance respectively.

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 6-24** and **Figure 6-25)**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.

PRESENT ECOLOGICAL STATE AND CONSERVATION IMPORTANCE

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- Erosion and sedimentation associated with road crossings;
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- Sedimentation and scour of channels due to undersized culverts within present day road crossings.

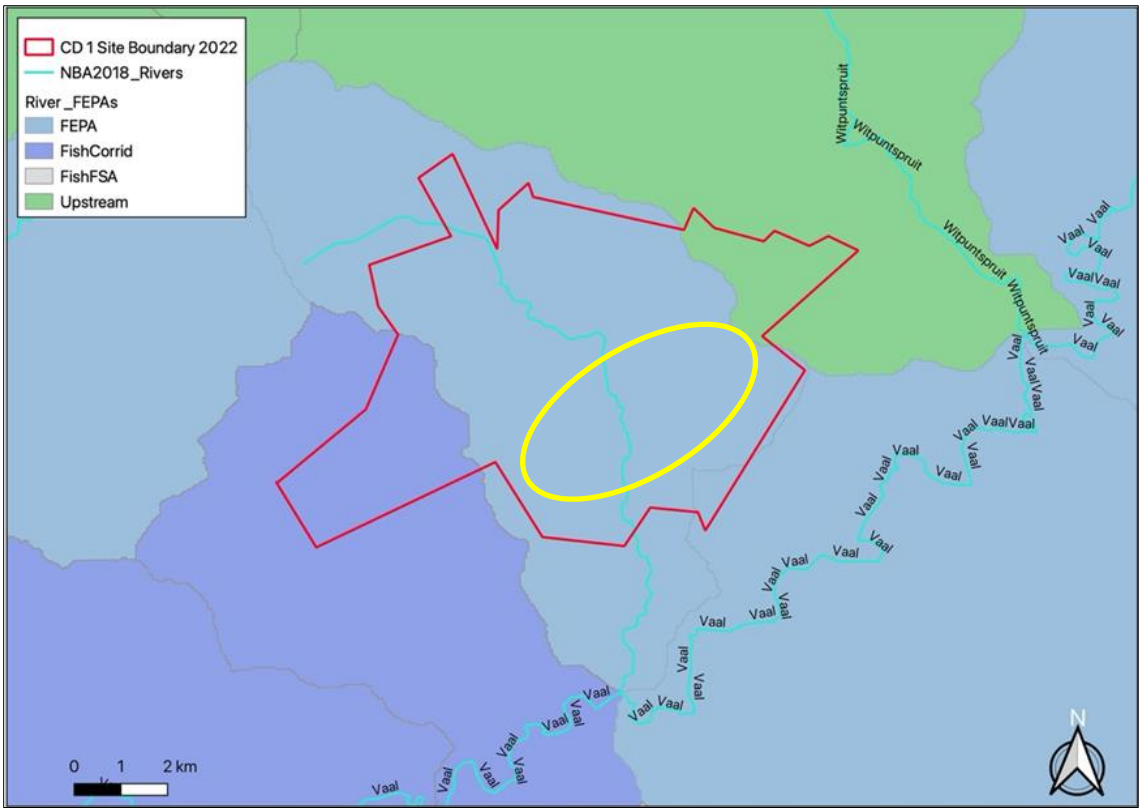


Figure 6-24: The Freshwater Ecosystem Priority Areas for the study area (Nel *et al*, 2011) (Approximate location of the Grid Connection indicated by the Yellow Oval)

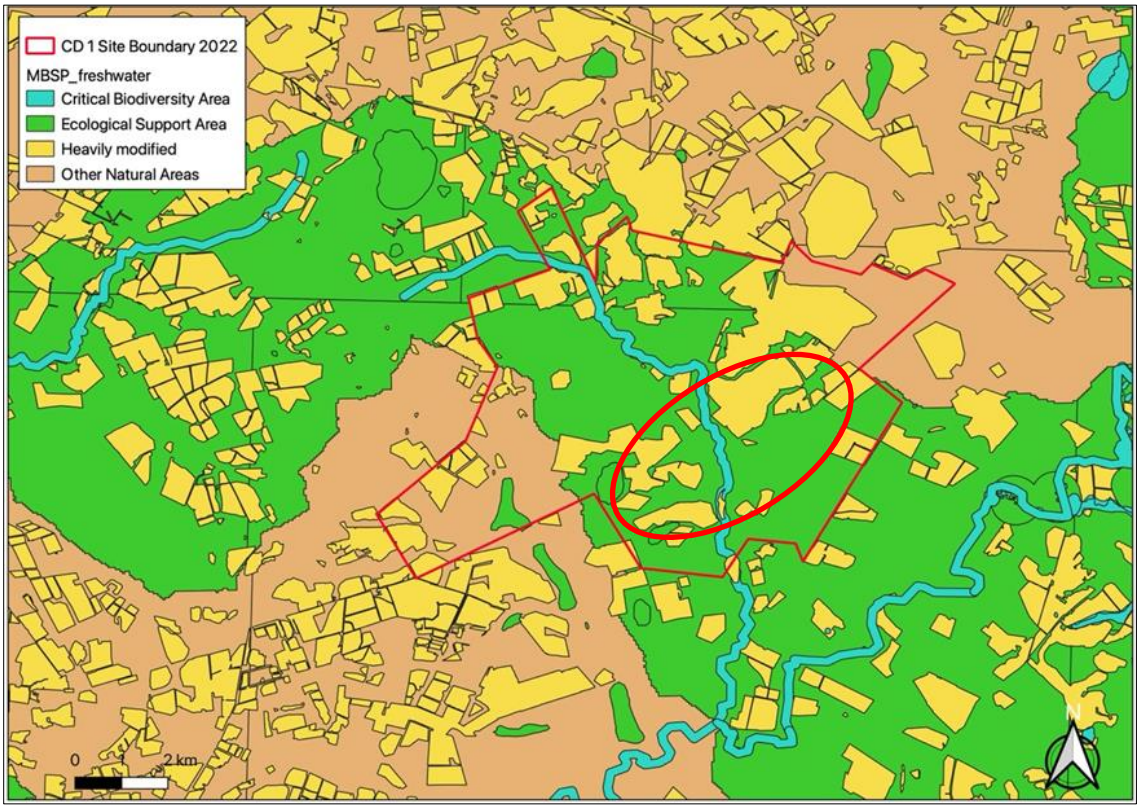


Figure 6-25: The Critical Biodiversity Areas as per the Mpumalanga Biodiversity Spatial Plan (Nel *et al*, 2011) issued 2014 (Approximate location of the Grid Connection indicated by the Red Oval)

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 6-18** outlines the Aquatic sensitivity mapping categories used to categorise features or areas (with their buffers).

Table 6-18: 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 6-19 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 6-26**. 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 6-19: 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
Solar Panels	Riverine Floodplains with Riparian Vegetation or wetland areas	No-Go with 95 m buffer	
	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		

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
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 specialist, preferably with the engineers and a site visit
	Seepage Wetlands	No-Go with 62 m buffer	
	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		

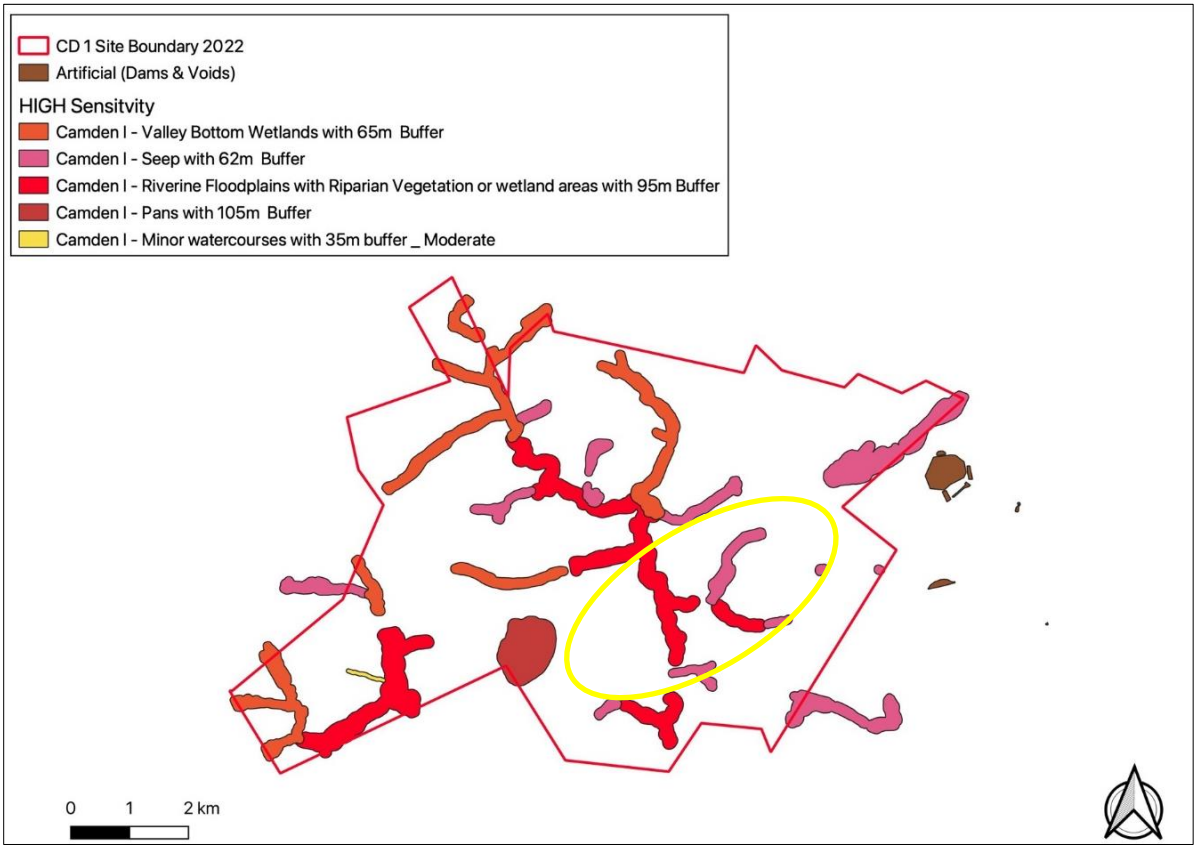


Figure 6-26: The delineated waterbodies inclusive of the respective buffer distances (Approximate location of the Grid Connection indicated by the Yellow Oval)

6.3 SOCIAL ENVIRONMENTS

6.3.1 LAND USE

The following is extracted from the Visual Impact Assessment, compiled by SLR Consulting (Pty) Ltd (April, 2022) and included as ***Appendix F-8****.*

Majority of the visual assessment area is classified as "Grassland" interspersed with significant areas of "Cultivation". Small tracts of forested land and numerous water bodies are scattered throughout the study area **Figure 6-27**. Commercial agriculture is the dominant activity in the study area, with the focus being maize cultivation, soybean 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. Multiple dirt roads are further evident throughout the site connecting the various farm activities.

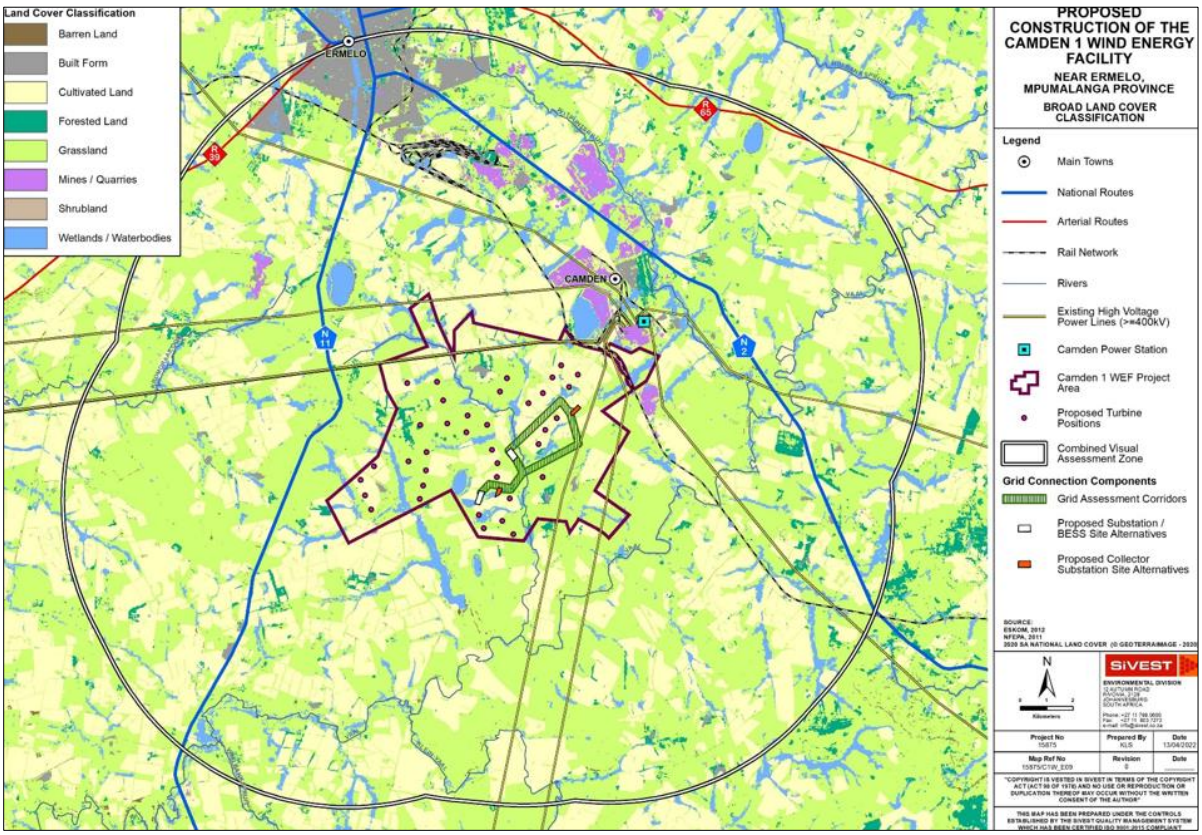


Figure 6-27: Broad land cover classification

6.3.2 TRANSPORT NETWORK

The local road network consists of the N2 to the north and northeast of the project site, and the N11 to the west and south of the site. The Richards Bay railway line traverse the site to the south of the Camden Power station site. There are 3 landing strips within Msukaligwa municipality one municipal landing strip in Ermelo with tarred runaway for various activities, one at Warburton and Woodstock farms respectively used for fire-fighting purposes by forestry companies.

6.3.3 HERITAGE AND CULTURAL RESOURCES

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

HERITAGE RESOURCES

Heritage finds in the area are limited to burial sites and the demolished remains of structures in the greater area (**Figure 6-28**). None of the recorded features are located closer than 100 meters from the proposed infrastructure and will not be directly impacted on. Locations of recorded heritage features are included in the Heritage Register for the proposed project site, provided in Appendix 1 of the Heritage Impact Assessment report.

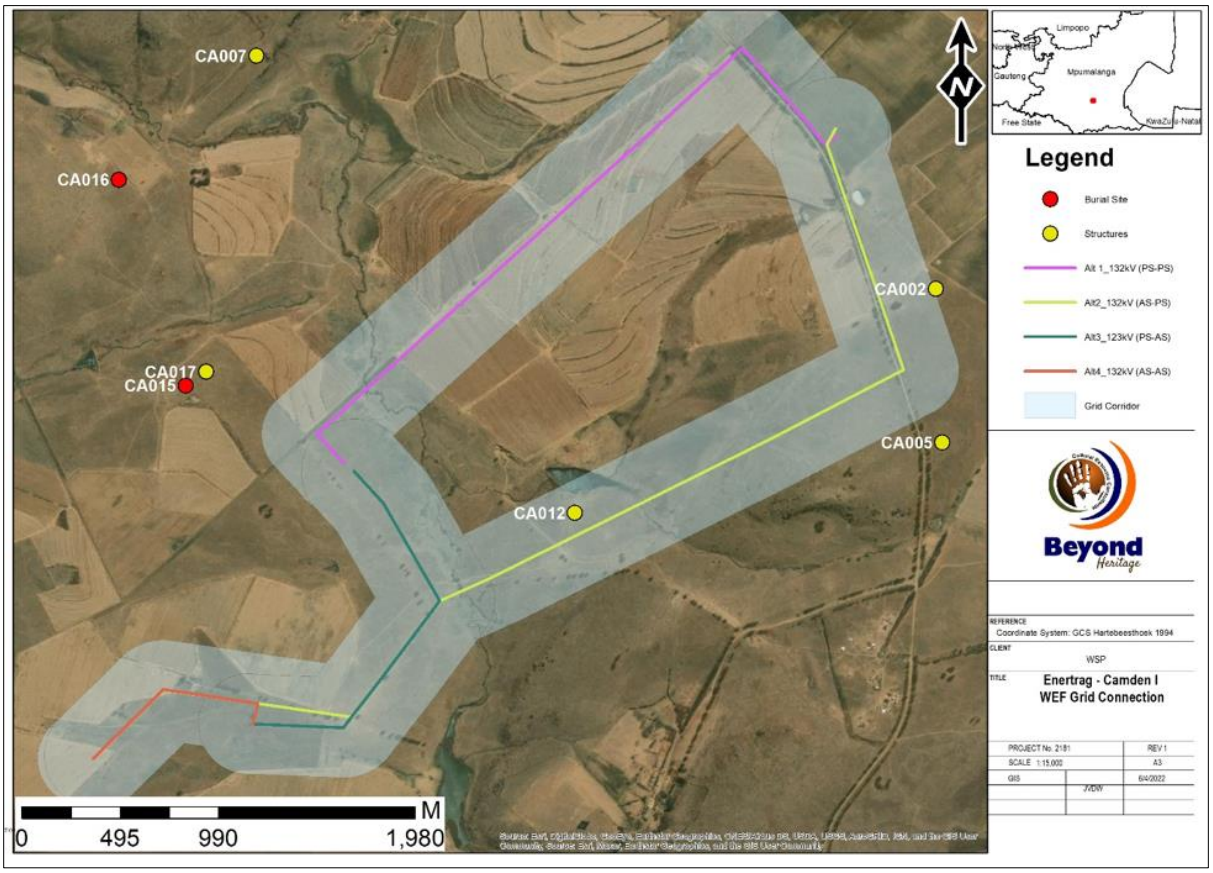


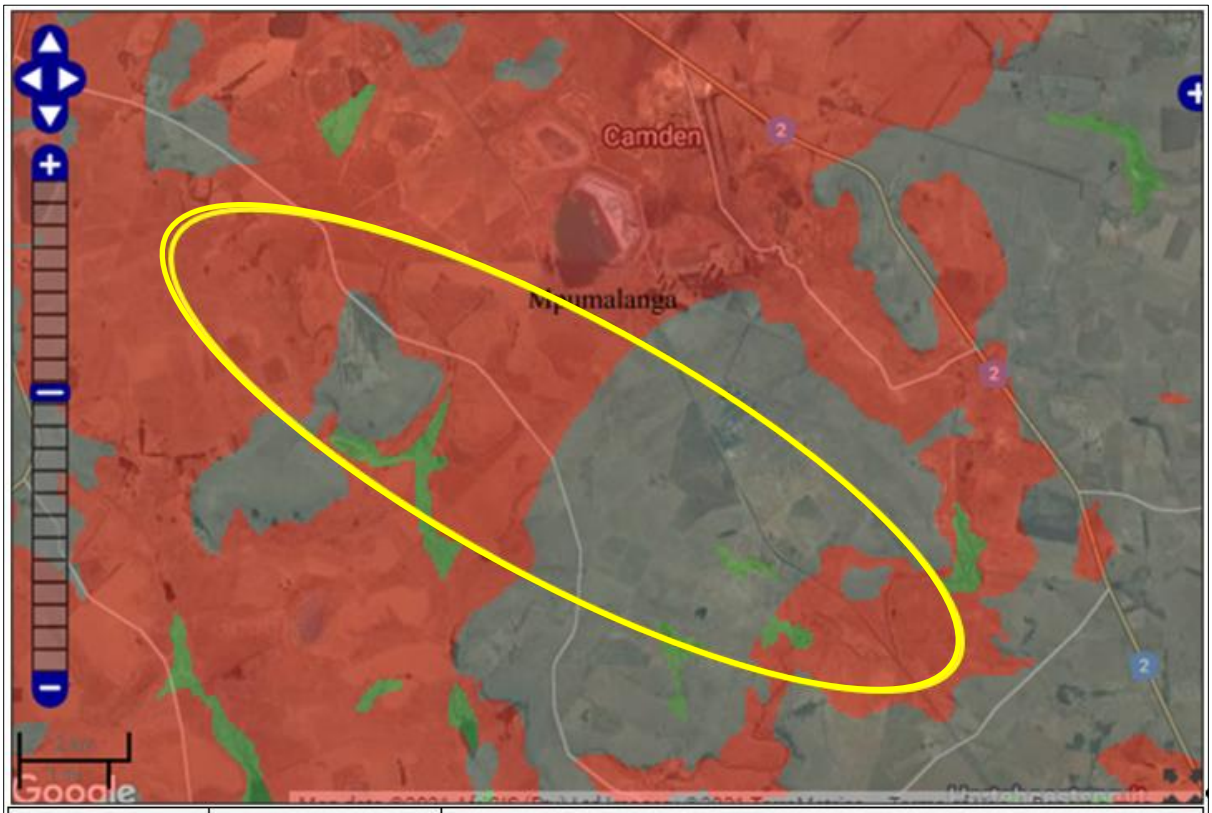
Figure 6-28: Observation points in relation the project area

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.

PALAEONTOLOGICAL HERITAGE

According to the SAHRA Paleontological map (**Figure 6-29**) the study area is of zero to very high paleontological significance, therefore, an independent study was conducted. The site visit and walk through confirmed 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. 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). The Fossil Chance Find Protocol has been added to the EMPr (**Appendix G**).



Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map

Figure 6-29: Paleontological sensitivity of the approximate study area (yellow polygon) as indicated on the SAHRA Palaeontological sensitivity map

6.3.4 PALAEONTOLOGICAL

The following is extracted from the Palaeontological Impact Assessment (Phase 2), compiled by Professor Marion Bamford (May, 2022) and included as ***Appendix F-5****.*

DESKTOP OBSERVATIONS

The palaeontological sensitivity of the area under consideration is presented in **Figure 6-30**. 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. 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.

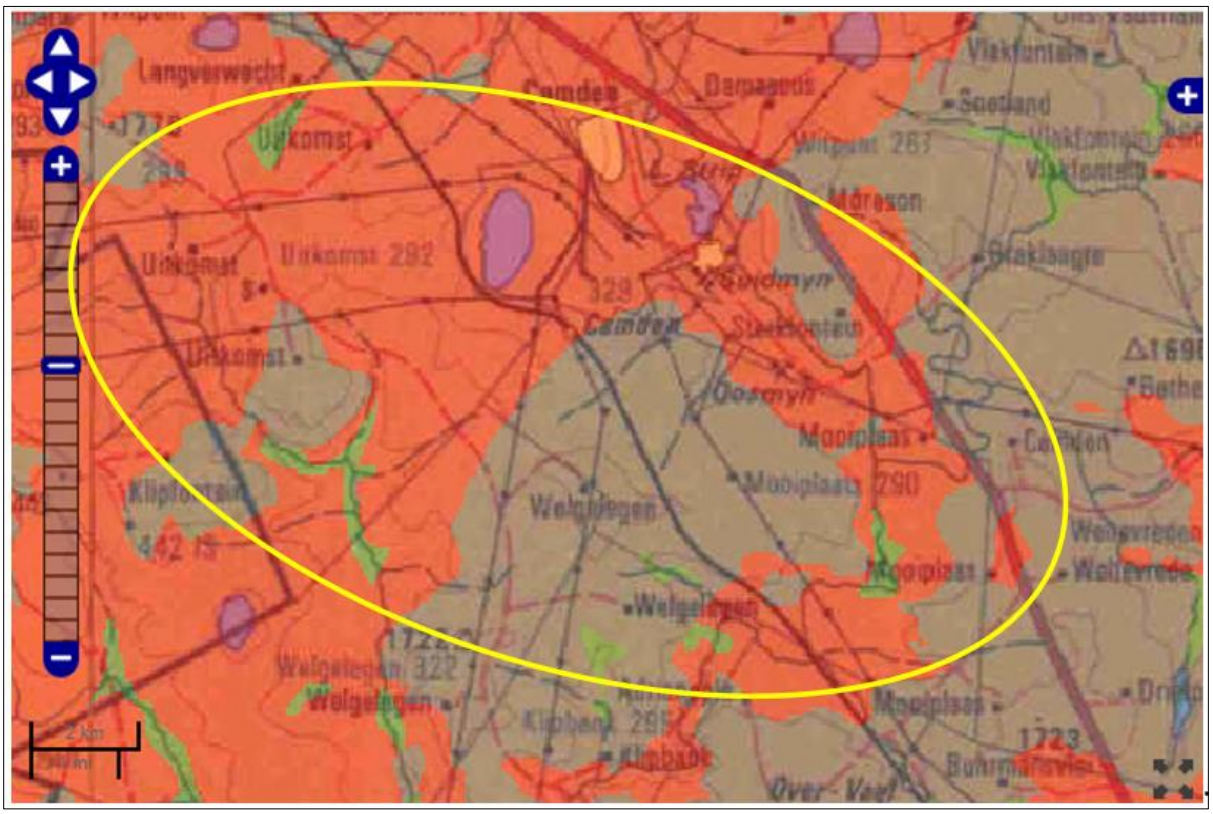


Figure 6-30: SAHRIS palaeosensitivity map for the site for the proposed Camden I WEF within the yellow oval. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero

SITE OBSERVATIONS

The site walkover for the study area was conducted in April 2022. The area has been cultivated for crops over the past few decades and so the land is fairly flat, and rocks have been removed. There were no rocky outcrops, no exposures of shale and no fossils present on the land surface. Images of the site observations is presented in **Figure 6-31** below.

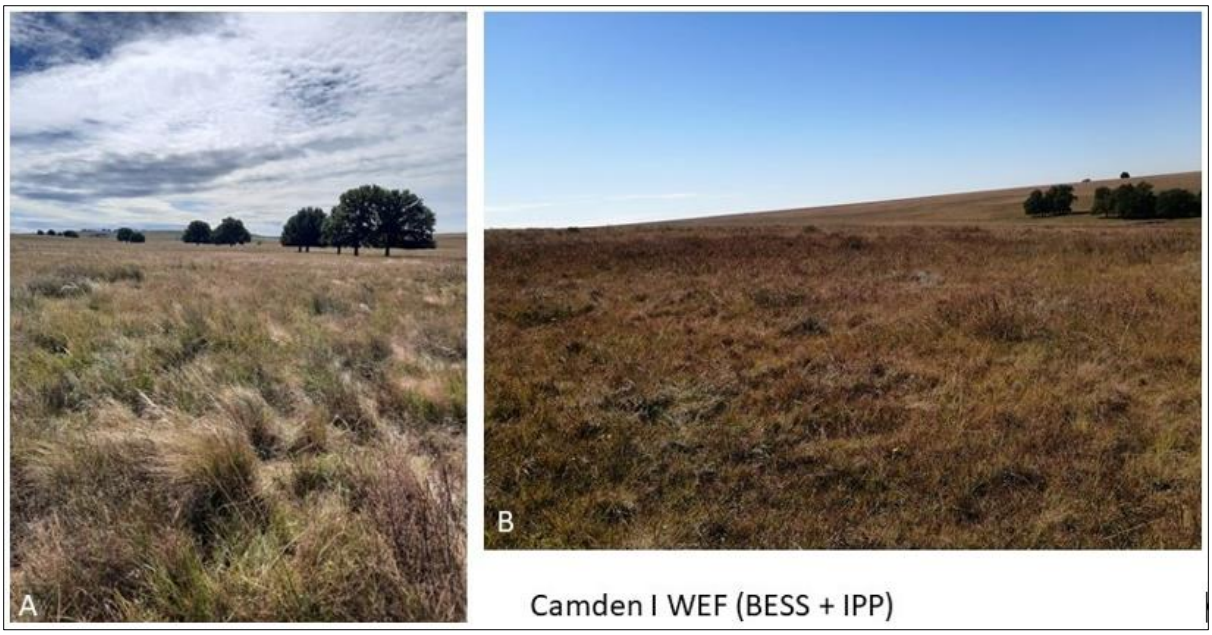


Figure 6-31: Photographs of the site visit observations for the Camden I WEF project. A – View across a typical field that is lying fallow. No rocky outcrops and no fossils. B – View of another section of the area. No rocky outcrops and no fossils

6.3.5 VISUAL CHARACTER AND SENSITIVITY

The following is extracted from the Visual Impact Assessment report, compiled by SLR Consulting (Pty) Ltd (May, 2022) and included as **Appendix F-8**.

VISUAL ENVIRONMENT

WEF facilities and electrical infrastructure are not features of the natural environment but are rather a representation of human (anthropogenic) alteration. As such, these developments are likely to be perceived as visually intrusive when placed in largely undeveloped landscapes that have a natural scenic quality and where tourism activities are practised that are dependent on the enjoyment of, or exposure to, the scenic or aesthetic character of the area. Residents and visitors to these areas could perceive the development to be highly incongruous in this context and may regard the development as an unwelcome intrusion which degrades the natural character and scenic beauty of the area, and which could potentially even compromise the practising of tourism activities in the area. In this instance however, significant transformation in parts of the study area has resulted in considerable degradation of the scenic quality of the landscape.

The presence of other anthropogenic features associated with the built environment may not only obstruct views but also influence the perception of whether a development is a visual impact. In industrial areas for example, where other infrastructure and built form already exists, the visual environment could be considered to be 'degraded' and thus the introduction of a WEF and associated grid connection infrastructure into this setting may be considered to be less visually intrusive than if there was no existing built infrastructure visible.

POWER LINE ROUTE SENSITIVITY

GIS-based visibility analysis in respect of the Camden I WEF 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.**

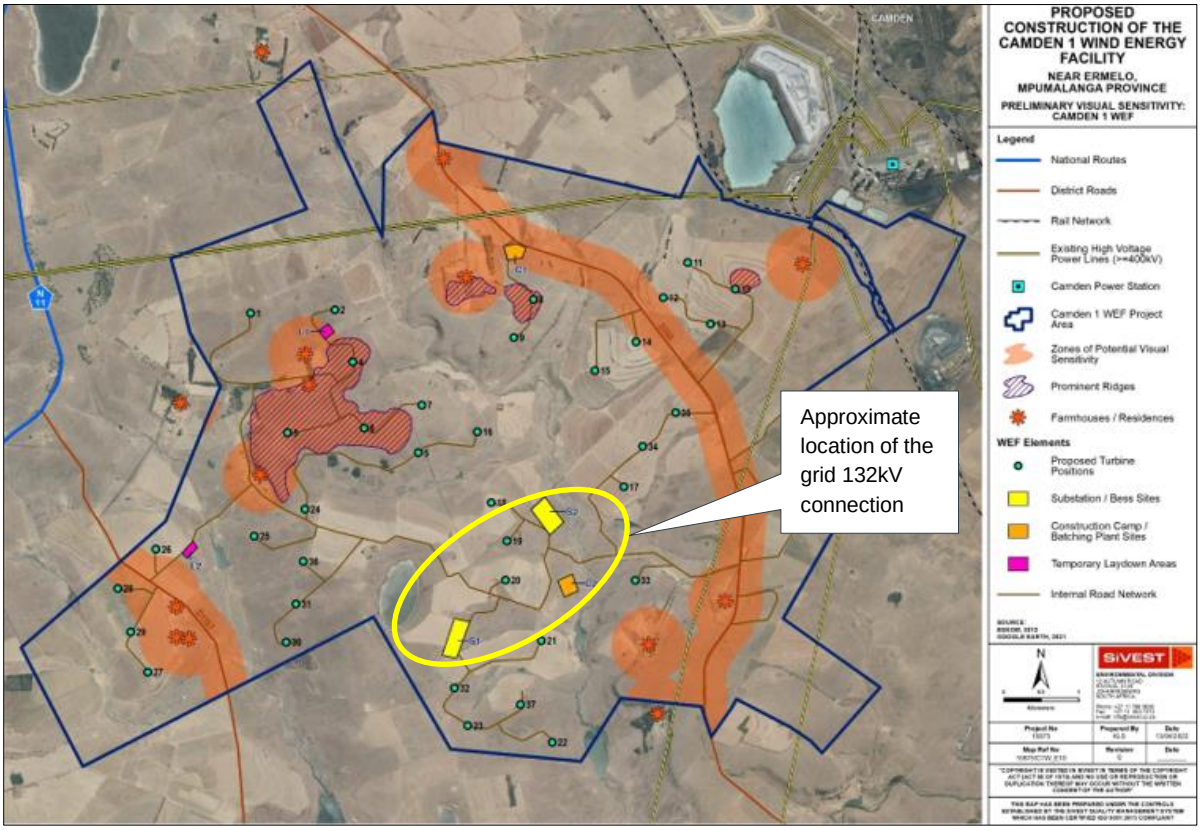


Figure 6-32: Zones of potential visual sensitivity on the Camden 1 WEF Site

6.3.6 SOCIO-ECONOMIC

SOCIAL OVERVIEW OF THE STUDY AREA

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 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 (**Figure 6-33**). The Eskom Camden Coal Power station is located immediately to the north and north-east of the site (**Figure 6-34**).

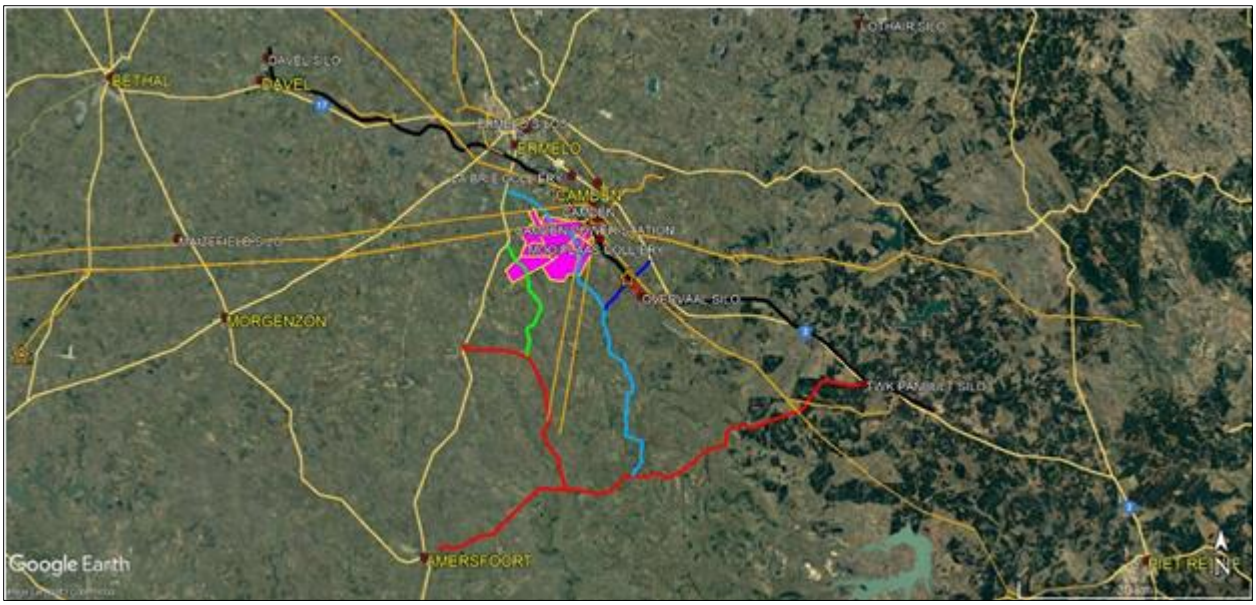


Figure 6-33: Proposed Camden I WEF up to 132 kV line alternatives (pink) and subject properties (yellow) indicated in relation to settlements, grain silos and local collieries, Camden power plant, existing Eskom lines (orange lines), railway line (black) and local public gravel roads (red), including the Familiehoek road (green), De Emigratie road (light blue) and Overvaal road (dark blue)

Figure 6-34: Camden Power Station

Figure 6-35: De Emigratie Road, looking west on Uitkomst Farm

The properties within the study area 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 6-35**). 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 (N2-De Emigratie Road) provides the only access road to the Overvaal silo complex.

Figure 6-36: Maize fields on Uitkomst farm along the De Emigratie gravel road with Camden Power station in the background

Figure 6-37: Overvaal silo located adjacent to Richards Bay railway line

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 6-36**). Six large silo complexes are located within a 40 km of Ermelo, including the silos at the Overvaal rail siding (**Figure 6-37**).

Figure 6-38: Beef cattle on Adrianople Farm (van der Meulen) adjacent to Overvaal Road

Figure 6-39: Sheep on De Emigratie Farm (van der Meulen) along De Emigrate Road

Both beef cattle and sheep are also farmed in the area raised (**Figure 6-38** and **Figure 6-39**). The natural grassveld grazing resource has a relatively high carrying capacity of around 1 head of cattle to 3 hectares. Most owners also utilize pastures for hay production. 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 6-40: Abandoned farmstead on Adrianople 296/1 (de Jager) adjacent to the De Emigratie Road

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 6-40**). Base farms are typically inhabited by farm owners and or managers.

Figure 6-41: Dwellings of households with tenure rights and 400 kV line on Adrianople farm along the Overvaal 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 6-41**).

Figure 6-42: 400 kV line traversing N11 approximately 6 km south of Ermelo

Figure 6-43: Two 400 kV lines traversing De Emigratie 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 five (5) Eskom transmission line corridors. These include two corridors approaching Camden from the west which traverse the N11 (**Figure 6-42**), and two corridors approaching Camden from the south-west which traverses the De Emigratie Road (**Figure 6-43**), and a corridor aligned parallel to the north of the Richard's Bay 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.

Visitor accommodation in Ermelo largely caters for travellers and business people. The town is 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 WEF site consists of nine (9) properties, with wind turbines proposed on seven (7). Both substation site alternatives are located on the same property, Welgelegen 322/2 (**Figure 6-44**).

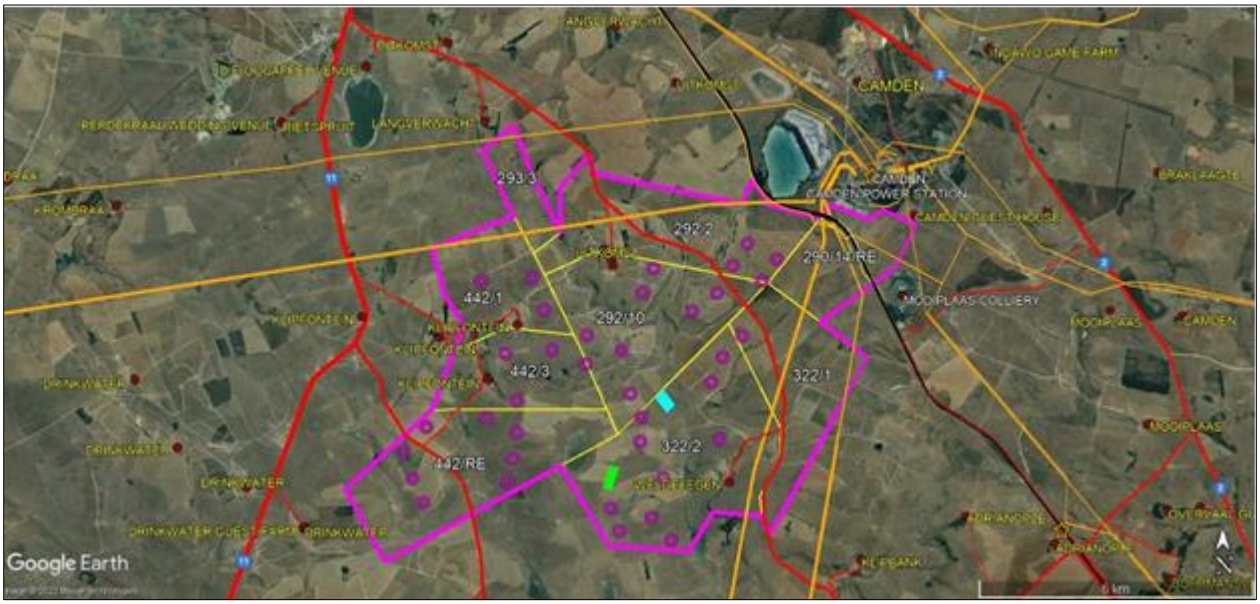


Figure 6-44: Camden I WEF site (pink) and substation/BESS Alt 1 (green fill) and Alt 2 (blue) in relation to site properties (yellow). Pink circles indicate proposed turbine locations. Also indicated are existing power lines (orange), the railway line (black) and local road network (red)

In terms of ownership, the nine properties are owned by three land owners, namely Mr Lood de Jager (Uitkomst farm), Ms. Petronella Reyneke (Welgelegen), and Mr David Zeelie (Klipfontein). **Table 6-20** lists the properties and the land land uses.

Table 6-20: Overview of properties affected by proposed infrastructure

PROPERTY	OWNER	ACCESS	LAND USE
292/10 Uitkomst	Mr Lood de Jager	De Emigratie Rd	Residential (base farm complex) Dryland cropping; Grazing
292/2 Uitkomst		De Emigratie Rd	
290/14/RE Mooiplaats		De Emigratie Rd	Dryland cropping; Grazing
322/1 Welgelegen	Ms Petronella Reyneke	De Emigratie Rd	Dryland cropping; Grazing
322/2 Welgelegen		De Emigratie Rd	Residential Dryland cropping; Grazing
442/RE Klipfontein	Mr David Zeelie (in process of selling)	Familiehoek Rd	Dryland cropping; Grazing
442/3 Klipfontein		De Emigratie Rd	Residential Dryland cropping; Grazing
442/1 Klipfontein	Mr Lood de Jager	N11	Residential Dryland cropping; Grazing
292/3 Uitkomst		De Emigratie Rd	Dryland cropping; Grazing

Figure 6-45: Rangeland and cropped fields (middle ground) on Welgelegen 322/1

Figure 6-46: Farmstead on Welgelegen

Figure 6-47: Farm labourers' dwellings on Uitkomst

Welgelegen 322/1 and 322/2 are part of three contiguous properties owned by Ms Reyneke, which are all accessed off the De Emigratie Road. The properties are currently leased out for cropping and stock farming purposes to two separate local farmers, Messrs. Lood de Jager and Bernard Scheepers (**Figure 6-45**). Ms Reyneke and her son reside in separate dwellings on 322/2 (**Figure 6-46**). Mr Reyeneke is employed as farm manager by Mr Scheepers and also runs a small logistics (grain transport) operation from 322/2. Eight tenured households reside in a cluster of small houses adjacent to the De Emigratie Road (**Figure 6-47**). Members of two households are employed by the Reynekes.

Figure 6-48: One of three primary dwellings located on Uitkomst

Figure 6-49: Sheep grazing on Uitkomst

The contiguous Uitkomst 292/2, 292/3, 292/10, Mooplaas 290/14/RE and Klipfontein 442/1 form part of Mr Lood de Jager's mixed farming operation. Mr de Jager also owns Langverwacht (adajcent) and Adrianople (non-adjacent) properties in the study area. The extensive farmyard straddles Uitkomst 292/2 and 292/10, and includes three primary dwellings, a few workers' houses and outbuildings (**Figure 6-48** and **Figure 6-49**). Mr de Jager leases 332/1 from Mr Reyneke. Approximately 82% of Mr de Jager's operation's income is derived from cropping activities.

Figure 6-50: Main dwelling on Klipfontein

Figure 6-51: Beef cattle on Klipfontein

Figure 6-52: Accommodation for non-tenured workers on Klipfontein

Klipfontein 442/RE and 442/3 are accessed off the Familiehoek Road. Mr Zeelie resides on 442/3 (**Figure 6-50**). A second dwelling on the yard is inhabited by the farm manager. Workers' houses are located along the Familiehoek Road. Arabale protions of the property have historically been leased out to Mr Bernard Scheepers, and the balance of the property is used by the owner for grazing beef cattle and sheep (**Figure 6-51**). Twelve farm workers are currently employed on Klipfontein, none of whom permanently tenured (but only reside on the property during contracted work periods) (**Figure 6-52**).

POTENTIALLY SENSITIVE SOCIAL RECEPTORS

The views towards the site from urban receptors in Ermelo (>9 km) and Camden (>3.9 km) are impacted by the infrastructure associated with the Camden Power station. The area north of the railway line and N2 east of Ermelo has also been transformed by historic and active coal mining operations. The area to the south of the railway line is rural, with the relatively sparse settlement pattern concentrated along or near major public roads.

In terms of residential receptors in the area to the south a number of turbines are within a 500 m to 1 km range of farmsteads and dwellings. The nearest affected dwellings are located on Klipfontein, Zeelie (630 m), Klipfontein, De Jager (670 m), Uitkomst (860 m), and Welgelegen (930 m). The farmsteads on these properties are to some extent screened by the natural topography and or vegetation. Drinkwater Guest Farm (2.7 km) and Die Oogappel venue (5.4 km) are the nearest tourism/ hospitality receptors in the area south of the railway line. However, as indicated, local tourism is largely based on stop-over and essential travel, i.e., less sensitive to visual impacts. The substation site alternatives are not located in significant proximity to any residential, tourism or urban receptors. All are located at distances of 2 km or more from the relevant receptors (**Table 6-21**).

Table 6-21: Distance of proposed turbine and associated substation alternatives to most proximate urban, residential and tourism receptors

RECEPTOR	TURBINE	SS ALT 1	SS ALT 2	COMMENT
Ermelo built edge	9 km	13.6 km	12.4 km	Across coal mining area
Camden residential	3.9[8]	9.6 km	7.7 km	Existing Tx 470 m Across Camden PS
Welgelegen (main)	930 m	4.2 km	2 km	Camden I WEF site; Existing Tx 490 m
Welgelegen (labour)	1.1 km	3.3 km	2.2 km	Camden I WEF site; Existing Tx 140 m
Camden Guest House	3.1 km	8.4 km	6.6 km	Existing Tx 100 m Adjacent to Camden PS
Indawo Game Lodge	6.5 km	12.2 km	10.3 km	Across Camden PS
Overvaal Guest House	9.8 km	12 km	11 km	Property between N2 and KZN railway line

[8] Shaded entries indicate distances of less than 5 km (for purposes of reference).

RECEPTOR	TURBINE	SS ALT 1	SS ALT 2	COMMENT
Adrianople (Saaiman)	5.7 km	7.6 km	6.7 km	Existing Tx 2.2 km Camden II WEF site
Klipbank (Mabuza)	4 km	5.6 km	5.2 km	Existing Tx 950 m
Klipkrans	2.4 km	4.7 km	6.8 km	Existing Tx 6.4 km
Drinkwater Guest Farm	2.7 km	6.6 km	8.1 km	Existing Tx 5.6 km 1 km from N11
Klipfontein (Zeelie)	630 m	3.3 km	3.7 km	Camden I WEF site; Existing Tx 3 km
Klipfontein (De Jager)	670 m	3.7 km	3.4 km	Camden I WEF site; Existing Tx 1.9 km
Uitkomst (De Jager)	860 m	4.4 km	3 km	Camden I WEF site; Existing Tx 790 m
Die Oogappel venue	5.4 km	10.3 km	9.6 km	Existing Tx 1.9 km

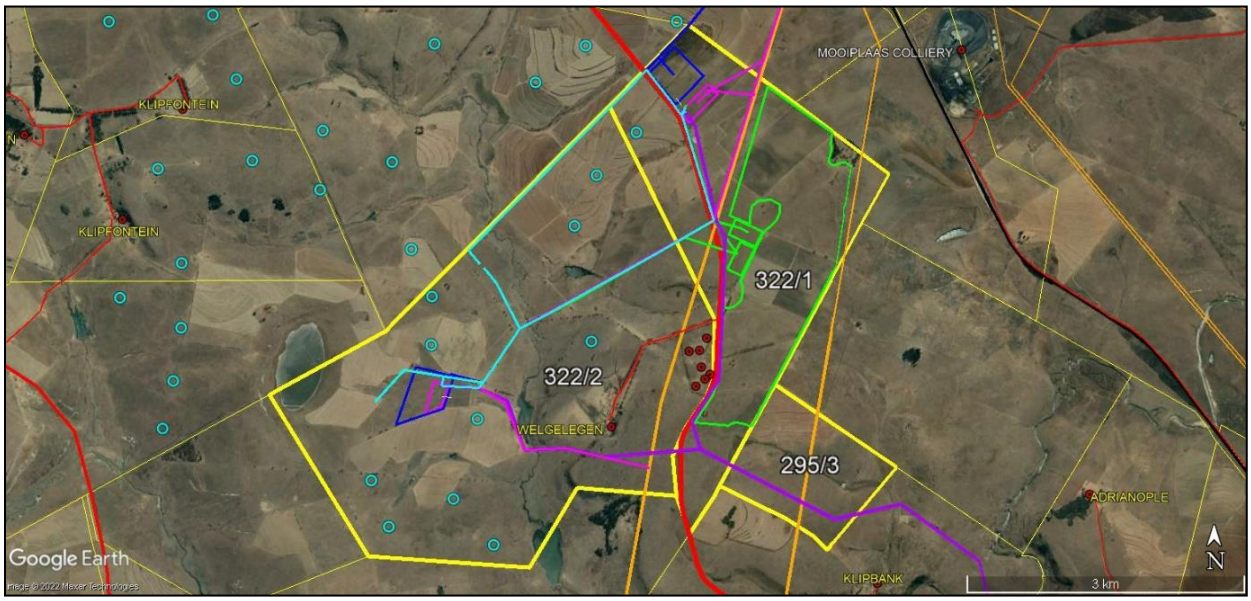


Figure 6-53: Cumulative impact of proposed Camden I and II projects infrastructure on Reyneke properties (bold yellow outlines) and De Emigratie road (bold red): Camden I Hydrogen& Ammonia plant (dark blue), Camden 1 PV and Tx (green), Camden 1 WEF& Tx (light blue), Camden I Collector substation& 400 kV line; and Camden II WEF Tx line. Also indicated are Eskom lines (orange) and the railway line (black)

OTHER RENEWABLE ENERGY FACILITIES

The Camden I WEF site is not located within a designated Renewable Energy Development Zone (REDZ). No operational REFs are currently located within significant proximity of the site. The DFFE's Renewable Energy applications interactive viewer (last updated February 2022) indicates no historic applications within a 35 km radius of the site. Two other REFs are currently proposed in proximity to the site (parallel applications), namely the up to 100 MW Camden 1 PV and up to 200 MW Camden 2 WEF. These projects are also associated with Enertrag.

7 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, 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.

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 / GENERATION OF DUST AND PM	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
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 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; – All stockpiles (if any) must be restricted to designated areas and may not exceed a height of two (2) metres; – Ensure that all vehicles, machines and equipment are adequately maintained to minimise emissions; – 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; – 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. – Enforcing of speed limits. Reducing the dust generated by the listed activities above, putting up signs to enforce speed limit in access roads. – No burning of waste, such as plastic bags, cement bags and litter is permitted; and – 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: / 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

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
NOISE								
Mitigation and Management Measures	– The equipment must be in maintained in good working order, within service dates, and inspected before use; – Align working times with the substation related operational times; and – 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. 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; – 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; – 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; – Erosion control measures should be implemented during the construction phase on large, exposed areas and where stormwater is temporarily channelled; – 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 – 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; – Plant and vehicles are to be repaired immediately upon developing leaks; – Drip trays shall be supplied for all idle vehicles and machinery; – Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants; – 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; – Ensure appropriate handling of hazardous substances; – Keep adequate spill kits onsite and train personnel to use them appropriately; – Fuels and chemicals must be stored in adequate storage facilities that are secure, enclosed and bunded; and – 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; – Drip trays shall be supplied for all idle vehicles and machinery; Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants; – 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; – Ensure appropriate handling of hazardous substances; – Keep a spill kit on site and train personnel to use it appropriately; and – Fuels and chemicals must be stored in adequate storage facilities that are secure, enclosed and bunded.							

7.4 AQUATIC

7.4.1 CONSTRUCTION PHASE

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
LOSS OF VERY HIGH SENSITIVITY SYSTEMS, NAMELY THE WETLANDS									
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. – 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. – 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). – 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: THE PHYSICAL REMOVAL OF RIPARIAN ZONES WITHIN WATERCOURSES	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. – 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. – 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. – 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. – 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). – Strict use and management of all hazardous materials used on site. – Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.) within demarcated / bunded areas – Containment of all contaminated water by means of careful run-off management on site, as per the specifications provided in the stormwater management plan. – 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. –								

Potential Impact: CHEMICAL POLLUTANTS (HYDROCARBONS FROM EQUIPMENT AND VEHICLES, CLEANING FLUIDS, CEMENT POWDER, WET CEMENT, SHUTTER-OIL, ETC.)	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. — 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. — 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. — 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). — Strict use and management of all hazardous materials used on site. — Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.) within demarcated / bunded areas — Containment of all contaminated water by means of careful run-off management on site, as per the specifications provided in the stormwater management plan. — 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. — 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. — 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: **INCREASE THE CONCENTRATION OF SURFACE WATER FLOWS**	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. — 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. – 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. – 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). – Strict use and management of all hazardous materials used on site. – Containment of all contaminated water by means of careful run-off management on site, as per the specifications provided in the stormwater management plan. – 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. – 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: **STORMWATER MANAGEMENT INCREASES RUNOFF FROM A SITE THROUGH THE CONCENTRATION OF SURFACE WATER FLOWS**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	4	5	4	2	**30**	**Low**	(-)	High
With Mitigation	2	2	2	2	2	**16**	**Very 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. – 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. – 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.								

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
STORMWATER MANAGEMENT INCREASES RUNOFF FROM A SITE THROUGH THE CONCENTRATION OF SURFACE WATER FLOWS								
	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. – 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). – Strict use and management of all hazardous materials used on site. – Containment of all contaminated water by means of careful run-off management on site, as per the specifications provided in the stormwater management plan. – 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. – 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 to biodiversity is shown in **Table 7-7**.

Table 7-7: Assessment of significance of potential impacts on terrestrial biodiversity 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	1	3	5	4	**40**	**Moderate**	(-)	High
With Mitigation	1	1	3	4	4	**36**	**Moderate**	(-)	High
Mitigation and Management Measures	— 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, 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; and
— impairment of wetland function.

Low existing populations of alien plants were see 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	2	3	1	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. — Undertake regular monitoring to detect alien invasions early so that they can be controlled. — Implement control measures as per the specifications of the alien management plan.								

7.5.2 OPERATIONAL PHASE

The following potential impacts were considered on biodiversity (fauna and flora) during the operational phase. This phase refers to when construction has been completed and the proposed infrastructure has been built and is functional.

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 on the impact on vegetation 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	1	3	5	3	**30**	**Low**	(-)	High
With Mitigation	1	1	3	5	2	**20**	**Low**	(-)	High
Mitigation and Management Measures	— 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, to be included into the EMPr during final approval.								

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 on the impact on biodiversity 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	3	2	3	4	3	**36**	**Moderate**	(-)	High
With Mitigation	1	1	3	2	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. — Undertake regular monitoring to detect alien invasions early so that they can be controlled. — 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 on the impact on biodiversity 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	1	3	5	3	**30**	**Low**	(-)	High
With Mitigation	1	1	3	5	2	**20**	**Low**	(-)	High
Mitigation and Management Measures	— 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.								

7.5.3 DECOMMISSIONING PHASE

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 of time, 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 operational phase on the impact on biodiversity 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	1	3	5	3	**20**	**Low**	(-)	High
With Mitigation	1	1	3	5	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 operational phase on the impact on biodiversity 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	2	3	4	4	**44**	**Moderate**	(-)	High
With Mitigation	1	1	3	4	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 — Prior to construction commencing, undertake a detailed walk-through survey of footprint areas that are within habitats where SCC are likely to occur. — Where significant populations of SCC are found, collect the data for any flora permits or micro-siting of infrastructure that may be required. — Prior to construction commencing, compile a Plant Rescue Plan, including monitoring specifications (timeframe, frequency etc). — 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 DESIGN PHASE

No negative impacts occur during the Design Phase of the project since no physical construction activities take place. Nevertheless, measures taken during the Design Phase of the project can potentially have a significant positive effect on the nature, extent and intensity of impacts experienced during the Construction Phase. This is usually as a response to identified issues, leading to design modifications to avoid negative impacts where possible.

7.7.2 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. — 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	— 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 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. — 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. A course on basic identification of all snakes specific to the area should be undertaken. — Contact numbers of trained snake-catchers must be available at all times and utilised for purposes of relocation.								

7.7.3 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. — No collecting, hunting or poaching of any plant or animal species. — 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.								

7.7.4 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

The following potential impacts on powerline sensitive avifauna are associated with the construction and operation of the up to 132kV grid connection related to the Wind Energy Facility:

— **Displacement due to disturbance associated with the construction of the proposed OHL and on-site substation:**

Construction activities could impact on birds through disturbance; this could lead to breeding failure if the disturbance happens during a critical part of the breeding cycle. Construction activities in close proximity to breeding locations could be a source of disturbance and could lead to temporary breeding failure or even permanent abandonment of nests. A potential mitigation measure is the timeous identification of nests and the timing of the construction activities to avoid disturbance during a critical phase of the breeding cycle, although this is often impractical to implement due to tight construction schedules. Powerline sensitive species which are potentially most vulnerable to displacement due to disturbance are mostly ground nesting species: African Grass Owl, Black-bellied Bustard, Blue Crane, Blue Korhaan, Denham's Bustard, Grey Crowned Crane, Helmeted Guineafowl, Marsh Owl, Northern Black Korhaan, Secretarybird, Spotted Eagle-Owl and White-bellied Bustard. The impact is rated as moderate pre-mitigation and it will decrease to low post-mitigation.

— **Displacement due to habitat transformation associated with the construction of the proposed OHL and on-site substation:**

During the construction of powerlines, service roads (jeep tracks), substations and other associated infrastructure, habitat destruction/transformation inevitably takes place. These activities could impact on birds breeding, foraging and roosting in or in close proximity of the proposed OHL grid connection through the transformation of habitat. Relevant to this development, very little mitigation can be applied to reduce the significance of this impact as the total permanent transformation of the natural habitat within the construction footprint of the on-site substation is unavoidable. In the case of the OHL, the direct habitat transformation is limited to the on-site substation and

pole/tower footprints and the narrow access road/track under the proposed OHL. The loss of habitat in the substation footprint (2 ha) will be a relatively insignificant percentage of the habitat that regularly supports powerline sensitive species, and the resultant impact is likely to be fairly minimal. Powerline sensitive species which are potentially most vulnerable to displacement due to habitat transformation are mostly ground nesting species: African Grass Owl, Black-bellied Bustard, Blue Crane, Blue Korhaan, Denham's Bustard, Grey Crowned Crane, Helmeted Guineafowl, Marsh Owl, Northern Black Korhaan, Secretarybird, Spotted Eagle-Owl and, White-bellied Bustard. The impact is rated as moderate pre-mitigation and it will decrease to low post-mitigation.

- **Mortality of powerline sensitive avifauna due to electrocutions on the OHL:**

Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (Van Rooyen 2004). The electrocution risk is largely determined by the voltage size of the proposed powerline and the pole/tower design. Should the proposed OHL be constructed using a 132kV tower specification, the electrocution impact for the majority of priority species will be negligible. The only priority species capable of bridging the clearance distances of an OHL constructed using this specification is the Cape Vulture, due to their size and gregarious nature. The impact is rated as moderate pre-mitigation and it will decrease to low post-mitigation.

- **Mortality of powerline sensitive avifauna due to electrocutions in the onsite substation:**

Electrocutions within the proposed on-site substation are possible, however the likelihood of this impact on the more sensitive SCC is remote, as these species are unlikely to regularly utilise the infrastructure within the onsite substation station for perching or roosting. Powerline sensitive species that are more vulnerable to electrocutions are medium-sized raptors, corvids, owls and certain species of waterbirds. As far as the substation is concerned, the following species are potentially at risk of electrocution: African Fish Eagle, African Grass Owl, Amur Falcon, Black Sparrowhawk, Black-chested Snake Eagle, Black-headed Heron, Black-winged Kite, Brown Snake Eagle, Cape Crow, Cape Vulture, Common Buzzard, Hadada Ibis, Helmeted Guineafowl, Jackal Buzzard, Lanner Falcon, Long-crested Eagle, Marsh Owl, Martial Eagle, Peregrine Falcon, Pied Crow, Southern Bald Ibis, Spotted Eagle-Owl, Western Barn Owl, Western Osprey and Yellow-billed Kite. The impact is rated as low pre- and post-mitigation.

- **Mortality of powerline sensitive avifauna due to collisions with the OHL:**

The up to 132kV OHL could pose a collision risk to virtually all powerline sensitive avifauna, depending on where the spans are located. Several factors are thought to influence avian collisions, including the manoeuvrability of the bird, topography, weather conditions, powerline configuration and visual capacity. Species potentially at risk are African Black Duck, African Darter, African Grass Owl, African Sacred Ibis, African Spoonbill, Black Heron, Black-bellied Bustard, Black-crowned Night Heron, Black-headed Heron, Black-necked Grebe, Blue Crane, Blue Korhaan, Blue-billed Teal, Cape Shoveler, Cape Teal, Cape Vulture, Denham's Bustard, Egyptian Goose, Fulvous Whistling Duck, Glossy Ibis, Goliath Heron, Great Egret, Greater Flamingo, Grey Crowned Crane, Grey Heron, Hadada Ibis, Hamerkop, Intermediate Egret, Lesser Flamingo, Little Egret, Little Grebe, Mallard, Marsh Owl, Northern Black Korhaan, Purple Heron, Red-billed Teal, Red-knobbed Coot, Reed Cormorant, Secretarybird, South African Shelduck, Southern Bald Ibis, Southern Pochard, Spotted Eagle-Owl, Spur-winged Goose, Squacco Heron, Wattled Crane, Western Barn Owl, Western Cattle Egret, White Stork, White-backed Duck, White-bellied Bustard, White-breasted Cormorant, White-faced Whistling Duck, Yellow-billed Duck. The impact is rated as moderate pre-mitigation and it will decrease to low post-mitigation

- **Displacement of priority species due to disturbance linked to dismantling activities in the decommissioning phase:**

The impact is likely to be similar in nature and extent to the construction phase of the proposed OHL and onsite substation. The impact is rated as medium pre-mitigation and it will decrease to low post-mitigation.

7.8.1 PLANNING AND DESIGN PHASE

MITIGATON MEASURES

- If a steel monopole pole design is used, the approved vulture friendly pole/tower design D-DT-7649 in accordance with the Eskom Distribution Technical Bulletin titled Refurbishment of 66/88kV line kite type

frames with D-DT-7649 type top configuration - Reference Number 240-170000467 relating to bird friendly structures, must be used.

- 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.

7.8.2 CONSTRUCTION PHASE

DISPLACEMENT DUE TO DISTURBANCE ASSOCIATED WITH THE CONSTRUCTION OF THE ON-SITE SUBSTATION AND UP TO 132KV OVERHEAD POWER LINE

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**	**Magnitude**	**Extent**	**Reversibilit**	**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 an inspection (avifaunal walk-through) to identify SCC that may be breeding within the infrastructure footprints. If a nest is occupied, the avifaunal specialist must consult with the contractor to find ways of minimising the potential disturbance to the breeding birds during the construction period. – Bird Flight Diverters must be fitted to the entire OHL according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines). These devices must be installed as soon as the conductors and earthwires are strung. – Construction activity should be restricted to the immediate footprint of the infrastructure. – Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species. – Measures to control noise and dust should be applied according to current best practice in the industry. – Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum. – Vegetation clearance should be limited to what is absolutely necessary. – The mitigation measures proposed by the vegetation specialist must be strictly enforced.								

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	Magnitude	Extent	Reversibilit	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
Mitigation and Management Measures	– Conduct an inspection (avifaunal walk-through) to identify SCC that may be breeding within the infrastructure footprints. If a nest is occupied, the avifaunal specialist must consult with the contractor to find ways of minimising the potential disturbance to the breeding birds during the construction period. This could include measures such as delaying some of the activities until after the breeding season, or other measures deemed suitable and practical at the time. – Bird Flight Diverters must be fitted to the entire OHL according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines). These devices must be installed as soon as the conductors and earthwires are strung. – Construction activity should be restricted to the immediate footprint of the infrastructure. – Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species. – Measures to control noise and dust should be applied according to current best practice in the industry. – Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum. – Vegetation clearance should be limited to what is absolutely necessary. – The mitigation measures proposed by the vegetation specialist must be strictly enforced.								

7.8.3 OPERATIONAL PHASE

MORTALITY OF PRIORITY SPECIES DUE TO COLLISIONS WITH THE UP TO 132KV OVERHEAD POWER LINE

The Displacement of priority species due to habitat transformation operational impact on avifauna is shown in **Table 7-19**.

Table 7-19: Displacement of priority species due to habitat transformation Operation Impact on Avifauna

Potential Impacts:	Magnitude	Extent	Reversibilit	Duration	Probability	Significance		Character	Confidence
MORTALITY OF PRIORITY SPECIES DUE TO COLLISIONS WITH THE UP TO 132KV OHPL									
Without Mitigation						**60**	**Moderate**	(-)	High
With Mitigation						**26**	**Low**	(-)	High
Mitigation and Management Measures	— No management actions are required for the operational phase.								

ELECTROCUTION OF PRIORITY SPECIES ON THE ON-SITE SUBSTATION INFRASTRUCTURE

The electrocution of priority species on the 132kV OHPL operational impact on avifauna is shown in **Table 7-20** below.

Table 7-20: Mortality of priority species due to collisions Operation Impact on Avifauna

Potential Impacts:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
ELECTROCUTION OF PRIORITY SPECIES ON THE ON-SITE SUBSTATION INFRASTRUCTURE									
Without Mitigation	5	3	3	4	2	**30**	**Moderate**	(-)	High
With Mitigation	1	2	3	4	2	**20**	**Moderate**	(-)	High
Mitigation and Management Measures	— No management actions are required for the operational phase								

ELECTROCUTION OF PRIORITY SPECIES ON THE ON-SITE SUBSTATION INFRASTRUCTURE

The Electrocution of priority species on the on-site substation infrastructure with the on-site substation infrastructure operational impact on avifauna is shown in **Table 7-21**

Table 7-21 below.

Table 7-21: Electrocution of priority species on the on-site substation infrastructure Operation Impact on Avifauna

Potential Impacts:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
ELECTROCUTION OF PRIORITY SPECIES ON THE ON-SITE SUBSTATION INFRASTRUCTURE									
Without Mitigation	5	3	3	4	3	**45**	**Moderate**	(-)	High
With Mitigation	1	2	3	4	2	**20**	**Low**	(-)	High
Mitigation and Management Measures	— No management actions are required for the operational phase.								

7.8.4 DECOMMISSIONING PHASE

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 7-22** below.

Table 7-22: 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 Impacts: **DISPLACEMENT OF PRIORITY SPECIES DUE TO DISTURBANCE**	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	– Conduct an avifaunal inspection of the OHL prior to its decommissioning to identify nests on the poles/towers. – Decommissioning activity should be restricted to the immediate footprint of the infrastructure as far as possible. – Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species. – Measures to control noise and dust should be applied according to current best practice in the industry. – Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum								

7.9 VISUAL

7.9.1 CONSTRUCTION PHASE

POTENTIAL VISUAL ISSUES / IMPACTS RESULTING FROM CONSTRUCTION PHASE OF THE PROPOSED 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 is indicated in **Table 7-23** below.

Table 7-23: Impact Rating for Camden I WEF 132kV Grid Connection Infrastructure during the construction phase

Potential Impact: 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	– Carefully plan to minimise the construction period and avoid construction delays. – Inform receptors within 500m of the proposed power line and / or substation of the construction programme and schedules; – Make use of existing gravel access roads where possible. – Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible. – Ensure that dust suppression techniques are implemented:								

	— on all access roads; — in all areas where vegetation clearing has taken place; — on all soil stockpiles. — Maintain a neat construction site by removing litter, rubble and waste materials regularly.

7.9.2 OPERATIONAL PHASE

POTENTIAL VISUAL ISSUES / IMPACTS RESULTING FROM OPERATIONAL PHASE OF THE PROPOSED 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 is indicated in **Table 7-24**.

Table 7-24: Impact Rating for Camden I WEF 132kV Grid Connection Infrastructure during the operational phase

Potential Impact: **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	— Where possible, limit the number of maintenance vehicles using access roads. — Ensure that dust suppression techniques are implemented on all gravel access roads. — As far as possible, limit the amount of security and operational lighting present on the substation site whilst adhering to relevant safety standards. — Light fittings for security at night should reflect the light toward the ground and prevent light spill. — Lighting fixtures should make use of minimum lumen or wattage whilst adhering to relevant safety standards. — Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used. — If possible, make use of motion detectors on security lighting. — Non-reflective surfaces should be used where possible								

7.9.3 DECOMMISSIONING PHASE

POTENTIAL VISUAL ISSUES / IMPACTS RESULTING FROM OPERATIONAL PHASE OF THE PROPOSED 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 7-25: Decommissioning Phase Impact

Potential Impact: / VISUAL IMPACTS	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. — Ensure that dust suppression techniques are implemented on all gravel access roads. — As far as possible, limit the amount of security and operational lighting present on the substation site whilst adhering to relevant safety standards. — Light fittings for security at night should reflect the light toward the ground and prevent light spill. — Lighting fixtures should make use of minimum lumen or wattage whilst adhering to relevant safety standards. — Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used. — If possible, make use of motion detectors on security lighting. — Non-reflective surfaces should be used where possible								

Table 7-26: Decommissioning Phase Impact

Potential Impact: / 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. — Carefully plan to minimize the decommissioning period and avoid delays. — Maintain a neat decommissioning site by removing rubble and waste materials regularly. — Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. — All cleared areas should be rehabilitated as soon as possible. — Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required. — Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase.								

7.10 TRAFFIC

7.10.1 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; — Ensure that trucks and other vehicles do not block access roads; and — All site vehicles must limit the idle time on access roads.								

7.10.2 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.

7.11 HERITAGE

Based on the current layout, none of the proposed alternatives will have a direct impact on the recorded features in the surrounding area. The significance of the recorded ruins (CA002, 005, 007, 012 and 017) (**Figure 6-29**) ranges from low to medium and high (if associated with stillborn graves) and the sites should be indicated on development plans and avoided during construction after which the impacts will be very low. The significance of the cemetery at CA015 and CA016 (**Figure 6-29**) is high, and the sites must be preserved in situ with a 30-meter buffer as mitigation measure, after mitigation the impact will be 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.

7.11.1 CONSTRUCTION PHASE

Potential impacts that might be experienced include the destruction or partial destruction of non-renewable heritage resources.

Table 7-28: Construction Impact on recorded ruins

Potential Impact: DESTRUCTION OR DAMAGE TO RECORDED RUINS: (CA002, CA005, CA007, CA0012, CA0017)	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	1	5	5	2	**28**	**Low**	(-)	High
With Mitigation	3	1	5	5	1	**14**	**Very Low**	(-)	High
Potential Impact: DESTRUCTION OR DAMAGE TO RECORDED GRAVES: (CA015 and CA016)	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	4	2	5	5	2	**32**	**Moderate**	(-)	High
With Mitigation	4	2	5	5	1	**16**	**Low**	(-)	High

7.11.2 OPERATIONAL PHASE

No impacts are expected during the operation phase.

7.12 PALAEONTOLOGY

Table 7-29: Construction Impacts on palaeontological records

Potential Impact: DESTRUCTION OR DAMAGE TO RECORDED RUINS: (CA002, CA005, CA007, CA0012, CA0017)	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**	(+)	High
Mitigation and Management Measures	— If fossils occur in the footprint of any section of the WEF footprint, associated grid infrastructure, access roads or all other associated infrastructure, they can be removed (Fossil Chance Find Protocol – **Appendix G**), and the project can continue. If no fossils are found, then no mitigation is required. — 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. — 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 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.

7.13.1 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 7-30**.

Table 7-30: Construction Impact on Employment, Skills Development and Business Opportunities

Potential Impact: **CREATION OF EMPLOYMENT AND BUSINESS OPPORTUNITIES DURING THE CONSTRUCTION PHASE**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	2	N/a	2	3	**18**	**Low**	(+)	High
With Mitigation	2	3	N/a	2	3	**28**	**Low**	(+)	High
Mitigation and Management Measures	**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. *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 7-31**.

Table 7-31: Construction Impact on presence of construction workers and family structures

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
PRESENCE OF CONSTRUCTION WORKERS AND POTENTIAL IMPACTS ON FAMILY STRUCTURES AND SOCIAL NETWORKS									
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. – 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. – The proponent and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase. – 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. – 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. – No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

Residual Impacts on family and community relations that may, in some cases, persist for a long period of time. Also, in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent residual/cumulative impacts on the affected individuals and/or their families and the community.

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 7-32.**

Table 7-32: Construction Impact on Safety, Livestock, and Farm Infrastructure

Potential Impact: **POTENTIAL RISK TO SAFETY OF FARMERS AND FARM WORKERS, LIVESTOCK AND DAMAGE TO FARM INFRASTRUCTURE ASSOCIATED WITH THE PRESENCE OF CONSTRUCTION WORKERS ON 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	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. – All farm gates must be closed after passing through.								

	– Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site. – 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. – 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). – The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested. – 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. – 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. – 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 7-33**.

Table 7-33: Construction Impact on 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. – Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas. – Smoking on site should be confined to designated areas. – 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. – Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle. – Contractor should provide fire-fighting training to selected construction staff. – No construction staff, with the exception of security staff, to be accommodated on site overnight. – 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 impact** is shown in **Table 7-34**.

Table 7-34: Nuisance impacts during the construction phase

Potential Impact: **Potential noise, dust and safety impacts associated with movement of construction related activities and movement of traffic to and from the site**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
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. – Ongoing communication with land owners and road users during construction period. – 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. – 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. – Repair of all affected road portions at the end of construction period where required. – 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. – 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 impact **associated with loss of farmland** is shown in **Table 7-35**.

Table 7-35: Construction Impact on Nuisance

Potential Impact: **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. – The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be minimised. – An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase. – 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. – 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 EIA.								

	— The implementation of the Rehabilitation Programme should be monitored by the ECO.

7.13.2 OPERATIONAL PHASE

IMPROVE ENERGY SECURITY AND SUPPORT THE RENEWABLE ENERGY SECTOR

The proposed power line is essential to enable the development and operation of Camden I WEF. The primary goal of the proposed Camden I WEF 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 generators. 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 period. The operational impact on **energy security** is shown in **Table 7-36**.

Table 7-36: Operational Impact on Improved Energy Security

Potential Impact: **DEVELOPMENT OF INFRASTRUCTURE TO IMPROVE ENERGY SECURITY AND SUPPORT RENEWABLE SECTOR**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	3	4	N/a	4	4	**44**	**Moderate**	(-)	High
With Mitigation	3	4	N/a	4	4	**44**	**High**	(+)	High
Mitigation / Enhancement and Management Measures	— Maximise the number of employment opportunities for local community members. — Implement training and skills development programs for members from the local community. — 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 AND BUSINESS OPPORTUNITIES

The potential employment, skills development and business-related opportunities associated with the power line and substations 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 opportunities and business opportunities** is shown in **Table 7-37**.

Table 7-37: 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	2	N/a	4	2	**14**	**Low**	(+)	High

With Mitigation	4	2	N/a	4	2	**40**	**Moderate**	(+)	High
Mitigation / Enhancement and Management Measures	— Maximise the number of employment opportunities for local community members. — Implement training and skills development programs for members from the local community. — 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 7-38**.

Table 7-38: Operational Impact on income generated for affected farmer(s)

Potential Impact: **RISKS POSED TO FARMING ACTIVITIES BY MAINTENANCE WORKERS**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	1	0	3	3	**21**	**Low**	(+)	High
With Mitigation	3	2	0	2	5	**45**	**Moderate**	(+)	High
Mitigation / Enhancement 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 7-39**.

Table 7-39: Operational Impact on Visual impact and impact on sense of place

Potential Impact: **RISKS POSED TO FARMING ACTIVITIES BY MAINTENANCE WORKERS**	**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**	**Low**	(-)	High
Mitigation and Management Measures	— The recommendations contained in the VIA should also 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 property values is shown in **Table 7-40**.

Table 7-40: The operational impact on farming operations during maintenance

Potential Impact: **POTENTIAL IMPACT ON FARMING OPERATIONS DURING MAINTENANCE**	**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. – Maintenance teams must ensure that all farm gates must be closed after passing through. – Property owners should be compensated for damage to farm property and or loss of livestock or game associated maintenance related activities. – Movement of traffic and maintenance related activities should be strictly contained within designated areas associated with transmission lines and substations. – Strict traffic speed limits must be enforced on the farm. – No maintenance workers should be allowed to stay over-night on the affected properties								

7.14 HEALTH AND SAFETY

7.14.1 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 7-41** below.

Table 7-41: Construction Impact on Employee Health and Safety

Potential Impact: **EMPLOYEE HEALTH AND SAFETY**	**Magnitude**	**Extent**	**Reversibilit**	**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; – Ensure employees are properly trained to use specific equipment or machinery; – Train personnel on how to deal with snake encounters, as well as encounters with other dangerous animals known to occur in the area; – Provide suitable personal protective equipment (PPE);								

Potential Impact:	Magnitude	Extent	Reversibilit	Duration	Probability	Significance	Character	Confidence
EMPLOYEE HEALTH AND SAFETY								
	– Conduct site and safety induction to raise awareness of the risks associated with the site; – Conduct regular toolbox talks as refreshers to improve health and safety; – Develop safe work instruction method statements that should be used by employees in completing their tasks; – Train all relevant personnel on handling, use and storage of hazardous substances; – Provide Material Safety Data Sheets (MSDS) for all hazardous substances kept onsite; and – All visitors should undergo site induction and be made aware of the risks associated with the site.							

7.14.2 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 7-42** below.

Table 7-42: Operation Impact on Employee Health and Safety

Potential Impact:	Magnitude	Extent	Reversibilit	Duration	Probability	Significance		Character	Confidence
EMPLOYEE HEALTH AND SAFETY									
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; – Ensure employees are properly trained to use specific equipment or machinery; – Train personnel on how to deal with snake encounters, as well as encounters with other dangerous animals known to occur in the area; – Provide suitable PPE; – Conduct site and safety induction to raise awareness of the risks associated with the site; – Conduct regular toolbox talks as refreshers to improve health and safety; – Develop safe work instruction method statements that should be used by employees in completing their tasks; – Train all relevant personnel on handling, use and storage of hazardous substances; – Provide MSDSs for all hazardous substances kept onsite; and – All visitors should undergo site induction and be made aware of the risks associated with the site.								

7.15 AGRICULTURAL POTENTIAL

An agricultural impact is a temporary or permanent change to the future production potential of land. The significance of the agricultural impact is directly proportional to the extent of the change in production potential. If a development will not change the future production potential of the land, then there is no agricultural impact.

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 1.5 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. The production potential of the land on the preferred northern site is limited to being unsuitable for crop production and only suitable as grazing land. Therefore, the agricultural impact of the preferred northern alternative is assessed as being of low significance. The production potential of the land on the southern alternative site is partly suitable for crop production. Therefore, the agricultural impact of the alternative southern site is higher than that of the preferred northern site but because it only involves the loss of 1.5 hectares, it is still assessed as being of low significance.

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 VISUAL CUMULATIVE IMPACTS

Although it is important to assess the visual impacts of the proposed Camden I WEF and associated grid connection specifically, it is equally important to assess the cumulative visual impact that could materialise because of this development. 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 I WEF 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 impacts on the landscape.

Table 8-1: Visual cumulative Impact

Potential Impact: / **VISUAL IMPACT**	**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. — Non-reflective surfaces should be utilised where possible. — Where possible, limit the amount of security and operational lighting present at the on-site substation. — Light fittings for security at night should reflect the light toward the ground and prevent light spill.								

8.2 AVIFAUNAL CUMULATIVE IMPACTS

The combined length of the grid connections for the Camden I and II renewable energy projects listed above, and the 400kV OHL to Camden Power Station Substation, is approximately 26.4km. The proposed Camden I grid connection will be a maximum of 5.3km long. The existing high voltage lines in the 30km radius around the proposed Camden I WEF run into hundreds of kilometres. The Camden I grid OHL contribution to the total length of high voltage lines within a 30km radius, and by implication to the cumulative impact of all the planned and existing high voltage lines, is thus **Low** in comparison. However, the density of planned and existing high voltage lines within a 30km radius, and by implication the cumulative impact on avifauna, is considered to be **Moderate**.

MORTALITY OF PRIORITY AVIFAUNA DUE TO THE CONSTRUCTION OF THE OHPL

Table 8-2: Visual Cumulative Impacts associated with the decommissioning phase (mortality collisions)

Potential Impact:	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
MORTALITY COLLISION									
Without Mitigation	2	2	2	4	3	**30**	**Low**	(-)	High
With Mitigation	2	3	3	4	2	**24**	**Low**	(-)	High

DISPLACEMENT OF PRIORITY AVIFAUNA DUE TO DISTURBANCE AND HABITAT TRANSFORMATION

Table 8-3: Visual Cumulative Impacts associated with the decommissioning phase (displacement)

Potential Impact:	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
DISPLACEMENT									
Without Mitigation	2	2	2	4	3	**30**	**Low**	(-)	High
With Mitigation	3	2	3	2	2	**24**	**Low**	(-)	High

MORTALITY (ELECTROCUTION) OF PRIORITY AVIFAUNA DUE TO THE CONSTRUCTION OF THE ON-SITE SUBSTATION

Potential Impact:	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
MORTALITY ELECTROCUTION									
Without Mitigation	3	3	3	4	2	**26**	**Low**	(-)	High
With Mitigation	1	2	3	4	2	**20**	**Low**	(-)	High

8.3 AQUATIC CUMULATIVE IMPACTS

Table 8-4: Cumulative impacts on visual sense of place

Potential Impact: **In the assessment of this project, any similar projects were assessed (e.g Camden II and Ummbila Emoyeni Wind Energy Facility)**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
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
Mitigation and Management Measures	– All alien plant re-growth must be monitored 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. – It is further recommended that a comprehensive rehabilitation / monitoring plan be implemented from the project onset i.e. during the detailed design phase prior to construction, to ensure a net benefit to the environment within all areas that will remain undisturbed. – 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. – 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. – 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, i.e. stormwater detention pond. – Strict use and management of all hazardous materials used on site. – Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.) within demarcated / bunded areas – Containment of all contaminated water by means of careful run-off management on site. – 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 shown. – Strict control of the behaviour of construction workers.								

	— Appropriate waste management. — Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Construction Environmental Management Plan (EMPr) for the project and strictly enforced. — Install properly sized culverts with erosion protection measures at the present road / track crossings where already installed by local landowners / public works entities.

8.4 AGRICULTURAL CUMULATIVE IMPACTS

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 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.

8.5.1 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 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

8.5.2 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

8.5.3 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:	Magn…	Exten…	Rever…	Durat…	Proba…	Signif icanc e		Chara cter	Confi dence

ESTABLISHMENT AND SPREAD OF DECLARED WEEDS AND ALIEN INVADER PLANTS									
Current project	1	2	3	1	2	**14**	**Very Low**	(-)	High
Combination of projects	3	4	3	3	4	**52**	**Moderate**	(-)	High

8.6 TERRESTRIAL ANIMAL SPECIES

8.6.1 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:	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
LOSS OF FAUNAL HABITAT									
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

8.6.2 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:	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
LOSS OF FAUNAL HABITAT									
Overall impact of the proposed project considered in isolation	1	2	1	2	3	**18**	**Low**	(-)	High
Cumulative impact of the project and other projects in the area	3	2	1	3	4	**36**	**Moderate**	(-)	High

8.6.3 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**	**Low**	(-)	High
Cumulative impact of the project and other projects in the area	3	4	1	3	4	**44**	**Moderate**	(-)	High

8.7 Terrestrial plant species

8.7.1 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: LOSS OF INDIVIDUALS OF SPECIES OF CONSERVATION CONCERN	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
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

8.8 SOCIO-ECONOMIC CUMULATIVE IMPACTS

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. The relevant issues identified by Scottish Natural Heritage study include:

- Combined visibility (whether two or more wind farms will be visible from one location).
- Sequential visibility (e.g., the effect of seeing two or more wind farms along a single journey, e.g., road or walking trail).
- The visual compatibility of different wind farms 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.

8.8.1 CUMULATIVE IMPACTS ON SENSE OF PLACE AND LANDSCAPE

Table 8-12: Cumulative impacts on sense of place and the landscape

Potential Impact:									
VISUAL IMPACTS ASSOCIATED WITH THE ESTABLISHMENT OF MORE THAN ONE REF 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**	**Low**	(-)	High
Cumulative impact of the project and other projects in the area	3	2	1	4	4	**40**	**Moderate**	(-)	High
Mitigation Measures	— The recommendations contained in the VIA should be implemented.								

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.

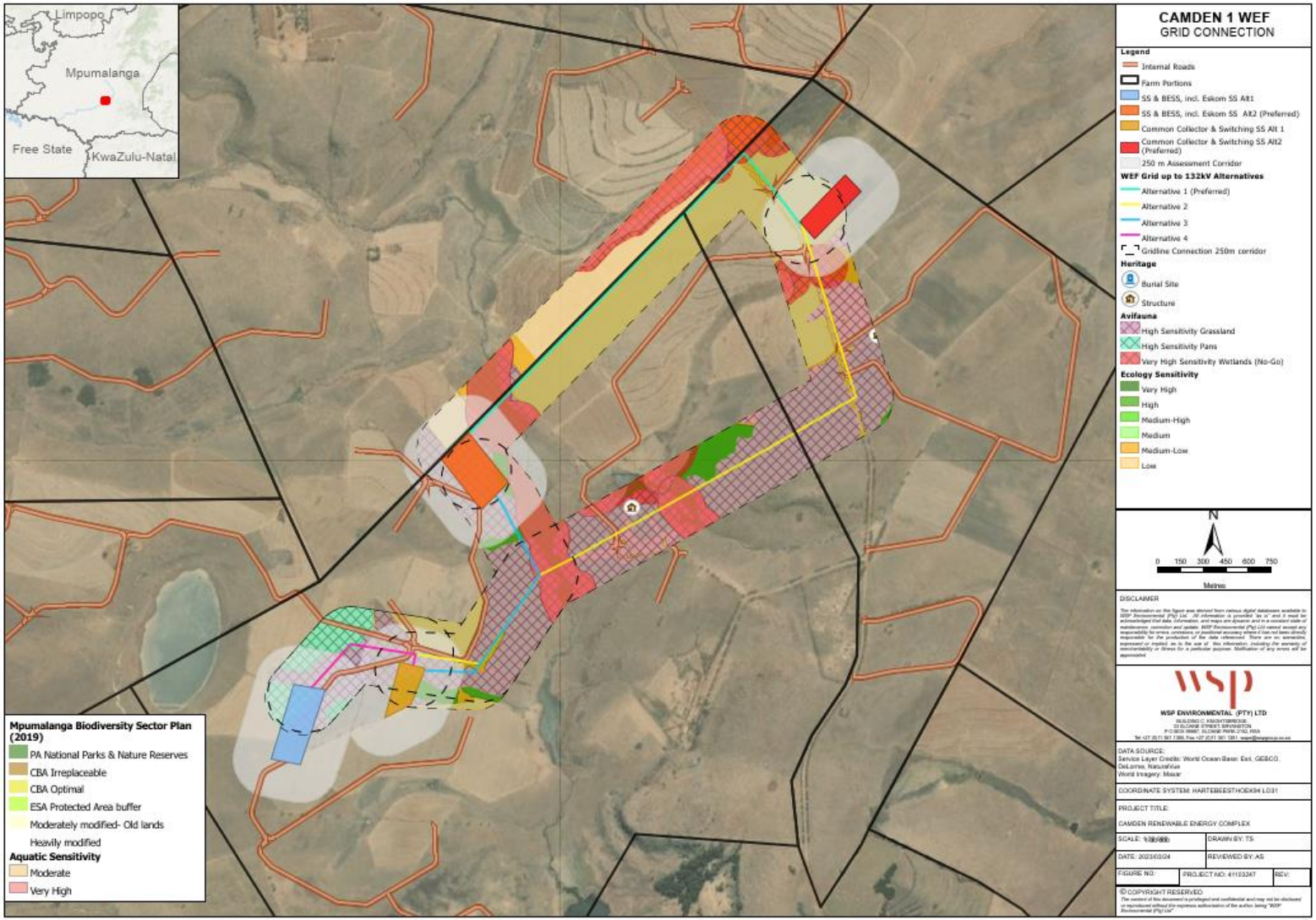


Figure 9-1: Combined Sensitivity Map, showing grid and substation assessment corridors

9.1.1 AGRICULTURAL POTENTIAL AND SOILS

Agricultural sensitivity is a direct function of the capability of the land for agricultural production. All arable land that can support viable crop production, is classified as high (or very high) sensitivity. This is because there is a scarcity of arable production land in South Africa and its conservation for agricultural use is therefore a priority. Land which cannot support viable crop production is much less of a priority to conserve for agricultural use and is rated as medium or low agricultural sensitivity.

It is important to recognise that the agricultural sensitivity of land, in terms of a particular development, is not only a function of the screening tool sensitivity but is also a function of the severity of the impact which that development poses to agriculture. This is not recognised in the screening tool classification of sensitivity. So, for example, the sensitivity of an agricultural environment to overhead powerlines is not what the screening tool classifies the sensitivity as, because most agricultural environments have a very low sensitivity to overhead powerlines. This is because powerlines have negligible agricultural impact in most environments, regardless of the agricultural production potential of the land that they cross. Therefore, in the context of the development of overhead powerlines, almost no land can be considered to have high sensitivity for impacts on agricultural resources. For this reason, the screening tool sensitivity of the powerline corridor is largely irrelevant. In this assessment, only the footprint of the substation is of relevance for it, 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. The data is generated by GIS modelling. 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, based on its soil, climate and terrain. The higher land capability values (≥8 to 15) are likely to be suitable as arable land for crop production, while lower values are only likely to be suitable as non-arable grazing land.

A map of the proposed powerline and substation alternatives, overlaid on the screening tool sensitivity, is given in **Figure 9-2** and **Figure 9-3**, but as noted above, 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 minimise interference 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 the substation site (preferred northern alternative) is 9 to 11 and of the alternative southern site is 10 to 11. Values of 9 to 10 translate to a high agricultural sensitivity and values of 11 to 15 translate to a very high agricultural sensitivity.

However, 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 is given in **Figure 6-8**. Therefore, the preferred northern substation site should be classified as MEDIUM agricultural sensitivity because it is uncropped and therefore unsuitable for crop production. The alternative southern site includes some areas of cropland that are confirmed as high agricultural sensitivity.

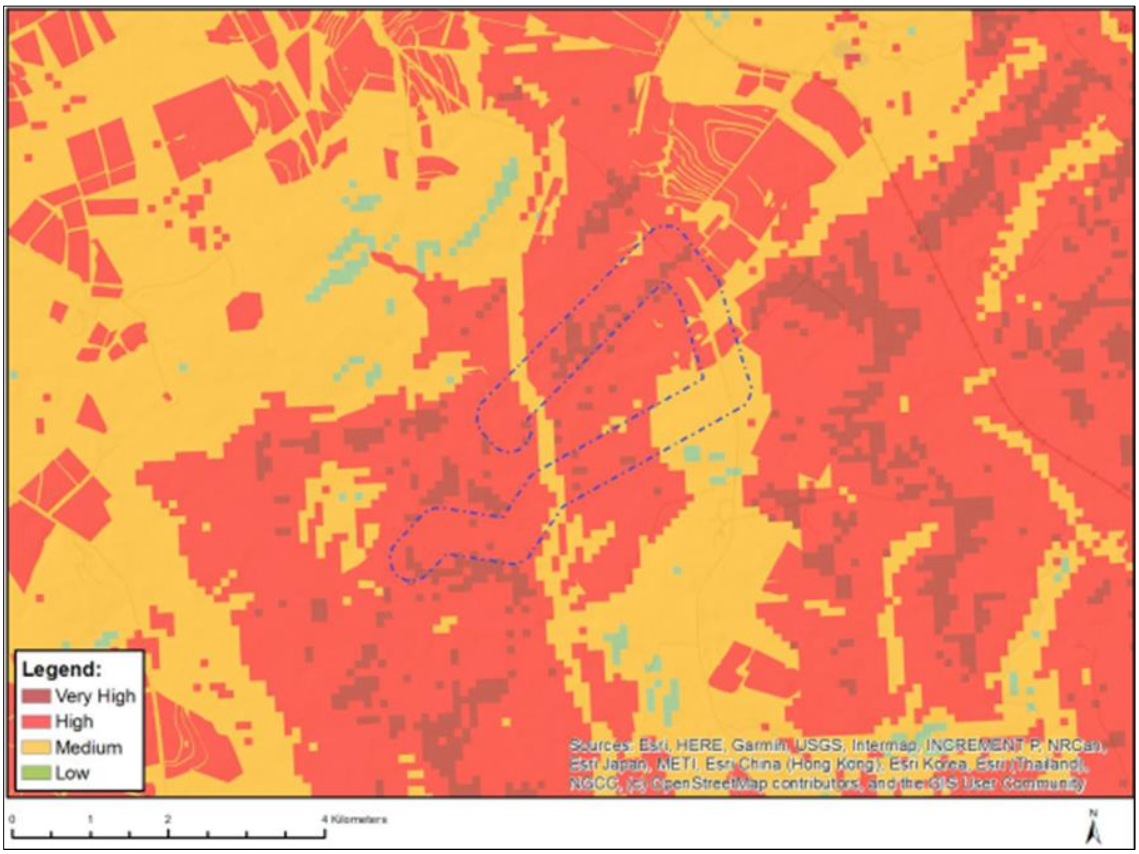


Figure 9-2: DFFE Screening Tool extract: Agricultural species theme (Alternative 1&2)

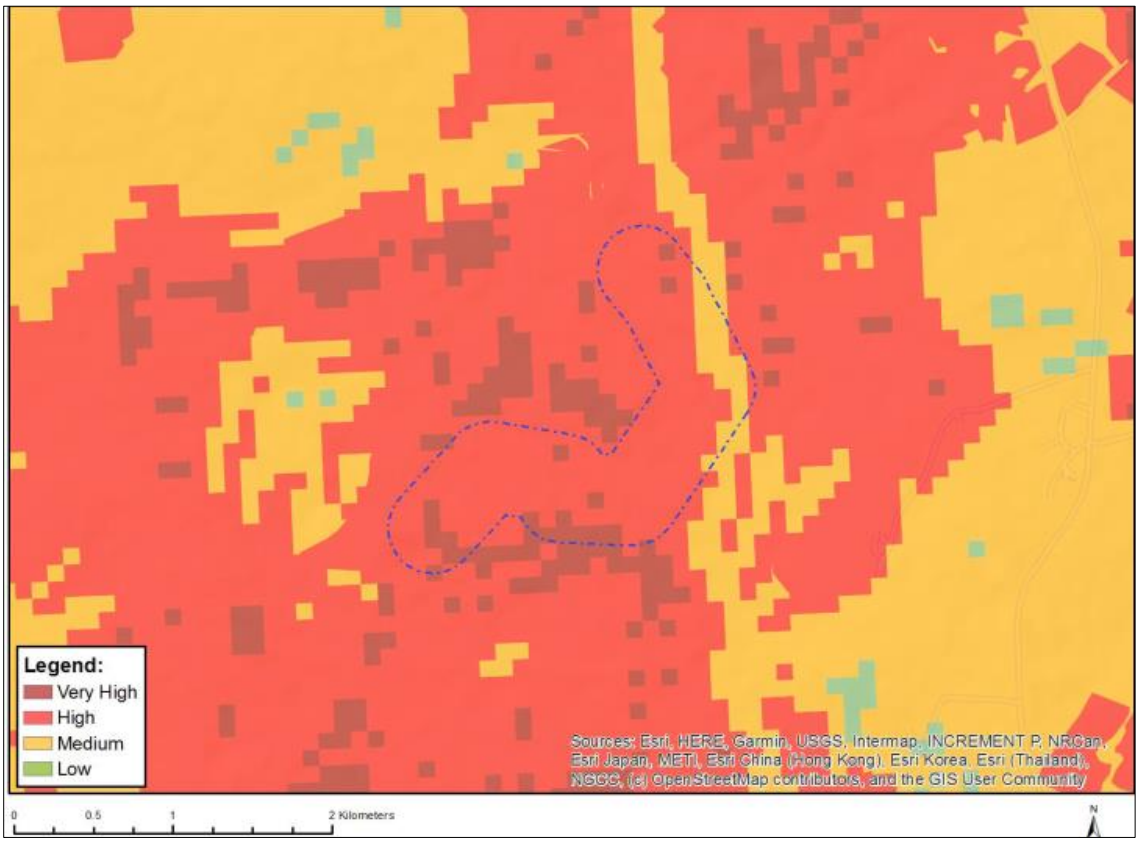


Figure 9-3: DFFE Screening Tool extract: Agricultural species theme (Alternative 3&4)

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 9-4** and **Figure 9-5**). 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.

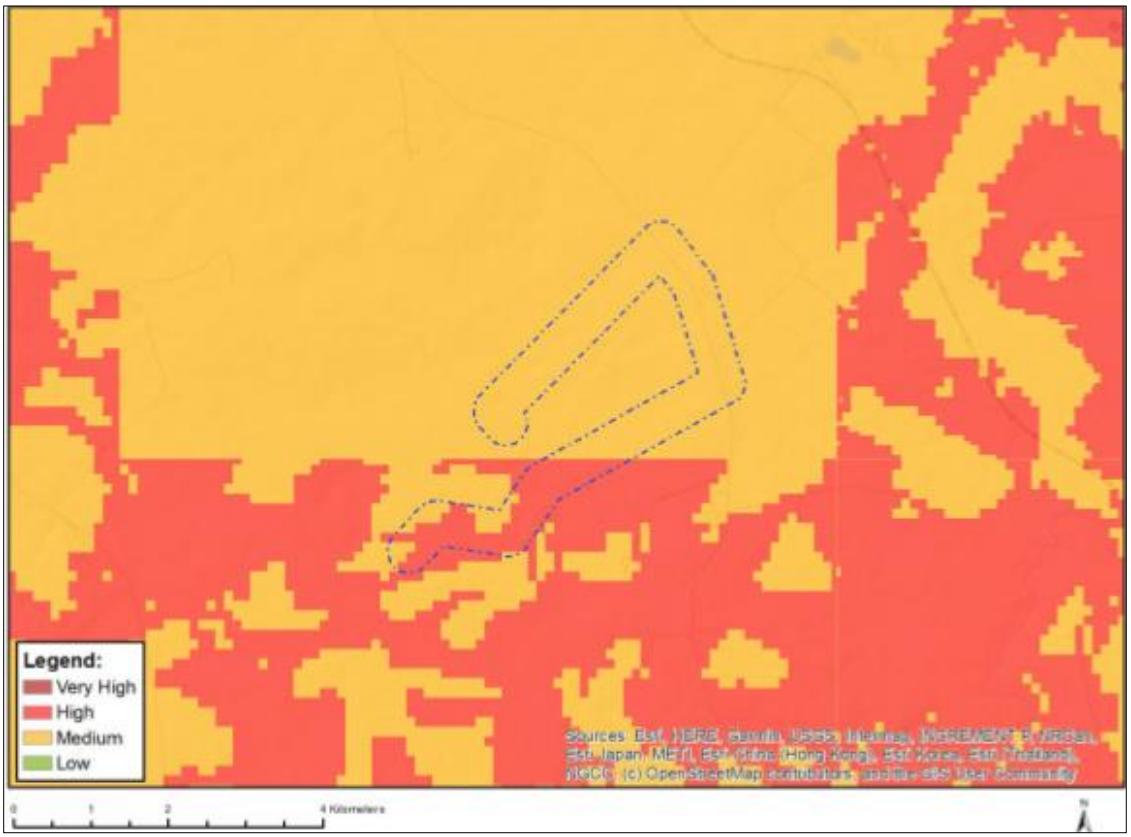


Figure 9-4: DFFE Screening Tool extract: Animal species theme (Alternative 1&2)

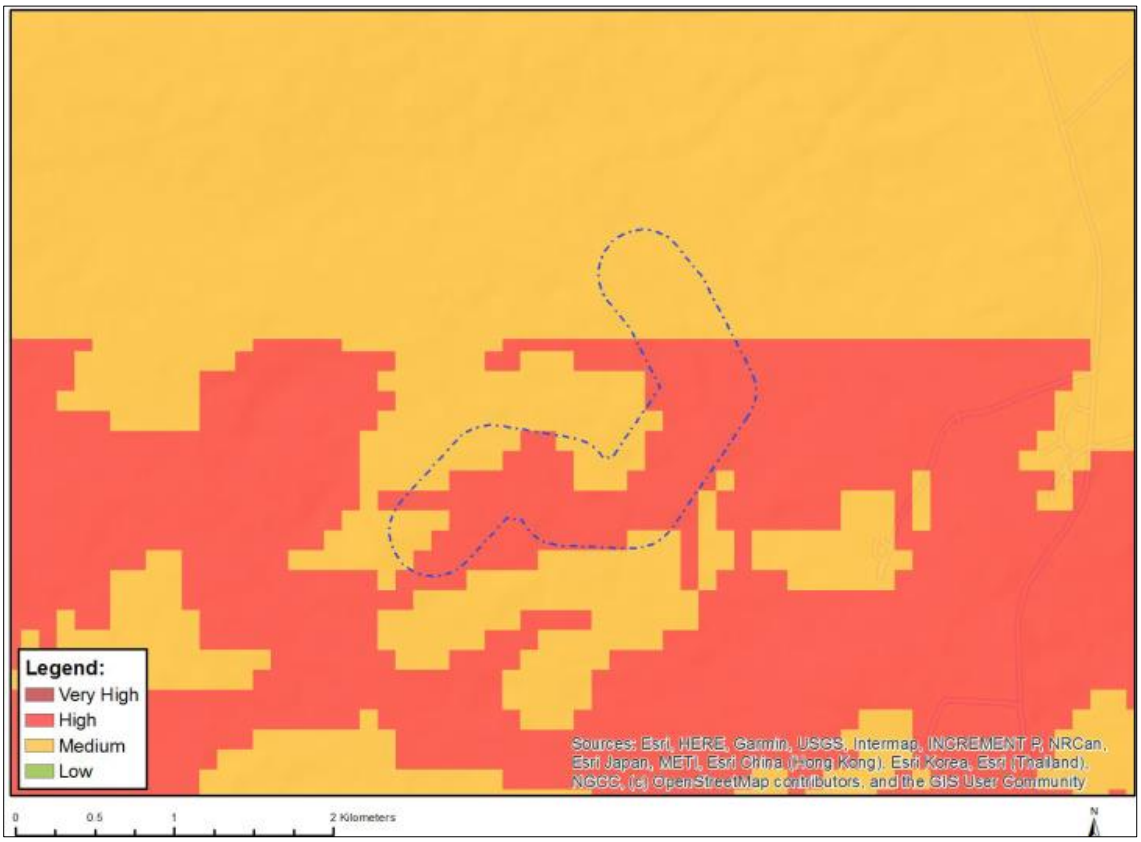


Figure 9-5: DFFE Screening Tool extract: Animal species theme (Alternative 3&4)

9.1.3 TERRESTRIAL PLANT SPECIES

The plant species theme indicates that the site is within two sensitivity classes, namely MEDIUM and LOW (**Figure 9-6 and Figure 9-7**). 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.

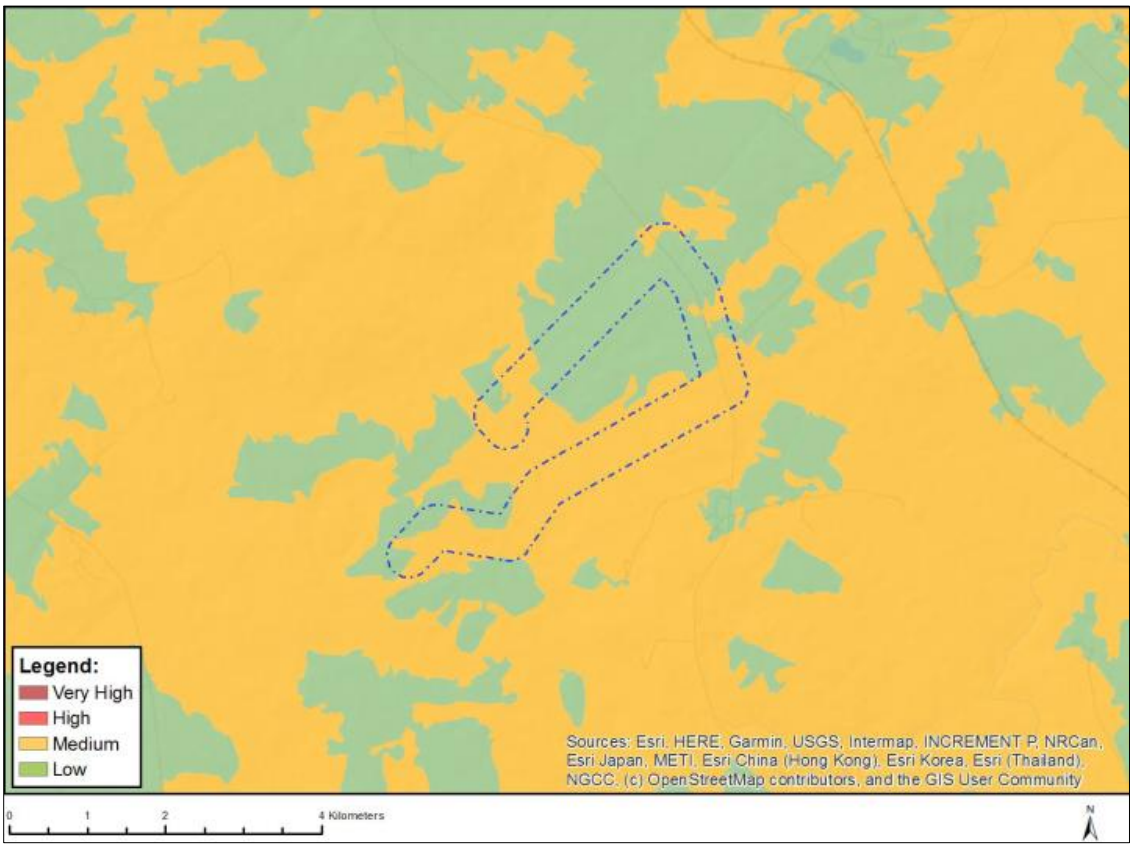


Figure 9-6: DFFE Screening Tool extract: Animal species theme (Alternative 1&2)

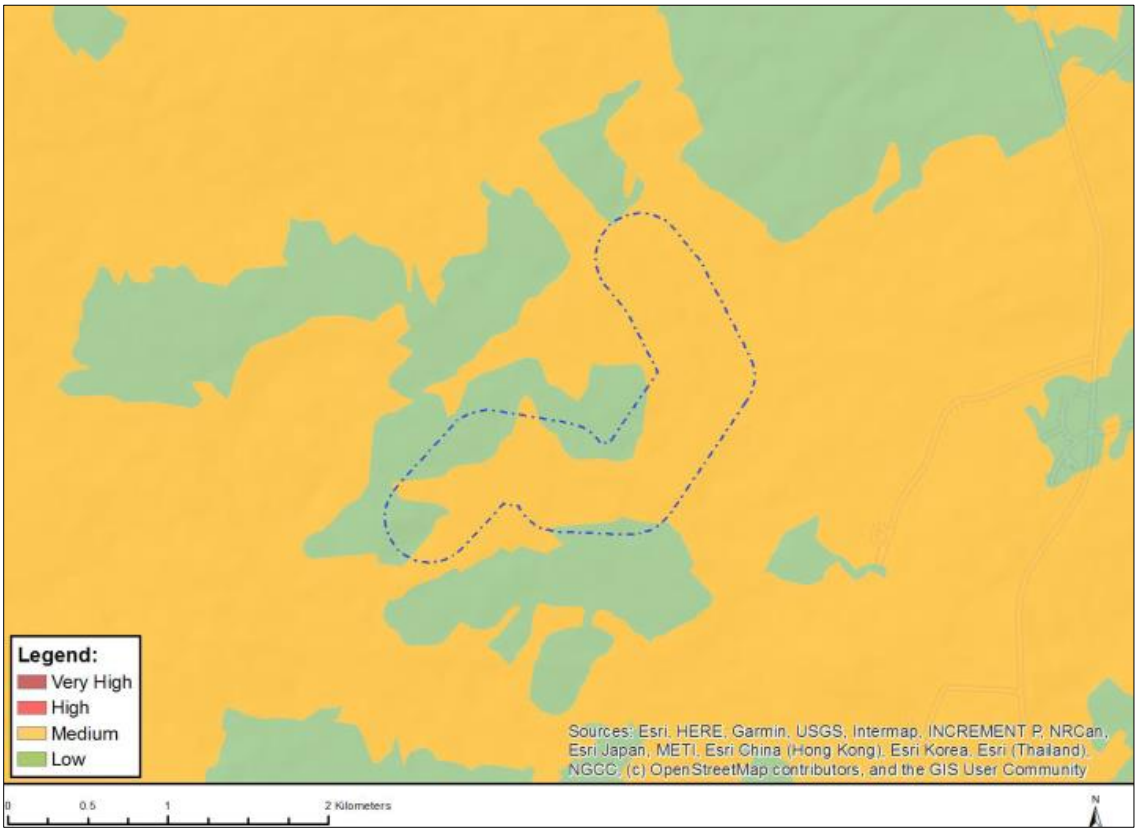


Figure 9-7: DFFE Screening Tool extract: Animal species theme (Alternative 3&4)

9.1.4 TERRESTRIAL BIODIVERSITY

Separate Screening Tool reports were requested for Alternatives 1/2 and for Alternatives 3/4, but they cover the same areas, except that the second report is for a smaller area near the southern end of the alignments. The terrestrial biodiversity theme indicates that the site is within one sensitivity class, namely VERY HIGH (**Table 9-1**, **Table 9-2**, **Figure 9-8** and **Figure 9-9**).

Table 9-1: DFFE Screening Tool Sensitivity features for Alternative 1 and 2):

SENSITIVITY	FEATURE(S)
Very High	Critical biodiversity area 1
Very High	Critical biodiversity area 2
Very High	FEPA Subcatchments
Very High	Protected Areas Expansion Strategy
Very High	Strategic Water Source Areas
Very High	Endangered ecosystem
Very High	Langcarel Private Nature Reserve

Table 9-2: DFFE Screening Tool Sensitivity features for Alternative 3 and 4):

SENSITIVITY	FEATURE(S)
Very High	FEPA Subcatchments
Very High	Protected Areas Expansion Strategy
Very High	Strategic Water Source Areas
Very High	Endangered ecosystem
Very High	Langcarel Private Nature Reserve

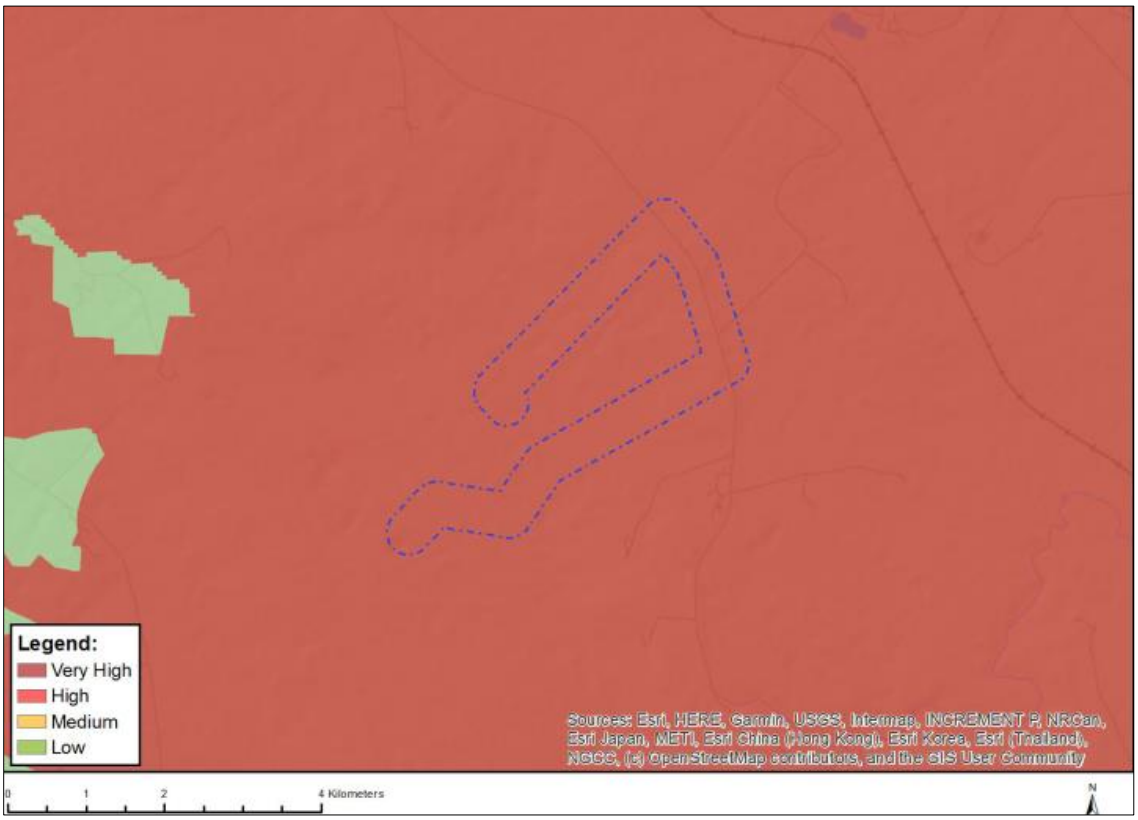


Figure 9-8: DFFE Screening Tool extract: Terrestrial biodiversity theme (Alternative 1&2)

Figure 9-9: DFFE Screening Tool extract: Terrestrial biodiversity theme (Alternative 3&4)

9.1.5 AVIFAUNA

In the case of the Animal Species theme, relevant to the proposed WEF, grid connection and BESS, the project area is classified as MEDIUM to HIGH sensitivity (**Figure 9-4** and **Figure 9-5**), based on the potential presence of several species of conservation concern (SCC) namely Grey Crowned Crane (Globally and Regionally Endangered), Martial Eagle (Globally and Regionally Endangered), Southern Bald Ibis (Globally and Regionally Vulnerable), White-bellied Korhaan (Regionally Vulnerable) and Secretarybird (Globally Endangered and Regionally Vulnerable). This classification was confirmed during the site surveys, based on the presence of recorded SCC, namely Secretarybird (Globally Endangered, Regionally Vulnerable) White-bellied Bustard (Regionally Vulnerable), Blue Crane (Globally Vulnerable, Regionally Near-threatened), Grey Crowned Crane (Globally and Regionally Endangered), Martial Eagle (Globally and Regionally Endangered), Lanner Falcon (Regionally Vulnerable), Greater Flamingo (Regionally Near-threatened), Lesser Flamingo (Globally and Regionally Near-threatened), Black Harrier (Regionally and Globally Endangered), Southern Bald Ibis (Regionally and Globally Vulnerable), Blue Korhaan (Globally Near-threatened), African Grass Owl (Regionally Vulnerable) and Cape Vulture (Globally Vulnerable and Regionally Endangered).

9.1.6 AQUATIC

Based on the DFFE 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 9-10 and Figure 9-11**).

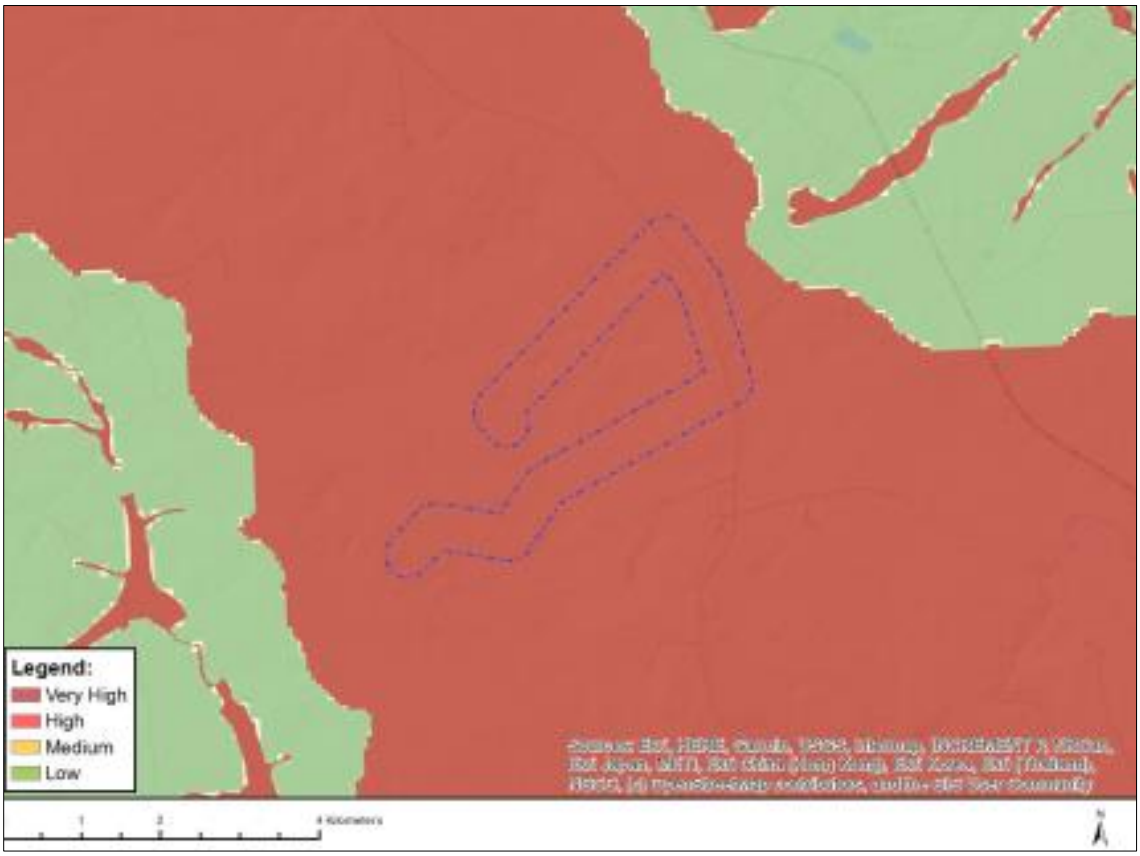


Figure 9-10: DFFE Screening Tool outcome for the aquatic biodiversity theme (Alternative 1&2)

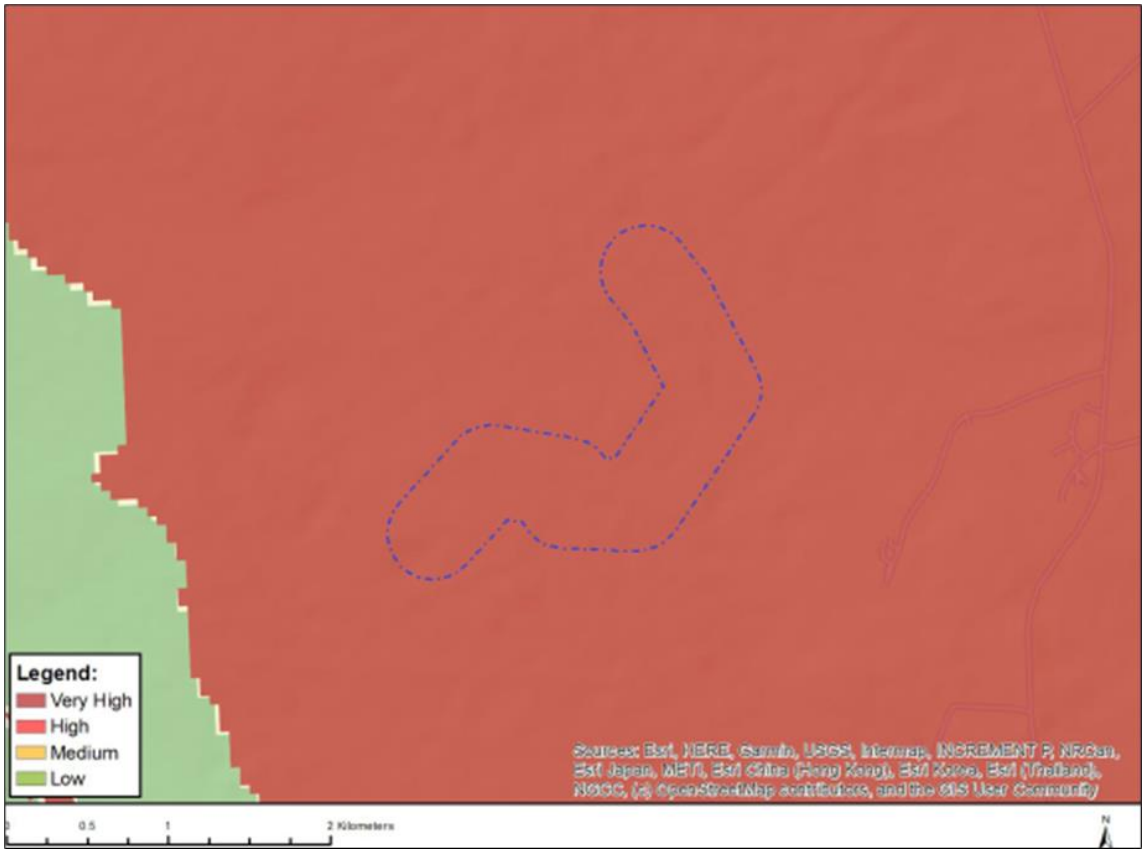


Figure 9-11: DFFE Screening Tool outcome for the aquatic biodiversity theme (Alternative 3&4)

9.1.7 HERITAGE

Based on the DFFE Screening Tool, the site contains areas of LOW SENSITIVITY (**Figure 9-12** and **Figure 9-13**).

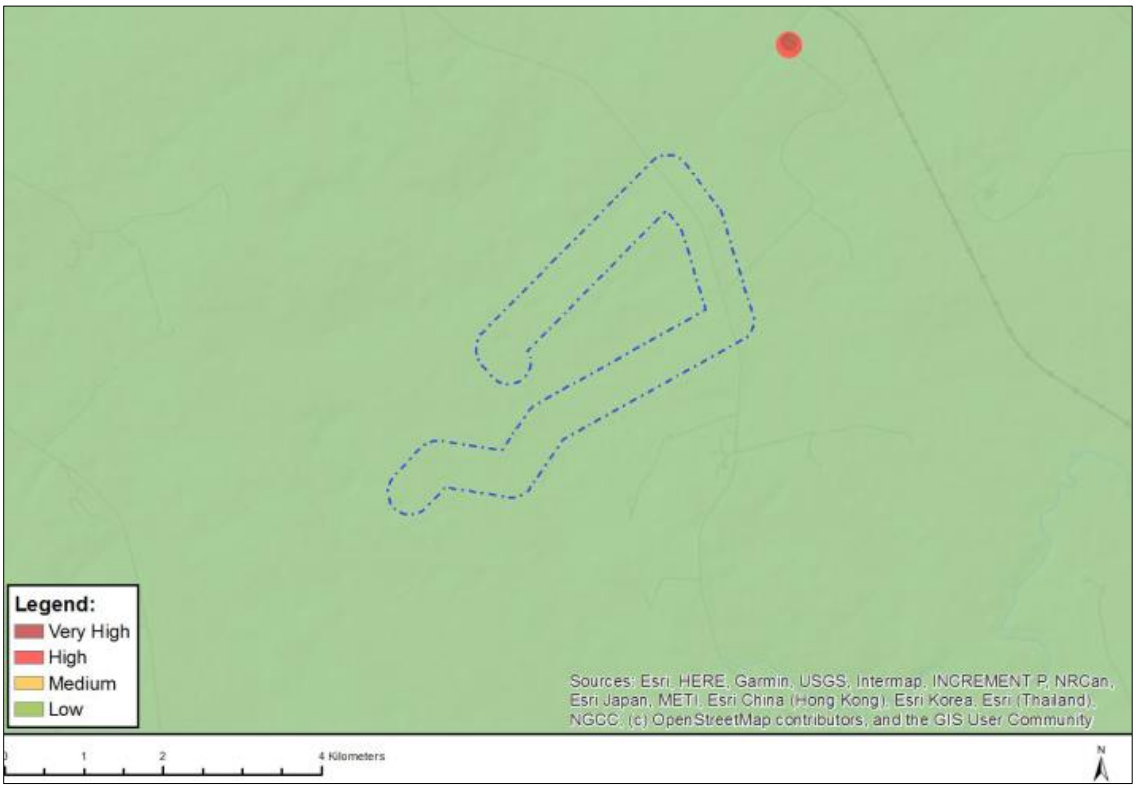


Figure 9-12: DFFE Screening Tool outcome for the heritage theme (Alternative 1&2)

Figure 9-13: DFFE Screening Tool outcome for the heritage theme (Alternative 3&4)

9.1.8 PALAEONTOLOGICAL

Based on the DFFE Screening Tool, the site contains areas of LOW SENSITIVITY (**Figure 9-14** and **Figure 9-15**).

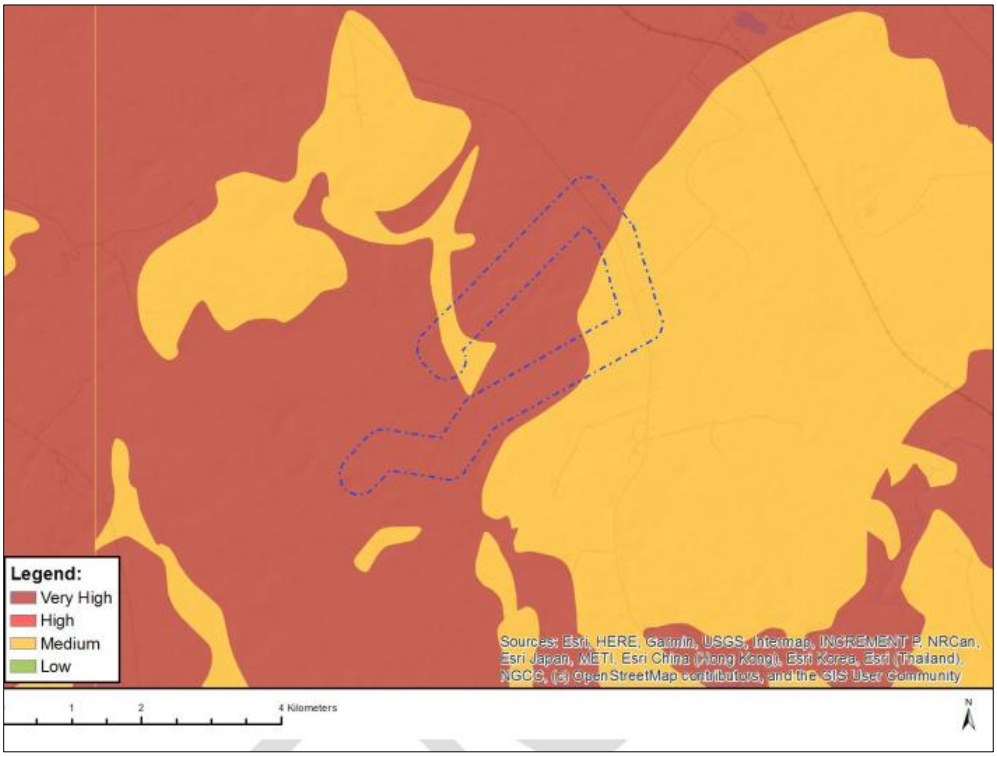


Figure 9-14: DFFE Screening Tool outcome for the palaeontological theme (Alternative 1&2)

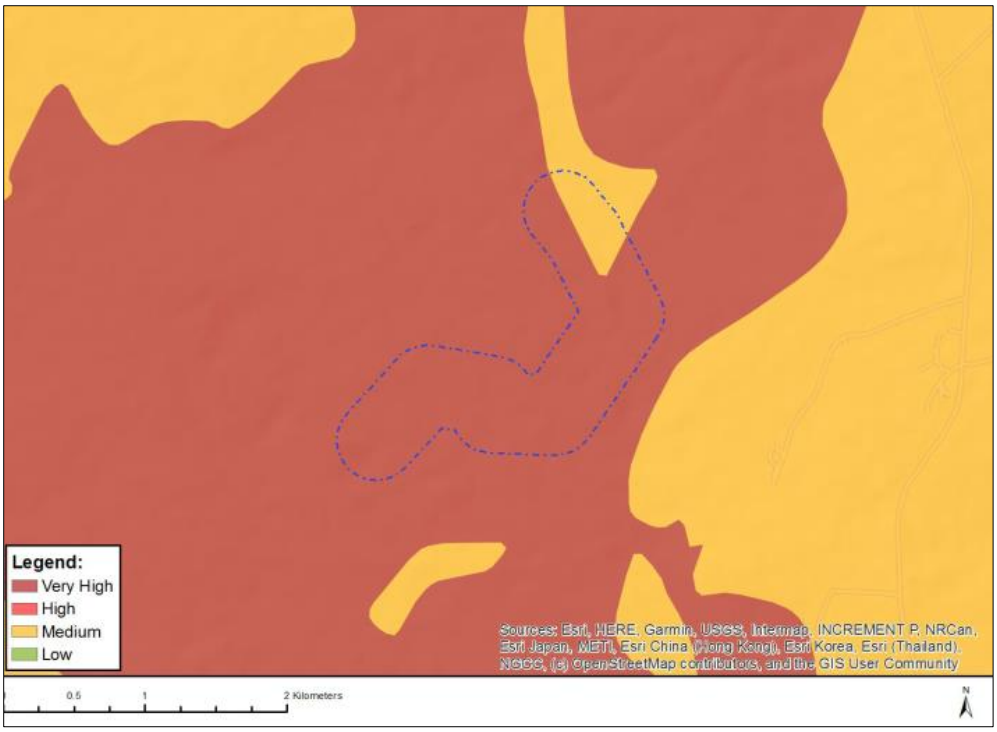


Figure 9-15: DFFE Screening Tool outcome for the palaeontological theme (Alternative 3&4)

9.2 SPECIALIST CONCLUSIONS

9.2.1 AVIFAUNA ASSESSMENT

The proposed up to 132kV OHPL 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 AGRICULTURAL ASSESSMENT

The proposed development will have low agricultural impact and will therefore be acceptable in terms of its impact on the agricultural production capability of the site. The only impact of this development is the loss of approximately 1.5 hectares of agricultural land on the site of the substation. This is assessed as being of low significance because the amount of land loss is very small and the production potential of the land on the preferred site is limited to being unsuitable for crop production and only suitable as grazing land.

The powerline itself has insignificant agricultural impact because all agricultural activities that are viable in this environment, can continue completely unhindered underneath the powerline and there will therefore be no loss of agricultural production potential underneath it.

The only potential source of impact from 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 DFFE Generic EMPr.

From an agricultural impact point of view, it is recommended that the development be approved.

Because of 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, the northern site is the preferred one from an agricultural impact point of view because it results in less agricultural impact, but both alternatives are acceptable because of the very small area of land that is impacted.

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.

9.2.3 TERRESTRIAL BIODIVERSITY ASSESSMENT

- The vegetation type that occurs on site is Eastern Highveld Grassland, is 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 a maximum of 1.2 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 definitely 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.

9.2.4 TERRESTRIAL ANIMAL SPECIES 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 2 and 3 affect a greater length of natural habitat. The preferred alternative (Alternative 1) is preferred here, followed by Alternative 4.

9.2.5 TERRESTRIAL PLANT SPECIES 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.

9.2.6 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 (CA002, CA005, CA007, CA0012, CA0017) burial sites (Waypoint CA015 and CA016) in the wider area. These features are all located more than 100 meters from the Project and no direct impact is expected on these features. Therefore, all four grid alternatives are acceptable from a heritage point of view.

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)'s approval.

9.2.7 AQUATIC ASSESSMENT

The current layouts have, to a large degree, avoided these 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. Cumulative impacts were assessed based on the various assumptions, recommendation as well as impacts assessed for other projects within 30km that include Camden II and the Ummbila Emoyeni Wind Energy Facility. The latter was based on a review of those specialist studies.

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.

9.2.8 SOCIO-ECONOMIC ASSESSMENT

The energy security benefits associated with the proposed Camden I WEF are dependent upon it being able to connect to the national grid via the establishment of grid connection infrastructure.

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 up to 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 WEF is therefore supported by the findings of the SIA.

9.2.9 VISUAL ASSESSMENT

A total of fourteen receptors were identified within 5 km of the nearest corridor alternative, none of which are considered sensitive. All the receptors identified are assumed to be farmsteads which could be considered to be receptors. However, given the degree of transformation in the landscape, and the fact that much of the proposed route alignment is relatively close to existing high voltage power lines, it is not anticipated that all of these receptors would be sensitive to the proposed development.

Seven of the identified receptors were found to be outside the viewshed for the proposed power lines and were excluded from the assessment. Ten potentially sensitive receptor locations are located within the Camden I WEF project area and as the relevant landowners are known to support the proposed development, they are not expected to perceive the proposed development in a negative light.

Five receptor locations are expected to experience moderate levels of impact as a result of the Camden I grid connection infrastructure, while the remaining two (2) would only experience low levels of visual impact.

Although the N2 and N11 receptor roads traverse the study area, motorists travelling along these routes are only expected to experience moderate impacts from the proposed Camden 1 WEF. As there are no national routes or main roads within 5 kms of the grid assessment corridors, it is not anticipated that these roads will be subjected to any visual impacts as a result of the grid connection infrastructure.

A preliminary assessment of overall impacts revealed that impacts associated with all the proposed Camden I WEF and associated grid connection infrastructure (post mitigation) are of low significance during both construction and decommissioning phases. During operation however, visual impacts (post mitigation) from the Camden I WEF would be of moderate significance with relatively few mitigation measures available to reduce the visual impact. Visual impacts associated with the Camden I WEF 132kV Grid Connection project during operation would be of low significance.

Considering the presence of existing and proposed mining activity and electrical generation and distribution infrastructure, the introduction of new renewable energy facilities in the area will result in further change in the

visual character of the area and alteration of 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 light of this, cumulative impacts have been rated as moderate.

A comparative assessment of site alternatives for the on-site WEF infrastructure and also for the grid connection alternatives was undertaken in order to determine which of the alternatives would be preferred from a visual perspective. No fatal flaws were identified in respect of any of the alternatives for the proposed on-site substation / BESS facilities, temporary construction laydown area and temporary construction camp / cement batching plant and all alternatives were found to be favourable.

It is SiVEST's opinion that the potential visual impacts associated with the proposed Camden I WEF and the associated grid connection infrastructure are negative and of moderate significance. Given the relatively low number of sensitive receptors and the significant level of human transformation and landscape degradation in areas near the proposed development, the projects are deemed acceptable from a visual perspective and the respective EAs should be granted. SiVEST is of the opinion that the impacts associated with the construction, operation and decommissioning phases for both projects can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

9.3 IMPACT SUMMARY

A summary of the identified impacts and corresponding significance ratings for the proposed powerline is provided in **Table 9-3** below.

Table 9-3: 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	Operational	**Low**	(-)	**Low**	(-)
Aquatic	Loss of high sensitivity systems, i.e. wetlands	Construction	**Moderate**	(-)	**Low**	(-)
	The physical removal of riparian zones within watercourses	Construction	**Moderate**	(-)	**Low**	(-)
	Chemical pollutants	Construction	**Moderate**	(-)	**Low**	(-)
	Increase the concentration of surface water flows	Construction	**Moderate**	(-)	**Low**	(-)
	Stormwater management increases runoff from a site through the concentration of surface water flows	Operational	**Low**	(-)	**Very Low**	(-)
Terrestrial Biodiversity	Clearing of natural habitat for construction	Construction	**Moderate**	(-)	**Moderate**	(-)

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
	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	Operational	**Low**	**(-)**	**Low**	**(-)**
	Establishment and spread of declared weeds and alien invader plants	Operational	**Moderate**	**(-)**	**Very Low**	**(-)**
	Continued runoff and erosion	Operational	**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	Operational	**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**	**(-)**
	Mortality of priority species due to collisions with the up to 132kv OHPL	Operational	**Moderate**	**(-)**	**Low**	**(-)**
	Electrocution of priority species on the on-site substation infrastructure	Operational	**Low**	**(-)**	**Low**	**(-)**
	Electrocution of priority species on the on-site substation infrastructure	Operational	**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**	**(-)**

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
Visual	Visual Landscape	Construction	**Low**	**(-)**	**Low**	**(-)**
	Visual Landscape	Operational	**Low**	**(-)**	**Low**	**(-)**
	Visual Landscape	Decommissioning	**Low**	**(-)**	**Low**	**(-)**
Traffic	Increased Local Traffic	Construction	**Low**	**(-)**	**Low**	**(-)**
Heritage	Damage to Heritage Resources	Construction	**Low**	**(-)**	**Very Low**	**(-)**
Palaeontology	Destruction or damage to recorded ruins	Construction	**Low**	**(-)**	**Very Low**	**(-)**
Socio-economic	Creation of employment and business opportunities during the construction phase	Construction	**Low**	**(+)**	**Low**	**(+)**
	Potential impacts on construction workers on local communities	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**	**(-)**
	Increased risk of grass fires	Construction	**Moderate**	**(-)**	**Low**	**(-)**
	Nuisance impacts associated with construction related activities	Construction	**Low**	**(-)**	**Low**	**(-)**
	impact on productive farmland	Construction	**Moderate**	**(-)**	**Low**	**(-)**
	Improve energy security and support the renewable energy sector	Operational	**Moderate**	**(+)**	**Moderate**	**(+)**
	Creation of employment, skills development and business opportunities associated with the operational phase	Operational	**Low**	**(+)**	**Moderate**	**(+)**
	Generate income for affected landowners	Operational	**Low**	**(+)**	**Moderate**	**(+)**
	Visual impacts associated with the proposed facility and associated impact on property values	Operational	**Low**	**(-)**	**Low**	**(-)**
	Impact on farming operations during maintenance	Operational	**Moderate**	**(-)**	**Low**	**(-)**
	Employee Health & Safety	Construction	**Moderate**	**(-)**	**Low**	**(-)**

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
Health and Safety	Employee Health & Safety	Operational	**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 WEF to the grid 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 9-4 outlines the alternative preferences resulting from the various specialist studies.

Table 9-4: Specialist Alternative Preferences

SPECIALIST STUDY	COMMENT	PREFERENCE
Geotechnical	No preferences discussed.	***Powerline:*** No preference ***Substation:*** No preference
Agriculture	Because of 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, the northern site is the preferred one from an agricultural impact point of view because it results in less agricultural impact, but both alternatives are acceptable because of the very small area of land that is impacted.	***Powerline:*** No preference ***Substation:*** Northern site (Alt 2 – Prefferred)
Aquatic	The resultant impact assessment should these recommendations be approved, although no preference is given to the 132kV line and 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.	***Powerline:*** No preference (all acceptable)

SPECIALIST STUDY	COMMENT	PREFERENCE
		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 2 and 3 affect a greater length of natural habitat. The preferred alternative (Alternative 1) is preferred here, followed by Alternative 4.	***Powerline:*** Alternative 1 (preferred) ***Substation:*** No preference
Avifauna	Alternative 4 is the preferred alternative due to it being the shortest of all the alternatives. Alternative 2 is the least preferred alternative due to it being the longest and it runs mostly through high sensitivity grassland, and it crosses three drainage lines. However, all the alternatives can be mitigated to acceptable levels and therefore are considered suitable from an avifaunal perspective	***Powerline:*** Alternative 4 (note this alternative terminates at the least preferred collector substation option, which has not been selected for approval by the DFFE). ***Substation:*** No Preference
Visual	Two substation alternatives with four associated route alternatives are being assessed for the proposed Camden I WEF 132kV Grid Connection: No fatal flaws were identified for either of the proposed substation site alternatives or the proposed grid connection alternatives. Substation: No preference was determined for either of the site alternatives and both alternatives were found to be favourable. Grid Connection Corridors: Corridor Option 4 is the preferred option while Corridor Options 1, 2 and 3 were all found to be favourable. However, all Power Line Corridor Options are suitable from a visual perspective.	***Powerline:*** Alternatives 4 (note this alternative terminates at the least preferred collector substation option, which has not been selected for approval by the DFFE). ***Substation:*** No Preference
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:*** No preference (all acceptable) ***Substation:*** No preference
Palaeontological	No preferences discussed.	***Powerline:*** No preference ***Substation:*** No preference

SPECIALIST STUDY	COMMENT	PREFERENCE
Socio-economic	The social impacts and associated significance ratings are the same for each of the transmission line options. All four alternatives would establish new line corridors. Portions of Alternative 1 and 2 would follow the De Emigratie Road corridor, while Alternatives 3 and 4 are not located in significant proximity to the road but would nevertheless require access from the road. However, the potential impacts associated with the line alternatives feeding into Collector Substation Alternative 1, namely Transmission Line Alternatives 3 and 4 would be lower. This is due to the shorter distances. In this regard the grid connection associated with Alternative 3 and 4 would be 1.9 km and 1 km respectively, compared to 3.5 km and 5.7 km for Alternative 1 and 2 respectively.	***Powerline:*** No preference ***Substation:*** No preference

Based on the table above, the specialists concluded that either Alternative 1 or 4 are the preferred options for the proposed project WEF 132 kV OHPL; while the terrestrial biodiversity and heritage studies stated that all alternatives were acceptable. Furthermore, specialist reports did not have a preference between the proposed substations and existing substations.

The OHPL Alternative 1 is the shortest, least intrusive and technically preferred, and connects the already authorised IPP substation and common collector substations. Therefore, the assessment corridor for OHPL Alternative 1 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 and associated infrastructure:

- **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.
- **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.
- **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.

- **Terrestrial Biodiversity**

  Specific monitoring recommendations should be provided in the Alien Invasive Management Plan, and the Rehabilitation Plan. The following are broad recommendations:

  - **Alien Invasive Species:**
    - Monitor for early detection, to find species when they first appear on site. This should be as per the frequency specified in the management plan and should be conducted by an experienced botanist. Early detection should provide a list of species and locations where they have been detected. Summer (vegetation maximum growth period) is usually the most appropriate time, but monitoring can be adaptable, depending on local conditions – this must be specified in the management plan.
    - Monitor for the effect of management actions on target species, which provides information on the effectiveness of management actions. Such monitoring depends on the management actions taking place. It should take place after each management action.
    - Monitor for the effect of management actions on non-target species and habitats.
  - **Rehabilitated areas:**
    - Rehabilitation Plan must be compiled by an approved ecologist prior to achieving COD and prior to the start of decommissioning.
  - All management actions associated with rehabilitation must be recorded after each management action has taken place.
  - All rehabilitated areas should be monitored to assess vegetation recovery. This should be for a minimum of three years after post-construction rehabilitation, but depends on the assessed trajectory of rehabilitation (whether it is following a favourable progression of vegetation establishment or not – this depends on the total vegetation cover present, and the proportion that consists of perennial growth of desired species). For each monitoring site, an equivalent comparative site in adjacent undisturbed vegetation should be similarly monitored. Monitoring data collection should include the following:
    - Total vegetation cover and height, as well as for each major growth form;
    - Species composition, including relative dominance;
    - Soil stability and/or development of erosion features;
    - Representative photographs should be taken at each monitoring period.
  - Monitoring of rehabilitated areas should take place at the frequency and for the duration determined in the rehabilitation plan, or until vegetation stability has been achieved.
- **Terrestrial Plant Species**
  - A targeted terrestrial plant 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.
- **Visual Impact Assessment**
  - 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 Option 4 was identified as the Preferred Alternative, while Power Line Corridor Options 1, 2 and 3 were found to be favourable. However, all Power Line Corridor Options are suitable from a visual perspective.
- **Heritage assessment**

  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 in the Heritage Impact Assessment).
  - 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;
- The final alignment should be subjected to a heritage walkthrough.

- **Palaeontological**

  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. All routes are acceptable as far as the palaeontology is concerned, but Alternative 2 (yellow) has a shorter distance on the Vryheid Formation so would be preferred.

- **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 persection 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**

  The energy security benefits associated with the proposed Camden I WEF are dependent upon it being able to connect to the national grid via the establishment of grid connection infrastructure. 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 up to132 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 WEF is therefore supported by the findings of the SIA. Alternative 3 and 4 that link into Collector Substation 1 are the preferred options, although social impacts and associated significance ratings are the same for each of the transmission line options.

- **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.

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) 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, 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 WEF construction period, i.e., 10 years.

ALTERNATIVES

Based on Section 9.4, the specialists concluded that either Alternative 1 or 4 are the preferred options for the proposed project WEF 132 kV grid OHPL; while the terrestrial biodiversity and heritage studies stated that all

alternatives were acceptable. However, specialist reports did not have a preference between the proposed substations and existing substations.

The preferred route (Alternative 1) 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 (i.e., all specialists stated that other alternatives were also acceptable even when alternative 4 was nominated as the preferred). Furthermore, the social impact levels remain the same regardless of option.

It is the technically optimal alternative (Alternative 1) for connecting the WEF 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 substations are 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 1, 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.
- Necessary permits for important plant species must be obtained from MTPA prior to commencement.
- An alien invasive plant programme must be established an incorporated in the EMPr at the inception of the project. It must be implemented throughout the project lifecycle. In addition, Section 7.1 of the EMPr includes an Alien Invasive Management Plan.

10 WAY FORWARD

This report provides a description of the proposed Project and details the aspects associated with the construction and operation. 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 moderate or major 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 Draft BAR (this report) was made available for public review from **11 May 2023 to 12 June 2023** All comments received have been incorporated in the Comments and Response Report (CRR) which is attached as an **Appendix D** to 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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