



GEOHYDROLOGY

GEOTECHNICAL

ENVIRONMENTAL

SOCIAL DEVELOPMENT



Final BA Report

14/12/16/3/3/1/2664

FINAL BASIC ASSESSMENT REPORT FOR THE PROPOSED 132kV POWERLINE FOR THE CONNECTION OF THE BELA BELA SOLAR PARK TO THE ESKOM WARMBAD SUBSTATION, LOCATED IN THE BELA BELA LOCAL MUNICIPALITY, WATERBERG DISTRICT MUNICIPALITY, LIMPOPO PROVINCE - Short name: Bela Bela 132kV Powerline

13 December 2022

Commissioned by: Cetus Energy (Pty) Ltd
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Compiled by A von Well



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**FINAL BASIC ASSESSMENT REPORT FOR THE PROPOSED 132kV
POWERLINE FOR THE CONNECTION OF BELA BELA SOLAR PARK TO THE
ESKOM WARMBAD SUBSTATION, IN BELA BELA LOCAL MUNICIPALITY,
WATERBERG DISTRICT MUNICIPALITY, LIMPOPO PROVINCE**

Short name: Bela Bela 132kV Powerline

13 December 2022

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ABBREVIATIONS AND ACRONYMS

AGES	Africa Geo-Environmental and Engineering Services (Pty) Ltd
BID	Background Information Document
Cetus Energy	Cetus Energy (Pty) Ltd (applicant)
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CSP	Concentrating Solar Power
DALRRD	Department of Agriculture, Land Reform and Rural Development
DFFE	National Department of Forestry, Fisheries and the Environment,
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environment Impact Assessment Report
EMPr	Environmental Management Programme
ESS	Environmental Scoping Study
GHG	Green House Gases
GIS	Geographic Information Systems
GN	Government Notice
GWh	Giga Watt hour
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IPP	Independent Power Producer
kV	kilovolt
LEDET	Limpopo Department of Economic Development, Environment & Tourism (LEDET)
MW	Mega Watt
MWp	Mega Watt peak
NEMA	National Environmental Management Act - Act no. 107 of 1998
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act - Act no. 25 of 1999
NWA	National Water Act - Act no. 36 of 1998
PoS	Plan of Study
Property	Portion 67 of Tweefontein 462 KR, (Bela Bela Local Municipality, Waterberg District Municipality, Limpopo Province)
Project site	Remainder of Bela Bela 647 KR, Portion 1 of Roodekuil 498 KR, Remainder of Roodekuil 496 KR, Portion 147 of Roodekuil 496 KR, Portion 24 of Buiskop 464 KR, Portions 16, 17, 18 and 19 of Tweefontein 462 KR and Portion 67 of Tweefontein 462 KR (Bela Bela Local Municipality, Waterberg District, Limpopo Province)
PV	Photo Voltaic
RFP	Request for Proposals for New Generation Capacity under the IPP Procurement Programme
REIPPPP	Renewable Energy IPP Procurement Programme
SAHRA	South African Heritage Resources Agency
SANRAL	South African National Roads Agency Limited
SANS	South African National Standard
UPS	Uninterruptible Power Supply

1 OBJECTIVE OF THE ENVIRONMENTAL BASIC ASSESSMENT PROCESS

According to the EIA Regulations, 2014, as amended, the objective of the Environmental Basic Assessment process is to, through a process of consultation:

- a. Determine the policies and legislation relevant to the study and how the study complies with the policies and legislation.
- b. Motivate the need and desirability of the proposed activity including the need and desirability of the activity in the context of the preferred location.
- c. Identify the location of the development footprint within the preferred site, based on an impact assessment and risk ranking process which includes cumulative impacts and a ranking process of all the identified alternatives focussing on the geographical, physical, biological, social, economic and cultural aspects of the environment.
- d. Determine the
 - a. Nature, significance, consequence, extent, duration and probability of the impacts occurring to inform preferred alternatives; and
 - b. Degree to which these impacts
 - i. Can be reversed,
 - ii. May cause irreplaceable loss of resources, and
 - iii. can be avoided, managed, or mitigated.
- e. Identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment.
- f. Identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity.
- g. Identify suitable measures to avoid, manage or mitigate identified impacts, and
- h. Identify risks that need to be managed and monitored.

2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Name of EAP: AGES – Anton von Well

Contact details of EAP:

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Polokwane, 0699

Telephone number: 015 291 1577

Expertise of EAP: A National Higher Diploma in Nature Conservation. 22 years of experience in with the management and conducting of EIA's. Registered EAP at EAPASA. Curriculum Vitae of EAP is included in Annexure N.

3 LOCATION OF ACTIVITY

3.1 SURVEYOR GENERAL 21-DIGIT CODES OF DEVELOPMENT AREAS

The new distribution powerline (Bela Bela Powerline) will consist of one 132 kV powerline which will connect the proposed Bela Bela Solar Park to the Eskom Warmbad Main Transmission Substation (MTS).

The Bela Bela Solar Park is proposed on Portion 67 of the farm TWEEFONTEIN 462 KR, Bela Bela Local Municipality, Waterberg District Municipality, Limpopo Province. The proposed Bela Bela Solar Park has been approved with DFFE Reference 14/12/16/3/3/2/688.

The Eskom Warmbad Main Transmission Substation (MTS) is located on the Remainder of the farm BELA BELA 647 KR, Bela Bela Local Municipality, Waterberg District Municipality, Limpopo Province, 5.5 km South-West of the planned location of the Bela Bela Solar Park.

The following properties fall in the “powerline study corridor for Basic Assessment” (500m wide) and will be crossed by one (1) powerline, subject to the final alignment:

- Remainder of the farm Bela Bela 647 KR,
- Portion 1 of the farm Roodekuil 498 KR,
- Remainder of the farm Roodekuil 496 KR,
- Portion 147 of the farm Roodekuil 496 KR,
- Portion 8 of the farm Buiskop 464 KR,
- Portion 16 of the farm Tweefontein 462 KR,
- Portion 17 of the farm Tweefontein 462 KR,
- Portion 18 of the farm Tweefontein 462 KR,
- Portion 19 of the farm Tweefontein 462 KR
- Portion 67 of the farm Tweefontein 462 KR.

Please note that the powerline corridor assessed in the Basic Assessment is 500m, but the actual servitude width for a 132kV powerline is 36m (18m on either side of the powerline). Thus, the study area is much greater than the development footprint area.

The listed farms are located within the Bela Bela Local Municipality, Waterberg District Municipality, Limpopo Province.

Site location - Surveyor-general 21-digit site code:

T	0	K	R	0	0	0	0	0	0	0	0	0	6	4	7	0	0	0	0	0
T	0	K	R	0	0	0	0	0	0	0	0	0	4	9	8	0	0	0	0	1
T	0	K	R	0	0	0	0	0	0	0	0	0	4	9	6	0	0	0	0	0
T	0	K	R	0	0	0	0	0	0	0	0	0	4	9	6	0	0	1	4	7
T	0	K	R	0	0	0	0	0	0	0	0	0	4	6	4	0	0	0	0	8
T	0	K	R	0	0	0	0	0	0	0	0	0	4	6	2	0	0	0	1	6
T	0	K	R	0	0	0	0	0	0	0	0	0	4	6	2	0	0	0	1	7
T	0	K	R	0	0	0	0	0	0	0	0	0	4	6	2	0	0	0	1	8
T	0	K	R	0	0	0	0	0	0	0	0	0	4	6	2	0	0	0	1	9
T	0	K	R	0	0	0	0	0	0	0	0	0	4	6	2	0	0	0	6	7
1	2		3			4					5									

3.2 PHYSICAL ADDRESS AND FARM NAME

CETUS ENERGY (PTY) LTD is proposing the establishment of one (1) new 132kV powerline for the connection of one (1) renewable energy generation facility (Photovoltaic Power Plant) with associated infrastructure and structures on Portion 67 of the farm TWEEFONTEIN 462 KR, Bela Bela Local Municipality, Waterberg District Municipality, Limpopo Province.

The renewable Photovoltaic (PV) Power Plant will be connected to the Eskom grid via one new 132kV powerline (Bela Bela Powerline) between the one proposed solar park and the Eskom Bela Bela Main Transmission Substation (MTS). The Eskom Bela Bela MTS is located 5.5 km South-West of the project site, on the Remainder of the farm Bela Bela 647 KR.

The name of the proposed facility will be BELA BELA 132kV POWERLINE.

The geographical co-ordinates of the preliminary alignments of the 132 kV powerline, within the project site of the solar park and the 500 m wide powerline study corridor, are as follows:

Table 1. Geographical co-ordinates of the preliminary powerline alignments

Point	Latitude [degrees, minutes, seconds]	Longitude [degrees, minutes, seconds]	Progressive Length [km]
P01 Powerline starting point from the new on-site substation and switching station	24°52'18.11"S	28°22'28.55"E	0.00 km
P02 Powerline turning point	24°52'21.91"S	28°22'29.58"E	0.12 km
P03 Powerline turning point	24°52'39.55"S	28°21'38.04"E	1.67 km
P04 Powerline turning point	24°53'22.44"S	28°21'48.41"E	3.02 km
P05 Powerline turning point	24°53'24.81"S	28°21'50.49"E	3.11 km
P06 Powerline turning point	24°53'30.12"S	28°21'45.90"E	3.32 km
P07 Powerline turning point	24°53'30.80"S	28°20'58.03"E	4.66 km
P08 Powerline turning point	24°53'31.76"S	28°20'52.72"E	4.81 km
P09 Powerline turning point	24°53'33.52"S	28°19'40.85"E	6.83 km
P10 Powerline turning point (within Warmbad MTS)	24°53'29.88"S	28°19'38.70"E	6.96 km
P11 Powerline turning point (within Warmbad MTS)	24°53'24.09"S	28°19'38.87"E	7.14 km
P12 Powerline turning point (within Warmbad MTS)	24°53'22.89"S	28°19'35.63"E	7.23 km
P13 point of connection to a new 132kV bus-bay at the Eskom Warmbad MTS	24°53'24.36"S	28°19'35.58"E	7.28 km

Cetus Energy intends to include Bela Bela Powerline as part of the submission of Bela Bela Solar Park, in accordance with the next **Window of the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP)**, to be issued by the Department of Mineral Resources and Energy ("DMRE").

In order to develop the proposed infrastructure, Cetus Energy must undertake a Basic Assessment (BA) process and acquire environmental authorisation from the National Department of Forestry, Fisheries and the Environment, (DFFE), in consultation with the Limpopo Department of Economic Development, Environment and Tourism (LEDET), in terms of the EIA Regulations, 2014 published on 4 December 2014, as amended under section 24(5) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

Cetus Energy is the applicant for the Bela Bela Powerline (the proposed project), which will connect the Bela Bela Solar Park to the Eskom Bela Bela MTS located ±5.5 km South-West of the solar park site.

The independent Environmental Assessment Practitioners (EAP's) which have been appointed for the undertaking of the detailed environmental studies in compliance with the 2014 EIA Regulations, as amended, are AGES Limpopo (Pty) Ltd (AGES).

With the aim of identifying and assessing all potential environmental impacts related to the development as well as suggesting possible mitigation measures and alternatives, AGES has appointed specialist sub-consultants to compile detailed reports and to study the activities necessary for the assessment of the specific impacts related to their field of expertise.

AGES and the other specialist consultants are in a position of independency from Cetus Energy and not subsidiaries or affiliated to the latter. AGES and the specialist consultants have no secondary interest connected with the development of this project or of other projects which may originate from the authorization of the project.

The characteristics, the technology and the extent of the Bela Bela Powerline is defined and evaluated in this Final Basic Assessment Report and its annexures.

4 PLAN OF THE PROPOSED ACTIVITY

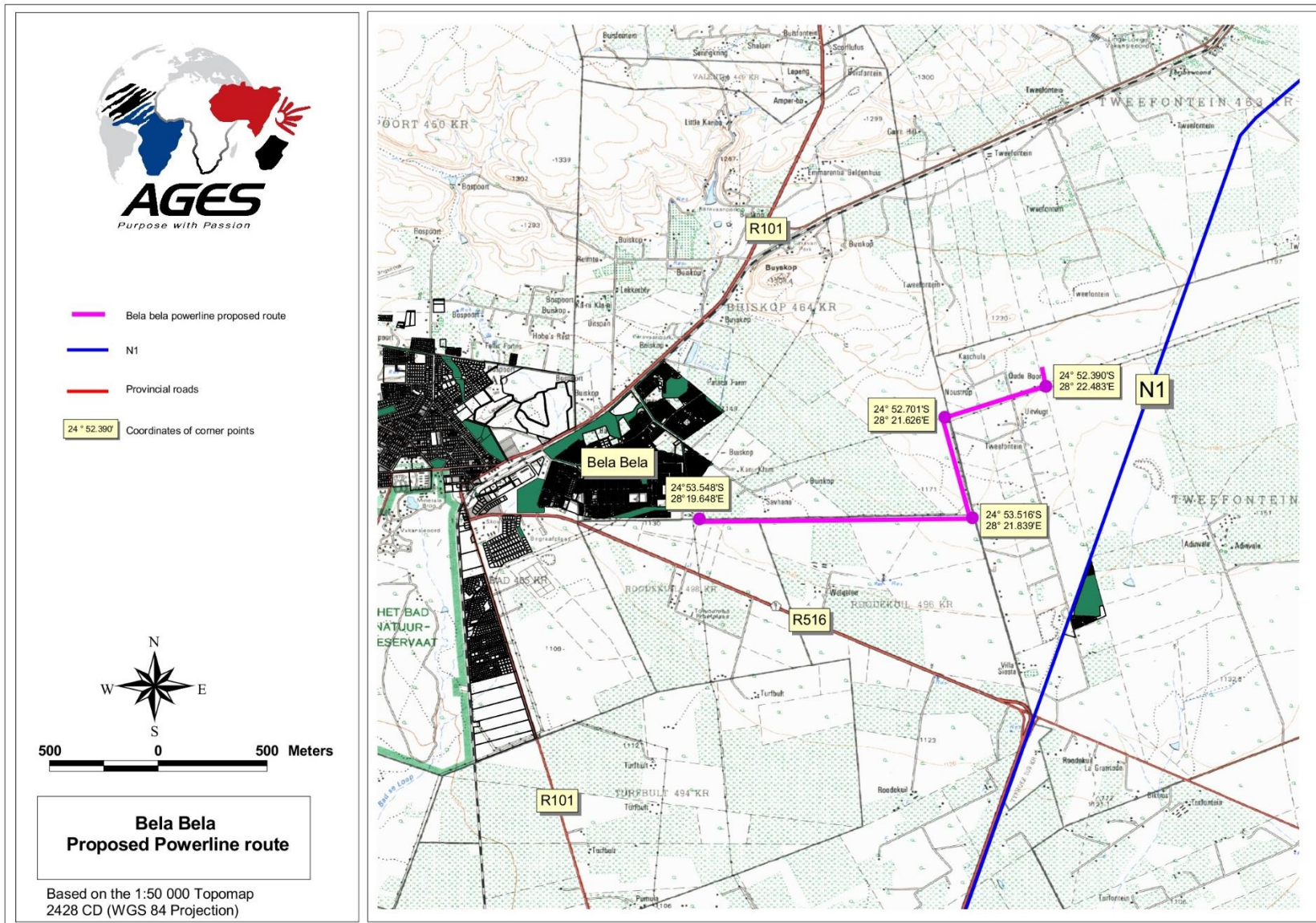


Figure 1. Locality Map (Google Earth): Powerline Study Corridor for Basic Assessment

5 SCOPE OF THE PROPOSED ACTIVITY

5.1 LISTED ACTIVITIES TRIGGERED IN TERMS OF NEMA

The “listed activities” in terms of sections 24 and 24D of NEMA, included in Listing Notices 1, 2 & 3 of the EIA Regulations, 2014, as amended, involved in the proposed development, are listed in table below.

Table 2. Listed Activities triggered, in terms of EIA Regulations 2014, as amended.

Relevant notice	Activity No.	Description
R.983, 4 December 2014	11	<p><i>The development of facilities or infrastructure for the transmission and distribution of electricity:</i> <i>Outside urban areas or industrial complexes with a capacity of more than 33 kilovolts but less than 275 kilovolts.</i></p> <p>The proposed Bela Bela Powerline will consist of one 132 kV powerline which will connect the Bela Bela Solar Park to the Eskom Warmbad MTS. The Bela Bela Solar Park is authorized under DFFE Ref. 14-12-16-3-3-2-688 issued on 17 August 2015, as amended) is planned on Ptn 67 of TWEEFONTEIN 462 KR, Bela Bela Local Municipality, Waterberg District, Limpopo Province.</p> <p>The proposed 132kV Bela Bela Powerline will be approximately 7.3 km long, depending on the final alignment.</p>
R.983, 04 December 2014	12	<p><i>The development of –</i> <i>(ii) infrastructure or structures with a physical footprint of 100m² or more;</i> <i>(c) within 32m of a watercourse, measured from the edge of a watercourse.</i></p> <p>The proposed 132 kV Bela Bela Powerline will run adjacent to a wetland on Ptn 67 of Tweefontein 462 KR and within 32 m from the wetland. The interception of these watercourses will exceed an area of 100 m².</p>
R.983, 04 December 2014	19	<p><i>The infilling or depositing of any material of more than 5 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-</i> <i>(i) a watercourse;</i></p> <p>The proposed 132 kV Bela Bela Powerline will run adjacent to a wetland on Ptn 67 of Tweefontein 462 KR and within 32 m from the wetland. The interception of these watercourses will exceed a volume of 10 m³.</p>
R.983, 04 December 2014	24	<p><i>The development of-</i> <i>(ii) a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.</i></p> <p>A new access road will be constructed in the power line servitude, for construction activities. This road will be ±4 m wide. In correspondence with turning points, the road reserve will be up to 14 m to allow the transportation of abnormal loads (steel monopoles).</p>

There are layout and site plans included in Annexure A, of this report, which will be finalized once inputs, via public participation have been received, analysed, and reviewed. All information acquired will be analysed to determine the proposed final development layout and site plans. Such approach will ensure a holistic view of future requirements of the site and that resources are utilised to their full availability in terms of social and environmental sustainability. This application and all other development applications, in the area, are considered together to ensure general sustainability in the Local and District Municipal areas.

5.2 DESCRIPTION OF ASSOCIATED STRUCTURES AND INFRASTRUCTURE RELATED TO THE DEVELOPMENT

The purpose of the Bela Bela 132 kV Powerline is to connect the proposed Bela Bela Solar Park to the Eskom Bela Bela Main Transmission Substation (MTS).

The Bela Bela Solar Park is proposed on Portion 67 of the farm Tweefontein 462 KR, Bela Bela Local Municipality, Waterberg District Municipality, Limpopo Province; an environmental authorisation was issued, under DFFE Reference 14/12/16/3/3/2/688.

5.3 LAYOUT OF INFRASTRUCTURE AND STRUCTURES ON SITE

The Bela Bela Powerline route was based on the locality of the proposed Bela Bela Solar Plant and the locality of the Eskom Bela Bela Substation. The proposed route / powerline study corridor (500m wide) is also based on current Eskom infrastructure as well as the natural topography of the area.

The proposed 132kV Bela Bela Powerline will be approximately 7.3km long, depending on the exact location of the on-site substation of the solar park on Portion 67 of the farm Tweefontein 462 KR, with a servitude width of 36m.

5.4 PRIMARY COMPONENTS

The new powerline will consist of a series of steel or aluminium monopole structures to be installed approximately 200 – 260m apart, with supporting electrical cables. The proposed structures will be between 18m and 25m high, and the basement of each pole will have a footprint of approximately 0.6m².

The construction phase will last approximately 6 months and will involve a team of 10 to 15 people. Monopole structures installation will not require the establishment of a permanent construction site, but will be done step-by-step, to only affect small stretches of corridor and for a short time.

An access road (dirty road), approximately 4.0m wide, will be constructed within the power line servitude, for construction and maintenance activities. In correspondence of the turning points, the road reserve will be up to 14m in order to allow the transportation of abnormal loads (steel monopoles).

Site preparation will consist of the clearing of the powerline servitude and vegetation removal will be done only within the servitude, for the minimum width required by the installation activities and by Eskom security rules. Vegetation must not be allowed to interfere with the high-voltage cables.

The proposed 132kV powerline (double circuit) will be built and developed by Cetus Energy (Pty) Ltd but will be owned and operated by Eskom Distribution. This will depend on the Eskom grid code in relation to the IPP’s (Independent Power Producers) and on the Connection Agreement to be finalized prior to or simultaneously with the conclusion of the PPA (Power Purchase Agreement) in respect of the options of retaining ownership of the connection works once completed.

Table 3. Bela Bela 132kV Powerline technical specifications.

Number of overhead powerlines required and voltage	1 overhead powerline at 132kV
Proximity to grid connection	±7.3km
Height of power line	Between 18m and 25m
Type of pylons	Steel monopile (double circuit)
Number of pylons	27 - 30 (up to 30)
Distance between each pylon	Between 200m and 260m
Total width and length of servitude	Servitude length: 7.3km Servitude width: 36m (18m from each side)

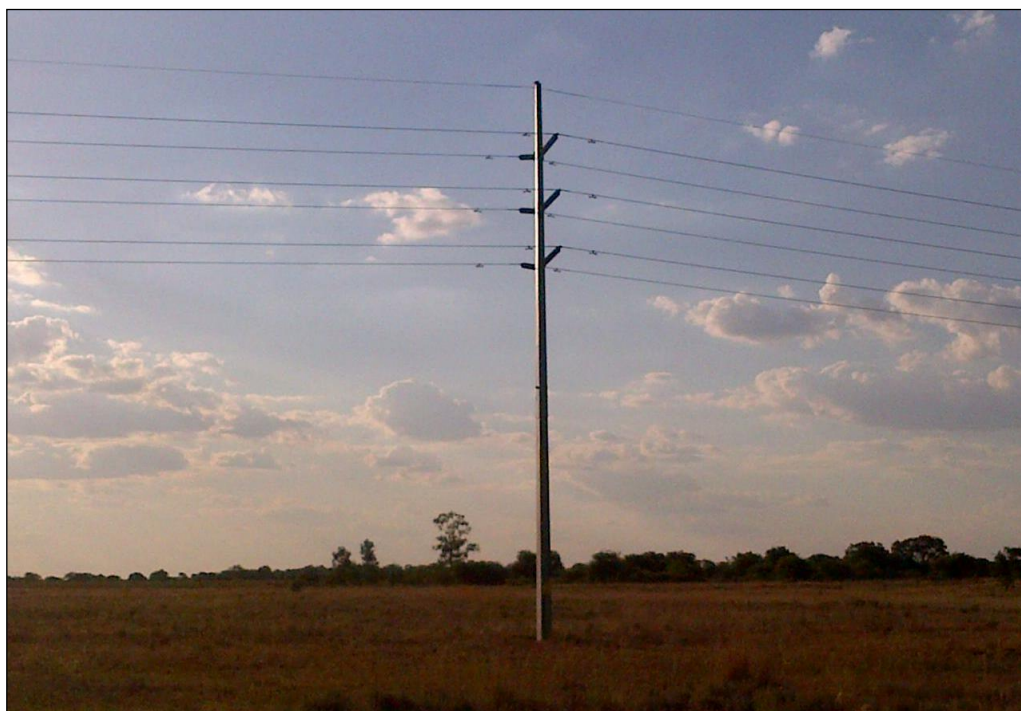


Figure 2. Steel monopole structure for a 132 kV powerline (double circuit)

6 LEGAL AND POLICY REQUIREMENTS

The legislative and regulatory framework of reference for the solar power plant project includes statutory and non-statutory instruments by which National, Provincial and Local authorities exercise control throughout the development of the same project.

The development and the environmental assessment process of a solar power plant project involve various authorities dealing with the different issues related to the project (economic, social, cultural, biophysical etc.).

6.1 REGULATORY AUTHORITIES

6.1.1 National Authorities

At national level, the main regulatory authorities and agencies are:

- *Department of Mineral Resources and Energy (DMRE)*: the Department is competent and responsible for all policies related to energy, including renewable energy. Solar energy is contemplated and disciplined under the White Paper for Renewable Energy and the Department constantly conducts research activities in this respect;
- *National Department of Forestry, Fisheries and the Environment (DFFE)*: the Department is competent and responsible for all environmental policies and is the controlling authority under the terms of NEMA and EIA Regulations. The DFFE is also the competent authority for the proposed project, and is entrusted with granting the relevant environmental authorisation;
- *National Energy Regulator of South Africa (NERSA)*: the Regulator is competent and responsible for regulating all aspects dealing with the electricity sector and, in particular, issues the licence for independent power producers;
- *South African Heritage Resources Agency (SAHRA)*: the Agency is responsible for the protection and the survey, in association with provincial authorities of listed or proclaimed sites, such as urban conservation areas, nature reserves and proclaimed scenic routes under the terms of the National Heritages Resources Act (Act no. 25 of 1999);
- *South African National Roads Agency Limited (SANRAL)*: the Agency is responsible for all National Road routes.

6.1.2 Provincial Authorities

At provincial level, the main regulatory authority is the Limpopo Department: *Department of Economic Development, Environment and Tourism (LEDET)*; this Department is responsible for environmental policies and is the Provincial authority in terms of NEMA and the EIA Regulations. The Department is also the commenting authority for the proposed project.

6.1.3 Local Authorities

At a local level, the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Limpopo Province, Municipalities and District Municipalities are involved in various aspects of planning and the environment related to solar energy facilities development. The proposed powerline route falls within Bela Bela Local Municipality which is part of the Waterberg District Municipality.

Under the terms of the Municipal System Act (Act no. 32 of 2000), all municipalities are deemed to go through an Integrated Development Planning (IDP) process to devise a five-year strategic development plan for the area of reference.

The identification of priority areas for conservation and their positioning within a planning framework of core, buffer, and transition areas is the subject of bioregional planning. Priority areas are individuated and defined with reference to visual and scenic resources and their identification and protection is granted through visual guidelines drafted for the area included in bioregional plans.

Local authorities also provide specific by-laws and policies in order to protect visual and aesthetic resources with reference to urban edge lines, scenic drives, special areas, signage, communication masts etc.

Finally, there are also various non-statutory bodies and environmental groups, who are involved in the definition of various aspects of planning and the protection of the environment, which may influence in the development of the proposed project.

6.2 LEGISLATION, REGULATIONS AND GUIDELINES

A review of the relevant legislation involved in the proposed development is detailed in table 4 below.

Table 4. Review of relevant legislation

National Legislation	Sections applicable to the proposed project	Compliance with legislation
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	<ul style="list-style-type: none"> • Prohibition of the spreading of weeds (S5) • Classification of categories of weeds & invader plants and restrictions in terms of where these species may occur (Regulation 15 of GN R0148) • Requirement and methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R0148) 	<ul style="list-style-type: none"> • Classification of alien invasive plants in Section 10.6.5 in the Final BAR.
National Water Act, 1998 (Act No. 36 of 1998)	<ul style="list-style-type: none"> • Entrustment of the National Government to the protection of water resources (S3) • Entitlement to use water (S4) - Schedule 1 provides the purposes which entitle a person to use water (reasonable domestic use, domestic gardening, animal watering, fire-fighting and recreational use) • Duty of Care to prevent and remedy the effects of water pollution (S19) • Procedures to be followed in the event of an emergency incident which may impact on water resources (S20) 	<ul style="list-style-type: none"> • Need for the application of a Water Use License (WUL) in terms of the Act was investigated in order to identify water uses that might need authorisation from DWS.
National Forests Act, 1998 (Act No. 84 of 1998)	<ul style="list-style-type: none"> • Protected trees 	<ul style="list-style-type: none"> • NFA must always be considered in case a permit application needs to be submitted for the removal of protected trees in terms of Act. • Possibility of protected trees on site is discussed in section 10.6.4 of the Final BAR.

<p>National Environmental Management Act, 1998 (Act no. 107 of 1998)</p>	<ul style="list-style-type: none"> • EIA Regulations 2014 (GN R. 982, 983, 984, 985 of 4 December 2014), as Amended • Requirement for potential impact on the environment of listed activities to be considered, investigated, assessed and reported on to the competent authority (S24 - Environmental Authorisations) • Duty of Care (S28): requirement that all reasonable measures are taken in order to prevent pollution or degradation from occurring, continuing and recurring, or, where this is not possible, to minimise and rectify pollution or degradation of the environment 	<ul style="list-style-type: none"> • Section 24 (2) of the Act indicates: The Minister, or an MEC with the concurrence of the Minister, may identify— • (a) activities which may not commence without environmental authorisation from the competent authority; • An application for environmental authorisation was submitted to the competent authority and the application process commenced. • Duty of care principle was applied throughout the Generic EMPr as included in the BAR.
<p>National Heritage Resources Act, 1999 (Act no. 25 of 1999)</p>	<ul style="list-style-type: none"> • Provision for the protection of all archaeological objects, paleontological sites and material and meteorites entrusted to the provincial heritage resources authority (S35) • Provision for the conservation and care of cemeteries and graves by SAHRA, where this is not responsibility of any other authority (S36) • List of activities which require notification from the developer to the responsible heritage resources authority, with details regarding location, nature, extent of the proposed development (S38) 	<ul style="list-style-type: none"> • Heritage and Archaeological impact assessment was conducted and discussed in detail in the Final BAR in Section 10.15.6. • Impacts identified and discussed in Section 10.8, 11.2.5 and 12 of the Final BAR. • Assessment report included in Annexure H of the EIA report.

<p>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)</p>	<ul style="list-style-type: none"> • Provision for the MEC for Environmental Affairs/Minister to publish a list of threatened ecosystems and in need of protection (S52) • Government notices: GN R150 (Commencement of Threatened and Protected Species Regulations, 2007); GN R151 (Lists of critically endangered, vulnerable & protected species) and GN R152 (Threatened Protected Species Regulations) 	<ul style="list-style-type: none"> • Biodiversity according to the NEM:BA was specifically assessed in the EIA report. • No threatened ecosystems were identified in site. • No threatened, vulnerable, critically endangered or protected species were identified on the site. • On species of conservation concern (SCC) was identified, namely the Cape Vulture, which may occur near the farm intermittently.
<p>National Environmental Management: Air Quality Act, 2004 (Act no. 39 of 2004)</p>	<ul style="list-style-type: none"> • Provision for measures in respect of dust control (S32) • Provision for measures to control noise (S34) 	<ul style="list-style-type: none"> • No activities on site will require any permits and/or licenses in respect of dust control or noise management. • Atmospheric pollution (dust) and noise is discussed in Section 11.2.1 of the Final BAR.
<p>National Environmental Management: Waste Management Act, 2008 (Act no. 59 of 2008)</p>	<ul style="list-style-type: none"> • Waste management measures • Regulations and schedules • Listed activities which require a waste licence 	<ul style="list-style-type: none"> • No listed activities, require a waste license and are triggered as a result of the proposed facility. • Waste management is discussed throughout the EIA report and refers to refuse, wastewater (sewage) and other waste, especially during the construction phase.
<p>Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)</p>	<ul style="list-style-type: none"> • Health and safety of all involved before and after construction must be protected. 	<ul style="list-style-type: none"> • No licenses or permits are required in terms of the Act but must be considered, during the construction phase. • A number of impact mitigation measures are included in the EMPr in order to ensure compliance with the Act.
<p>Limpopo Environmental Management Act, 2003 (Act No. 7 of 2003)</p>	<ul style="list-style-type: none"> • The protection of Sites of Ecological Importance and Protected Natural Environments (S25 & S26) – Schedule 1: Protected Areas. • Provision for the MEC to publish a list of Protected indigenous plants (S64) - Schedule 11: Specially Protected Plants Schedule 12: Protected Plants 	<ul style="list-style-type: none"> • No Sites of Ecological Importance and Protected Natural Environments were identified on the proposed development site. • No Specially Protected Plants or Protected Plant species were identified on the proposed development site.

Policies and White Papers	Sections applicable to the proposed project	Compliance
<p>Integrated Resource Plan (IRP1)</p> <p>Integrated Resources Plan 2010-2030 (IRP 2010).</p>	<ul style="list-style-type: none"> • The first Integrated Resource Plan was published in 2009. The DoE decided to undertake a detailed process to compile South Africa’s 20-year electricity plan, the Integrated Resources Plan 2010-2030 (IRP 2010). • The IRP1. IRP 2010 and IRP 2019 outline the Government’s vision, policy and strategy in matter of the use of energy resources and the current status of energy policies in South Africa. • In the IRP 2019, published in October 2019, provision has been made to procure an additional 6 000 MW of solar PV and 14 400 MW of wind between 2022 and 2030. 	<ul style="list-style-type: none"> • This application for a renewable energy project is a direct result of the publication of the IRP and specifically the IRP which was published in 2019.
<p>Renewable Energy IPP Procurement Programme (REIPPPP)</p>	<ul style="list-style-type: none"> • The IPP Procurement Programme, issued on 3rd August 2011 by the DoE, envisages the commissioning of 3 725 MW of renewable projects (1 450 MW with Solar photovoltaic technology) capable of beginning commercial operation before the end of 2020. 	<ul style="list-style-type: none"> • This application for a renewable energy project is a direct result of the REIPPPP for renewable energy projects.

7 NEED/DESIRABILITY OF THE PROJECT

The Bela Bela Powerline will form part of the Bela Bela PV Solar Park project which is approved by the Department of Forestry, Fisheries and the Environment (DFFE).

If this project is selected by the Department of Mineral Resources and Energy under the Independent Power Producer Procurement Programme (RMIPPPP), it will fit into the National Development Plan for 2030. The Plan states that South Africa should invest in and help exploit the wide range of opportunities for low-carbon energy from hydroelectric and other clean energy sources in Southern Africa, procuring at least 20,000 MW of renewable electricity by 2030, importing electricity from the region, decommissioning 11,000 MW of ageing coal-fired power stations and stepping up investments in energy-efficiency. The proposed Project will contribute towards the goals of the National Development Plan.

In the IRP 2019, published in October 2019, provision has been made to procure an additional 6 000 MW of solar PV and 14 400 MW of wind between 2022 and 2030.

Frequent shortages in electricity, fluctuations in supply and low voltages are currently experienced in South Africa. Therefore, the presence of new Photovoltaic Power Plants and associated infrastructure (Bela Bela Powerline) in the Bela Bela area, could contribute towards increasing the availability and improving the reliability of the Eskom network. The proposed solar project and associated Bela Bela Powerline will assist the Eskom grid to meet the high energy demand in the Bela Bela area, where township development has increased rapidly over the last few years.

The purpose of the proposed solar projects and associated Bela Bela Powerline is to add new capacity for the generation of renewable electric energy to the national electricity supply in compliance with the REIPP Procurement Programme and to meet the “sustainable growth” of the Limpopo Province. The use of solar radiation for power generation is considered as a non-consumptive use and a renewable natural resource which does not produce greenhouse gas emissions. The generation of renewable energy will contribute to the growth of South Africa’s electricity market, which has been primarily dominated up to this date by coal-based power generation. With specific reference to photovoltaic energy, and the proposed projects, it is important to consider that South Africa has one of the highest levels of solar radiation in the world.

The proposed solar park will assist the Eskom grid to meet the high energy demand related to the industrial and agricultural activities conducted in the Bela Bela area.

8 CONSIDERATION OF PROJECT ALTERNATIVES

The EIA Regulations, 2014, as amended, Section 28(1)(c) and NEMA, Section 24(4), require investigation and consideration of feasible and reasonable alternatives for any proposed development as part of the environmental impact assessment process.

8.1 LOCATION ALTERNATIVES

There are no location alternatives. There is only one powerline corridor because the proposed Bela Bela Photovoltaic Power Plant must be connected to the Eskom grid in the area from the approved locality, specifically to the Bela Bela MTS which is the closest available point of connection.

The proposed Bela Bela PV Power Plant is already located outside ecological sensitive areas, which limits space for alternative powerline corridors.

The power line route was chosen to avoid going through the Bela-Bela residential settlement that is located between the Bela-Bela Solar Park and the Eskom Warmbad MTS. The preferred route will follow an existing powerline route where corridors have already been established with no trees/vegetation and where formal servitudes have already been secured for powerlines.

After extensive liaising with Eskom it was found that the incoming powerline connection has to come from the south into the Eskom Warmbad substation. The point of connection also plays a role in determining the powerline route towards the Eskom Warmbad MTS.

8.2 TECHNOLOGY ALTERNATIVES

Structure Alternative 1: steel or aluminium monopole (preferred alternative)

The new 132 kV powerline will consist of a series of steel or aluminium monopole structures (double circuit, one as spare) supporting the electrical cables and a communication cable, to be installed approximately 200 – 260 m apart. The proposed structures will be between 18 m and 25 m high and the basement of each pole will have a footprint of approximately 0.6 m².

Structure Alternative 2: wood poles (not preferred)

The new powerline may be built as wooden poles (*e.g.* H-poles). This technology is not used anymore by Eskom for powerlines at 132kV, because of the shorter lifetime of the wooden poles (as opposed to steel poles). Furthermore, the new steel monopole structure was designed with the aim to reduce the risk of electrocution for avifauna, thanks to the position of the cables.

Voltage Alternative 1: 132kV powerline (preferred alternative)

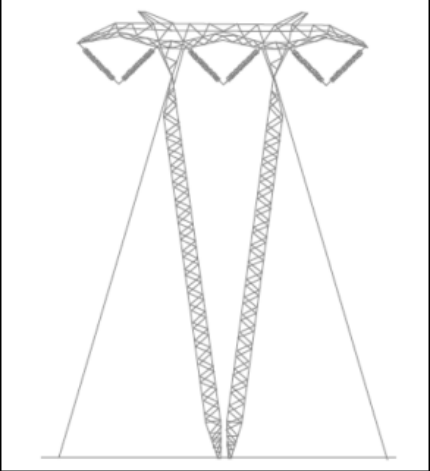
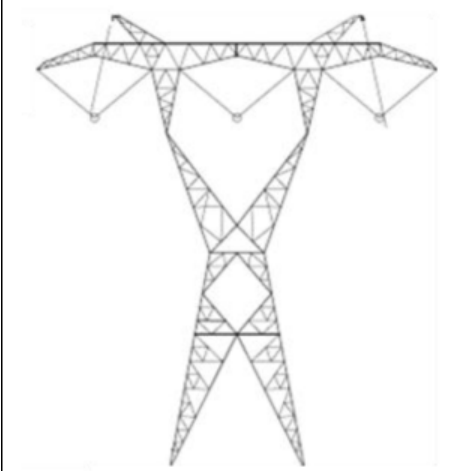
Powerlines transmit large quantities of electricity over long distances via wires carried on a system of mainly metal towers (pylons) and large substations.

As indicated by Eskom in the Cost Estimate Letter, the proposed Bela-Bela PV Power Plant must be connected to a 132 kV bus-bar at the Eskom Warmbad MTS. The most effective connection solution for relatively small renewable projects (≤ 75 MW), like the Bela Bela Solar Park, is the connection to the distribution network (≤ 132 kV), so that the electric energy can be used directly to feed the local network at distribution level.

As per Eskom standards, the servitude width for a 132kV powerline is 36m (18m on either side of the centre line of the powerline).

Voltage Alternative 2: 275kV powerlines (not preferred)

As alternative connection solution, the Bela Bela Solar Park may be connected to the 275kV bus-bar of the Eskom Warmbad Main Transmission Substation. Should this second alternative be selected, the 275kV pylons will be "Guyed V tower" type, because this type of structure requires a servitude of only 23.5m from each side of the centre line and it is the least intrusive in terms of visual impact (among other 275kV structures). Where the power line alignment changes direction, "Self-supporting" structures should be used as per Eskom standards. Please refer to the figure below.

<p><i>Self-support tower (voltage: 275 kV – maximum tower height: up to 40 m a.g.l. with leg extensions) on the left.</i></p>	<p><i>Guyed V tower (voltage: 275 kV – maximum tower height: 40 m a.g.l.) on the right.</i></p>
	

275kV connection is not efficient, because the electric energy should be converted to 132 kV by the transformers of the Eskom substation in order to be delivered to the distribution network and to feed customers. This voltage conversion entails energy loss and transformer loads, which can be avoided should the first connection solution (132kV) be selected.

The 132kV voltage alternative is therefore the preferred option, also due to the reduced visual impact and reduced potential impact on birds of 132kV poles if compared to 275kV towers.

8.3 POWERLINE CORRIDOR ALTERNATIVES

After extensive liaising with Eskom it was found that there are no location alternatives. There is only one powerline corridor available because the proposed Bela Bela Photovoltaic Power Plant must be connected to the Eskom grid in the area from the approved locality, specifically to the Bela Bela MTS which is the closest available point of connection.

Eskom indicated that the incoming powerline connection has to come from the south into the Eskom Warmbad substation.

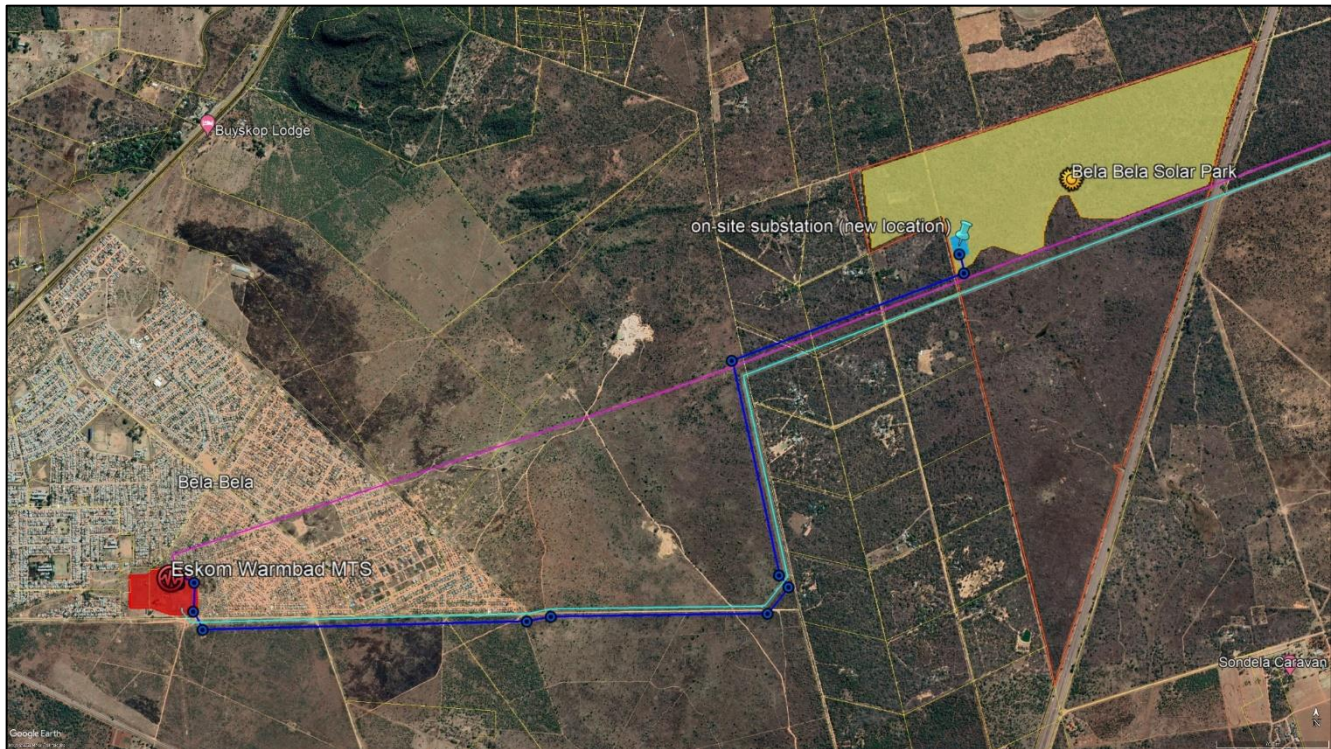


Figure 3. Illustration indicating the preferred powerline route.

8.4 NO-GO ALTERNATIVE

The no-go alternative is the option of not establishing the Bela Bela Powerline infrastructure associated with the proposed Bela Bela PV Solar Plant. If the Bela Bela Powerline is not developed, the Bela Bela PV Solar Park will not be able to be connected to the Eskom grid and the Bela Bela Solar Park (EIA application approved) will not be established. The environment will remain in its current state (*status quo* will remain).

No new employment opportunities will be created and additional capacity to the Eskom grid will be forfeited with no economic benefits for the Bela Bela area and no further reduction in the pressure on the Eskom grid.

9 DETAILS OF PUBLIC PARTICIPATION PROCESS UNDERTAKEN

All relevant I&APs have been identified and involved in the public participation process from the beginning of the project as per sections 54, 55, 56 and 57 of the EIA regulations 2014, as amended. The public participation process offers the opportunity to become actively involved through constant sharing of information. The main purposes of the public participation process are to ensure that:

- all relevant information in respect of the application is made available to I&APs for their evaluation and review;
- reasonable opportunity is given to I&AP's to comment and to submit queries related to the proposed project; and
- comments and queries by the I&APs to the Draft Basic Assessment Report are submitted and evaluated in a reasonable timeframe and in predetermined terms.

The initial stage of the public participation was conducted from 25 August 2022 until 29 September 2022.

In the enclosed Annexure B (Comments & Responses Report), there is a list of all components of the public participation process. The public was informed of the project by means of:

- Site notices, which were put up at four positions along the proposed corridor.
- Background Information Documents (BID) that were sent by e-mail or hand delivered to all adjacent landowners.
- A notice that was published in "The Post" newspaper, which is distributed locally.
- Sending of BIDs to all relevant government departments and other possible interested and affected parties/stakeholders.

An I&AP Register was opened and will be maintained and updated as required.

Site notices were put up on site on 25 August 2022.

After a Deed Search was done on the surrounding properties a Background Information Document was sent to the adjacent landowners. Proof of this is attached in Annexure B. A number of these documents were also distributed to the relevant governmental departments including Department of Water and Sanitation, Department of Agriculture, Land Reform & Rural Development, *etc.* Other identified interested and/or affected parties/stakeholders include Eskom, Bela Bela Local Municipality, Waterberg District Municipality *etc.* Proof of all correspondence is included in Annexure B.

A newspaper notice was published in the 26 August 2022 edition of "The Post", which is a local newspaper.

Several people registered as I&APs, but no comments were received from adjacent landowners and/or I&APs during the initial public participation process.

The Draft Basic Assessment Report (in electronic format) was made available for a 30-day commenting period for comments from 4 November 2022 until 5 December 2022. All comments received on the Draft Basic Assessment Report is attached in Annexure B (Comments & Responses Report) of this report.

9.1 FURTHER STEPS IN PUBLIC PARTICIPATION PROCESS

To ensure a transparent and complete public participation process the following steps are still to be taken during the rest of the Basic Assessment process:

- The Final BAR will now be submitted to DFFE.
- Registered I&APs and governmental organizations will be notified about the final decision of the DFFE (Environmental Authorisation granted or not).

10 ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PROPOSED POWERLINE

The receiving environment has been described using a combination of specialist inputs, on-site observations, a review of existing literature and utilizing Geographic Information Systems (GIS) planning tools.

10.1 ENVIRONMENTAL FEATURES

Environmental Screening Report

Table 5. Environmental Screening Tool Table

Theme	Very High	High	Medium	Low	Specialist Studies Conducted	Motivation for no Specialist Studies
Agriculture		X			X	Annexure F
Animal species			X		X	Annexure C
Aquatic biodiversity				X		Annexure D
Archaeological and Cultural Heritage				X	X	Annexure H
Civil Aviation		X			X	An application for approval will be submitted to the Civil Aviation Authority. Annexure L1
Defence				X		Annexure L2
Paleontology		X			X	Annexure I
Plant species			X		X	Annexure C
Terrestrial Biodiversity	X				X	Annexure C

The following environmental sensitivities are identified for the project area:

- **Agriculture Theme**

Sensitivity - High.

The results from the Agricultural Agro-Ecosystem Assessment (Annexure F) indicate that the agricultural potential of soils on the proposed development area varies from low (shallow, soils or very sandy to sandy loam soils with limited suitability for grazing) to moderate (deeper, red apedal soils with moderate potential for grazing). Field observations were done to verify the soil potential classified by the Department of Agriculture on a small scale. The site should subsequently be considered as moderate potential grazing land with Moderate to low potential for arable agriculture considering climatic conditions, soil physical characteristics and size of land potentially available.

In terms of the Site Sensitivity Verification, it was found that the actual impact on agricultural resources, on the powerline route will be Low to Medium and NOT High.

- **Animal Species Theme**

Sensitivity - Medium.

The findings of this report and the relevant impact assessment concluded that the development of the proposed power line between the approved Bela Bela Photovoltaic Power Plant to the Eskom Warmbad substation would have a medium impact on the bird communities and will cause a slight impact on the ecological process of the overall bird community. The biggest concern is the threat the power lines within this area hold to threatened large terrestrial species such vultures, korhaan, etc. and high-risk species such as herons, etc. Careful considerations need to be taken in terms of the proposed powerline. The competent authority must consider all prescribed mitigation measures and recommendations to minimise impacts of the proposed powerline – (Annexure C - Terrestrial Biodiversity Assessment and Annexure E – Avifauna Assessment).

In terms of the Site Sensitivity Verification, it was found that the impact on animal species, on the powerline route will be Medium. This is in line with the Environmental Screening Tool.

- **Aquatic Biodiversity Theme**

Sensitivity – Low.

According to the National Freshwater Ecosystem Priority Areas (NFEPA, 2011) dataset there are wetland features located within the buffer area of the proposed development site. Even though only a Compliance Statement would have sufficed, a detailed Wetland and Riparian Impact Report was compiled by a wetland specialist, which is included in Annexure D of the BAR. In terms of the Site Sensitivity Verification, it was found that the impact on aquatic resources, on the powerline route will be Low and is thus, in line with the Environmental Screening Tool.

- **Civil Aviation Theme**

Sensitivity - High

The proposed Bela Bela 132kV Powerline does not interfere with any civilian or military installations but an application for approval will be submitted to the Civil Aviation Authority. See Annexure L1 for confirmation of this as stated in the Site Sensitivity Verification Report as compiled by a qualified Civil Aviation consultant. The Sensitivity of the Civil Aviation Theme was found to be LOW after an assessment was done for the Bela Bela Powerline and not High as indicated in the Environmental Screening Tool Report.

- **Paleontological Theme**

Sensitivity – High

A Phase 1 Palaeontological Impact Assessment was conducted. There is no possibility that the Precambrian rocks could contain metazoan fossils. However, the rocks of the Clarens Formation, in both the Main Karoo Basin and also the Tuli and Tshipise basins are known to host Jurassic-aged fossil tetrapods, particularly sauropodomorph dinosaurs, therapsids, crocodylomorphs and therapsids. No fossils have yet been discovered in the study area. This is because there are very few rock outcrops in the study area and the areas affected by the proposed development are overlain by Quaternary unconsolidated alluvium covered by thick vegetation – Annexure I. It is indicated by the palaeontologist, following the findings of this Palaeontological Impact Assessment, that it is unlikely that fossils will be recovered as a result of the development of the Bela Bela Powerline. Thus, the sensitivity, regarding the palaeontology theme, can no longer be considered to be high, but is considered to be Low.

- **Plant Species Theme**

Sensitivity - Medium

The site has a Medium Sensitivity from a Plant Species Theme Perspective due to the presence of indigenous woodland with protected tree species. The botanist concluded that the development can be supported provided that the mitigation measures are implemented – Annexure C. On page 91 of the Terrestrial Biodiversity Impact Assessment it is indicated that mitigation measures are provided that would reduce these impacts from a higher to a lower significance. Thus, with the implementation of the mitigation measures, the Plant Species Theme Sensitivity will be Low.

- **Terrestrial Biodiversity Theme**

Sensitivity - Very High

The proposed development should avoid sensitive areas such as wetlands and riverine areas, while also allowing corridors of indigenous grassland and outcrops on areas outside the development footprint to be preserved. Where sensitive areas of natural vegetation cannot be avoided, mitigation measures are recommended to minimise impacts. Negative impacts can be minimised by strict enforcement and compliance with the EMPr which considers the recommendations for managing impacts detailed in the report. Provided that the proposed development and layout plans is consistent with the sensitivity map and take all the mitigation measures into consideration stipulated in this report, the planned development can be supported. The sensitivity can be deemed to be medium, considering the findings by the specialist, included in Annexure C.

10.2 RENEWABLE ENERGY DEVELOPMENTS WITH ENVIRONMENTAL AUTHORISATION WITHIN 30 KM OF PROPOSED DEVELOPMENT AREA

The following solar projects, within 30km from the project site, received Environmental Authorisation according to the DFFE database:

Table 6. List of renewable projects with associated powerline developments with Environmental Authorisation within a 30 km radius of the proposed study area

DFFE Ref No.	Project Title	Applicant	MW
14/12/16/3/3/2/688/AM1	The renewable energy generation project on Portion 67 of the farm Tweefontein 462 KR, Bela Bela Local Municipality, Waterberg District Municipality, Limpopo Province.	Jacaranda Energy RF (Pty) Ltd	0
14/12/16/3/3/2/576	Proposed Gihon Solar Energy facility project within Bela Bela Local Municipality, Waterberg District, Limpopo Province.	Networx Renewables (Pty) Ltd	75



Figure 4. Map of Wind and Solar developments with an approved Environmental Authorisation or applications under consideration within 30 km of the proposed area

10.3 CLIMATE

The development site falls within the summer rainfall region with very dry winters and frost that occurs infrequent. The area effectively has three seasons, namely a cool dry season from May to mid-August, a hot dry season from mid-August to about October and a hot wet season from about November to April. The mean annual precipitation for the Bela-Bela area is approximately 481mm, while the mean monthly maximum and minimum temperatures for Warmbaths - Towoomba are 35.2°C and – 2°C for October and July, respectively. The mean annual temperature is 18.0°C.

10.4 TOPOGRAPHY AND DRAINAGE

The study area falls within the Bushveld ecoregion. The topography is characterised by slightly undulating plains. The topography of the site can be described as generally favourable, when considering that most of the area consists of slopes of less than 1:5. The site is located at an altitude of 1200 meters above mean sea level (AMSL).

The site is located within the B31E (eastern section) and A23G quaternary catchments and is situated partially in the Olifants and Crocodile (West) and Marico Vaal Water Management Areas. Drainage occurs as sheet-wash into the drainage channels to the east and West (Bad-se-Loop River) of the site. More detailed is included in the Geo-technical report in Annexure G.

10.5 SOILS AND GEOLOGY

A Geo-technical desktop study was conducted in August 2022. The report is attached in Annexure G.

The Geological Survey of South Africa (now the Council for Geoscience) has mapped the area at 1:250 000 scale (2428 Nylstroom). No prominent linear structures, inferred to represent dyke intrusions and/or faults, cut through the route. However, a localised diabase/dolerite still has intruded into the Clarens Formation sediments directly to the north of the eastern portion of the route but is not inferred to have had a significant effect on the strata underlying the study area. Soils associated with the site varies from deep, leached sandy soils (north-east and central section), very shallow Mispah or Glenrosa soils (localised) associated with sandstone bedrock and red apedal soils in the western section of the site (basalt bedrock).

Conclusions:

The Bela Bela Powerline Corridor is defined as developable with minor precautions. Care should be taken to divert surface water away from deep excavation to prevent sidewall failure. Recommendations proposed in the Geotechnical Report (Annexure G) should be adhered to.

10.6 ECOLOGY (FAUNA & FLORA)

A Terrestrial Biodiversity Impact Assessment (Annexure C) was conducted by Dr. BJ Henning in order to describe the ecology (fauna and flora) present along the powerline study corridor, to assess its ecological sensitivity and to indicate the most suitable areas for the proposed development. For this purpose, detailed ecological (fauna habitat & flora) surveys were conducted during August 2022 to verify the ecological sensitivity and ecological components at ground level.

10.6.1 Vegetation Types

The most recent classification of the area by Mucina & Rutherford (2006) is the western section of the site to be part of the Springbokvlakte Thornveld vegetation type, while the central and north-eastern section is classified as Central Sandy Bushveld.

The conservation status of the Springbokvlakte Thornveld vegetation type is classified as Vulnerable with a national conservation target of 19%. Only 1% is statutorily conserved, mainly in the Mkombo Nature Reserve. Roughly three times this area is conserved in a few other reserves. At least 49% is transformed, including about 45% cultivated and 3% urban and built-up. Dense rural populations in parts of the southern and eastern side of the unit. Very scattered alien plants over wide areas include *Cereus jamacaru*, *Eucalyptus species*, *Lantana camara*, *Melia azedarach* and *Opuntia ficus-indica* (Mucina and Rutherford, 2006).

The Central Sandy Bushveld has a Least Concern conservation status, with less than 3% statutorily conserved and about 24% that has been transformed. The landscape and vegetation features of this vegetation type include low undulating areas, sometimes between mountains, and sandy plains and catenas supporting tall, deciduous *Terminalia sericea* and *Burkea africana* woodland on deep sandy soils and low, broadleaved Combretum woodland on shallow rocky or gravelly soils. Species of *Vachellia*, *Senegalia*, *Ziziphus* and *Euclea* are found on flats and lower slopes on eutrophic sands and some less sandy soils, while the grass-dominated herbaceous layer have a relatively low basal cover on dystrophic sands.

The proposed development site occurs on a landscape that varies from slightly undulating to flat plains. The importance to survey the area to have a better understanding of the ecosystem and the potential impact of the powerline development on the natural environment was identified as a key factor, and subsequently the footprint areas was completely surveyed. The site forms part of a larger area used for livestock farming, eco-tourism and wildlife grazing. The vegetation units on the site vary according to soil characteristics, topography, and land-use. Vegetation units were identified on the footprint development sites and can be divided into 8 distinct vegetation units according to soil types, land use and topography.

Vegetation communities identified on the development site are classified as physiographic physiognomic units, where physiognomic refers to the outer appearance of vegetation, and physiographic refers to the position of the plant communities in the landscape. Physiographic-physiognomic units will be referred to as vegetation units in the following sections, which are divided in terms of the land-use, plant species composition, topographical and soil differences.

The plant species for the QDS as listed by SANBI, Plants of Southern Africa (POSA) database is included in Appendix A of the Terrestrial Biodiversity Impact Assessment (Annexure C), while the detailed species list for each vegetation unit is included in Appendix B.

The following vegetation units were documented on site:

1. Mixed *Burkea* – *Terminalia* sandveld
2. *Combretum* – *Grewia* - *Sclerocarya* woodland
3. Open *Terminalia* – *Strychnos* woodland
4. Degraded microphyllous woodland
5. Dense *Vachellia* – *Dichrostachys* woodland
6. Rocky outcrop

- Mixed *Burkea* – *Terminalia* sandveld

The *Terminalia* – *Burkea* Sandveld variation occurs throughout a large section of the eastern section of the study area and represents woodland typical of deep sandy areas of the Central Sandy Bushveld. The habitat of this community is leached, sandy soils dominated by *B africana*, *T sericea* and *O pulchra*. Sandy soils in this plant community are heavily leached due to the high rainfall (600 - 900 mm) in the area (Van Rooyen & Bredenkamp, 1996), resulting in sourveld tree species like silver clusterleaf, red seringa and peeling plane dominating the woody layer. Some isolated termitaria bushclumps occurred in more clayey patches and is characterized by tree species such as *D rotundifolia* and *P capensis*. These sweetveld species occur on termitaria due to the depth and aeration, better drainage, as well as the finer texture and higher nutrient status of the soil (Lee & Wood, 1971).

The vegetation structure of this vegetation unit varies from an open sandveld variation dominated by *T sericea*, to a denser woodland variation where encroachment is apparent. The encroachment resulted because of overgrazing of the herbaceous layer by livestock in the past.

- *Combretum* – *Grewia* - *Sclerocarya* woodland

This woodland type occurs on an ecotone between Springbokvlakte Thornveld and Central Sandy Bushveld on medium depth sandy to gravelly soils (Hutton soil). The soils have a higher clay content compared to the north-east section of the powerline route. The woody layer is characterised by *C zeyheri*, *S birrea*, *D cinerea*, *C apiculatum* and *G bicolor*, while the grass layer is dominated by *Aristida* species. The herbaceous layer was in an overgrazed state that will cause further encroachment of the shrub layer in the future. Isolated individuals of the protected tree species *S birrea* occur in the area.

- Open *Terminalia* – *Strychnos* woodland

The woodland occurs in a central section of the project area on the plains on deep, leached sandy soils derived from sandstone. The woody layer forms open woodland with a dense grass layer dominated by woody species such as *T sericea*, *S pungens* and *G monticola*, while the grass layer is dominated by *H dissoluta* and *E pallens*. No red data species occurs; probably because of the habitat being different compared to the potential red data species that could occur.

- Degraded microphyllous woodland

This vegetation unit occurs on slightly undulating to flat low plains in the western section of the study area and represent microphyllous woodland typical of the Springbokvlakte Thornveld vegetation type. The state of the herbaceous layer is in a subclimax state and the shrub layer is well developed, although the area has been severely impacted by wood harvesting, overgrazing leading to encroachment and alien species invasion (prickly pear, queen-of-the-night). The woody layer is characterized by an open tree layer with a well developed shrub layer. The presence of sweetveld species *Vachellia tortilis*, *Vachellia nilotica*, *Euclea undulata* and *Grewia flava* indicate soils with a higher clay percentage.

- Dense *Vachellia* – *Dichrostachys* woodland

This area represents secondary old fields in the project area on red apedal soils. The outer successional stage of old fields only starts after several years of abandonment when woody species start to invade. These secondary old fields are usually dominated by species such as *Dichrostachys cinerea*, *Vachellia tortilis* and *Ziziphus mucronata*. Where overgrazing occurs the encroacher *Dichrostachys cinerea* becomes dominant as is evident on certain areas of the site. The landscape and vegetation features of this unit include slightly undulating plains with Hutton or Arcadia soils. The tree layer (> 3m.) covers 5 -10%, while the shrub layer covers 30-40% (different variants) of the area.

The grass layer is well developed with a 60 -70% cover, while the forb layer (0.2m.) covers 1 – 2 % of the area. The dominant tree species in the area include *Vachellia tortilis* and *Dichrostachys cinerea*. This vegetation unit is defined as a secondary old field variant/modified land which is evident from the higher tree cover/diversity as well as the higher shrub cover/diversity.

- Rocky outcrop

A small section of the project area indicated in Photograph 6 represent a rocky outcrop area with large sandstone boulders, although this area was previously degraded through anthropogenic influences (iron age site). The substrate is shallow, rocky soils derived from sandstone. The woody layer forms open woodland with a well-developed shrub layer, although alien species invasion was also observed in most of the vegetation unit. Typical species occurring in the area include *Ficus glumosa*, *Pappea capensis* and *Combretum apiculatum*.

10.6.2 Species of Conservation Concern (SCC)

Species of conservation concern are species that have a high conservation importance in terms of preserving South Africa's high floristic diversity and include not only threatened species, but also those classified in the categories Extinct in the Wild (EW), Regionally Extinct (RE), Near Threatened (NT), Critically Rare, Rare, Declining and Data Deficient – Insufficient Information (DD).

Not all species listed as protected are threatened or *vice versa*. A list of SCC plant species previously recorded in the study area in which the proposed development is planned was obtained from the Plants of Southern Africa (POSA) database of SANBI.

Habitat degradation is one of the main reasons for plant species becoming extinct in a particular area. Threatened species are also seen as indicators of the overall health of an ecosystem.

A list of red data plant species previously recorded in the grid square in which the proposed development is planned was obtained from SANBI. The following red listed plant species occur in the QDS (Quaternary Degree Square reference) or was recorded in the project area.

Family	Species	IUCN
Apocynaceae	<i>Ceropegia turricula</i> (lantern flower)	Near Threatened
Apocynaceae	<i>Stenostelma umbelluliferum</i>	Near Threatened

Although no populations or individuals of these species were documented during the surveys, ecological monitoring should still be implemented during the construction phase and specific sensitive habitats need to be avoided to ensure that any potential red data species potentially missed during the field surveys are preserved and not potentially impacted on.

10.6.3 Protected Plants (Limpopo Environmental Management Act)

Plant species are also protected in the Limpopo Province according to the Limpopo Environmental Management Act, 2003 (Act No. 7 of 2003). According to the Act, no person may pick, import, export, transport, possess, cultivate, or trade in a specimen of a specially protected or protected plant species. The Appendices to the Act provide an extensive list of species that are protected, comprising a significant component of the flora expected to occur on site. Communication with Provincial authorities indicates that a permit is required for all these species if they are expected to be affected by the proposed project.

After a detailed survey was conducted during August 2022, none of the species as listed in Schedule 11 and 12 of the Act, was confirmed on site.

10.6.4 Protected Trees Species (NFA)

The National Forest Act, 1998 (Act No. 84 of 1998) provides a list of tree species that are considered important in a South African perspective because of scarcity, high utilization, common value, etc. In terms of the National Forest Act of 1998, these tree species may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold – except under license granted by DWAF (or a delegated authority). Obtaining relevant permits are therefore required prior to any impact on these individuals. Taking cognizance of the data obtained from the field surveys, the following protected tree species occur within the study area (Table 6):

Table 7. List of protected tree species found in the area

Tree species	Habitat
<i>Boscia albitrunca</i>	Red apedal soils
<i>Sclerocarya birrea</i>	Sandy to gravelly soils on site
<i>Securidaca longipedunculata</i>	Deep sandy soils

All these species occur scattered as individuals on the proposed development site. A permit application needs to be submitted to the Department of Forestry to obtain a licence for the removal of the trees if needed.

10.6.5 Alien Invasive Plant Species

Continued movement of personnel and vehicles on and off the site, as well as occasional delivery of materials required for maintenance, will result in a risk of importation of alien species throughout the life of the project. The following alien invasive and exotic plant species were recorded on site during the surveys as stipulated in the Alien and Invasive Species Regulations (GNR 599 of 2014) (Table 8):

Table 8. Declared weeds and invader plants of the study area.

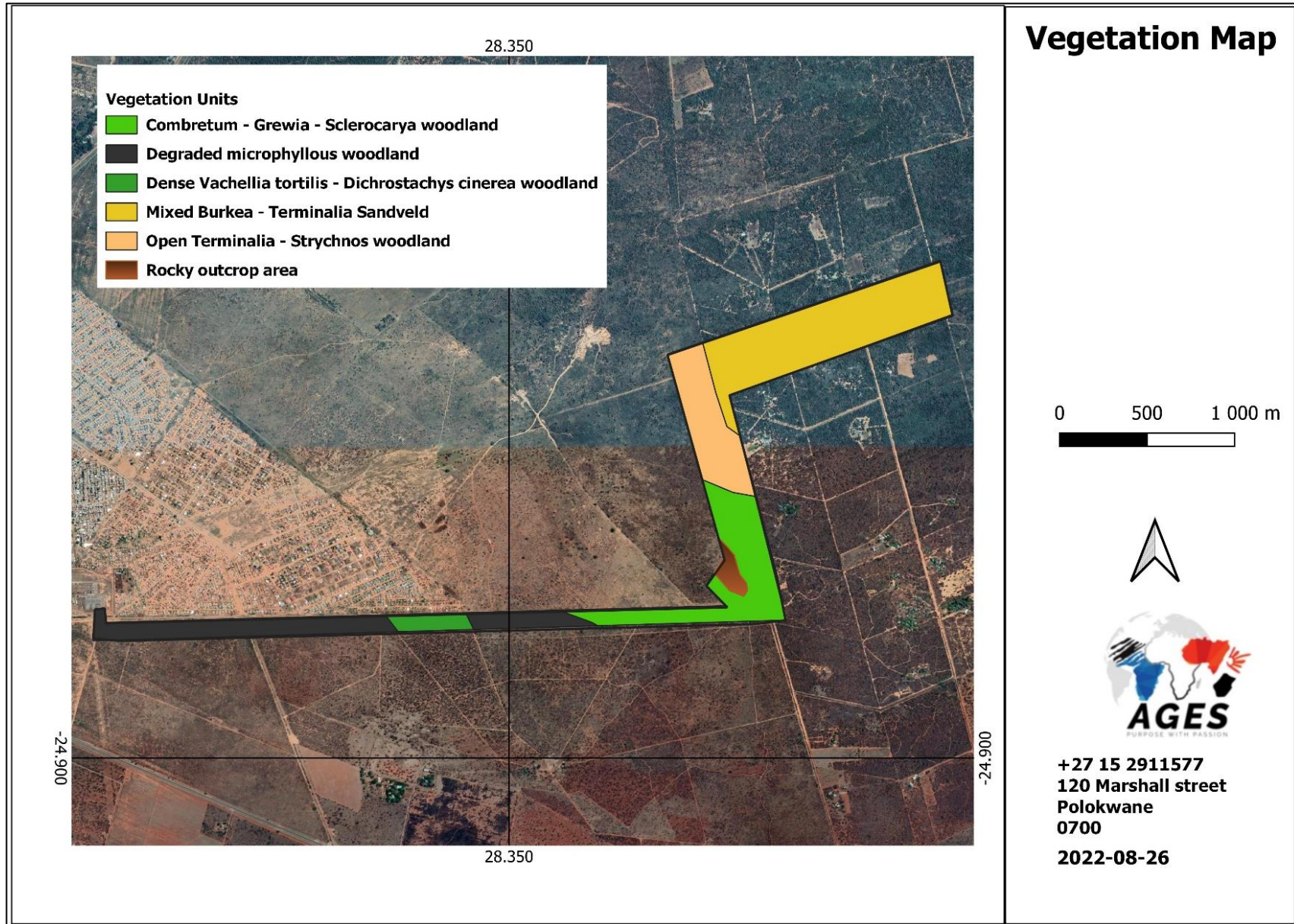
Species	Category
<i>Agave sisalana</i>	2
<i>Argemone ochroleuca</i>	1b
<i>Cereus jamacaru</i>	1b
<i>Datura stramonium</i>	1b
<i>Lantana camara</i>	1b
<i>Eucalyptus camaldulensis</i>	1b
<i>Melia azedarach</i>	1b
<i>Opuntia ficus-indica</i>	1b
<i>Xanthium strumarium</i>	1b

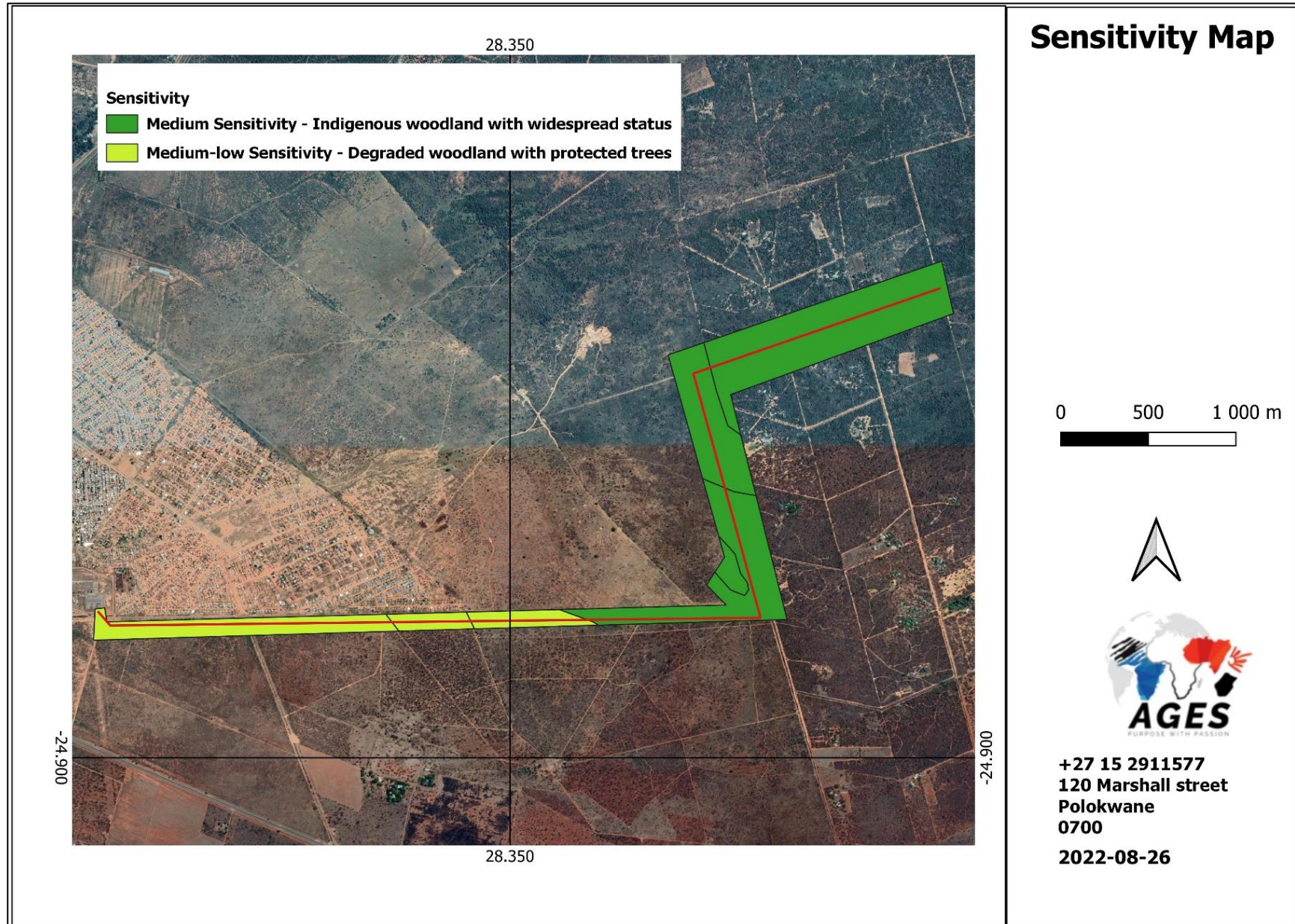
According to the amended regulations (No. R280) of March 2001 of the Conservation of Agricultural Resources Act 1983 (Act no. 43 of 1983), it is the legal duty of the land user/landowner to control invasive alien plants occurring on the land under their control. The State has the right to clear invasive plants at the landowner's expense if the landowner refuses to remove invasive plants.

10.6.6 Conclusions

The proposed development should avoid sensitive areas where possible, while also allowing corridors of indigenous woodland on areas outside the development footprint to be preserved. Where sensitive areas of natural vegetation cannot be avoided, a few mitigation measures have been recommended to minimise and/or offset impacts (licence application for eradication of protected species). Negative impacts can be minimised by strict enforcement and compliance with an Environmental Management Plan which considers the recommendations for managing impacts detailed above.

Provided that the proposed development and layout plans is consistent with the sensitivity map and take all the mitigation measures into consideration stipulated in this report, the planned development can be supported.





10.6.7 Fauna

A survey was conducted during August 2022 to identify specific fauna habitats, and to compare these habitats with habitat preferences of different fauna groups (birds, mammals, reptiles, amphibians) occurring in the quarter degree grid. During the site visit mammals, birds, reptiles, and amphibians were identified by visual sightings through random transect walks. Mammals were also recognized as present by means of spoor, droppings, burrows or roosting sites.

Mammals

Much of the large and medium-sized mammal fauna that previously occurred on the project site is now locally extinct or occurs in small, fragmented populations in reserves. Most of the habitat types on the respective study sites are fragmented. Therefore, the expected mammalian richness on these areas is considered low, although slightly higher richness values are expected from the more intact woodland habitats.

The surrounding habitat will still be utilized by mammals such as antelope, small predators, small mammals and rodents. Therefore, the expected mammalian richness is considered Moderate.

Antelope species such as kudu, duiker and steenbok still roam this area (dung, spoor identified). Smaller mammal species such as honey badgers and serval can become habituated to anthropogenic influences, while other species will rather move away from the township areas and will seldom use the area. Predators that still roam freely in the area include smaller predators such as black backed jackal, while predators such as brown hyena, caracal, serval and honey badger are rare in the area. The dominant species composition therefore comprises of widespread taxa with unspecialised life history traits.

The impact of the proposed development area will be low on mammal populations if one compares the footprint of the proposed development site, overall range of individual species and the fact that most of the surrounding area represent farming land used for livestock grazing. It is therefore considered highly unlikely that the rare species will be affected negatively by the development of the powerline. The connectivity¹ of the project site to the remainder of the larger area is Moderate due to the tar roads, agricultural activities and township areas to the north of the western section of the powerline site.

The use of trapping techniques was not deemed necessary due to the fact that the mammals in the area have already been largely displaced to the surrounding areas because of the development activities on the neighbouring properties.

Most mammal species are highly mobile and will move away during construction of the powerline development. The most important corridors that need to be preserved for free-roaming mammal species in the area include the riparian zones and floodplains.

¹ **Connectivity (habitat connectivity)** - Allowing for the conservation or maintenance of continuous or connected habitats, to preserve movements and exchanges associated with the habitat.

Avifauna

Most bird species identified within the study area are common species known to nest within or utilise the woodland in the region and may be either permanently or occasionally present within the study area. In general terms the open old field patches could attract the Secretarybird, White-bellied Korhaans, and White Stork and Abdim's Stork. The grassland patches are also a favourite foraging area for non-Red Data game birds such as Swainson's Spurfowl and Helmeted Guineafowl. This could attract large raptors because of both the presence and accessibility of prey. Many habitat generalist species utilize this habitat type for foraging and hunting purposes.

The largest surface area on site consists of woodland. *Vachellia* or *Senegalia* trees generally attract many insects and in turn attract a good diversity of typical savanna bird species. The ground cover between the trees consists of mainly short grasses interspersed with shrubs. Microphyllous woodland usually supports much higher bird numbers compared to the broadleaved woodlands. The area represents microphyllous woodland and supports many smaller bird species such as Ashy Tit, Pied Babbler, Kalahari Robin, Burntnecked Eremomela, Desert Barred Warbler, Marico Flycatcher, Pririt Batis, Crimsonbreasted Shrike, Longtailed Shrike, Threestreaked Tchagra, Great Sparrow, Whitebrowed Sparrowweaver, Scalyfeathered Finch, Violeteared Waxbill and Blackcheeked Waxbill.

The broadleaved woodland occurring in the study area (footslopes) has quite a higher diversity of birds because of the crossover of habitats. Typical examples of broad-leaved-woodland birds are Pallid Flycatcher, Greencapped Eremomela, White-bellied Korhaan and Meyer's Parrot.

According to Birdlife South Africa, the study area **falls outside of any Important Bird Areas (IBA)**, identified within South Africa (www.birdlife.org.za). The conservation status of many of the bird species that are dependent on wetlands reflects the critical status of wetland nationally, with many having already been destroyed. In the study area, valleybottom wetlands and dams represent wetland areas to the east of the powerline footprint area.

There is a long list of red data bird species that have a geographical distribution that includes the site. The presence of the habitat of these species is confined to the open water habitat and riparian woodland observed to the east of the site. These habitat types will be avoided during the proposed development, and it is therefore highly unlikely that species utilizing these habitat types will be impacted on.

Herpetofauna

There is a low potential presence of some toads and sand frogs in the project area due to the absence of permanent water and amphibian habitats. Amphibian species potentially occurring in the area include Common River Frog, Natal Sand Frog, Gutteral Toad, Raucous Toad and Bubbling Kassina. These species are non-threatened and widespread species, and as such the development will not have any impact on amphibian conservation within the region.

Reptile species such as the southern rock python, puff adder, boomslang, vine snake, spotted bush snake and several members of the green snakes (*Philothamnus* spp.) are expected to occur in the habitats of the project area, although the presence of these snakes is dependent on the presence of their prey species (rodents, frogs etc.). The general habitat type for reptiles consists of open to very dense bushveld, with limited available habitat for diurnally active and sit-and-wait predators, such as terrestrial skinks and other reptiles. Arboreal species are the more prominent components of the local herpetofauna.

According to the existing databases and field survey the following number of fauna species included in the IUCN red data lists can potentially be found in the study area:

Table 9. Red data list of potential fauna for the study area

English Name	Conservation Status	Probability of occurrence on site
BIRDS		
Eagle, Verreaux's	Vulnerable	Low
Bustard, Kori	Near Threatened	Moderate
Stork, Abdim's	Near Threatened	Moderate
Roller, European	Near Threatened	High
Pratincole, Black-winged	Near Threatened	Moderate
Vulture, White-backed	Critically Endangered	Moderate – dependant on carcasses
Vulture, Cape	Endangered	Moderate – dependant on carcasses
Eagle, Martial	Endangered	Moderate
Secretarybird	Vulnerable	Moderate
Vulture, Lappet-faced	Endangered	Moderate – dependant on carcasses
MAMMALS		
Rusty Pipistrelle	Near Threatened	Low
Brown Hyena	Near Threatened (2015)	Moderate
Southern African Hedgehog	Near Threatened (2016)	Low
Spotted Hyaena	Near Threatened (2016)	Low
African Clawless Otter	Near Threatened (2016)	Low
Cheetah	Vulnerable (2016)	Low
Leopard	Vulnerable (2016)	Moderate
HERPETOFAUNA		
Giant Bull Frog	Near Threatened	Low

The development would not have a significant impact on the above-mentioned red data fauna since adequate and natural habitat/vegetation would be available on the peripheral grassland and woodland habitats surrounding the development site.

If the following general mitigation and management actions are implemented, the impact on faunal populations should be low.

- Where trenches pose a risk to animal safety, they should be adequately cordoned off to prevent animals falling in and getting trapped and/or injured. This could be prevented by the constant excavating and backfilling of trenches during construction process;
- No animals may be poached during the construction of the powerline. Many animals are protected by law and poaching or other interference could result in a fine or jail term;
- Do not feed any wild animals on site;
- Waste bins and foodstuffs should be made scavenger proof;
- Roads should be designed without pavements to allow the movement of small mammals;
- Monitoring of the environmental aspects is recommended for the future phases of the proposed development should the authorities approve the application. The monitoring phase would ensure that negative impacts on the fauna and flora of the area are limited to a minimum during the construction phase.

10.6.8 Summary and results of the Terrestrial Biodiversity Impact Assessment

Detailed ecological (fauna habitat & flora) surveys were conducted during August 2022 to verify the ecological sensitivity and ecological components of the site at ground level. The timing of the season was considered as adequate due to sufficient rains received in the area during the winter months and early spring. The survey was considered successful.

Most sensitive sections: It is evident from the distribution of biodiversity, presence of threatened species and sites of scientific interest, that the proposed development has the potential for negative impact on the flora and faunal of the study area. This is particularly true of the sensitive components of the vegetation associated with the sandveld in the project area.

Most sensitive habitats: Many threatened species are woodland specialists, linked to these habitats either for breeding, feeding or shelter. Major impacts on natural woodland areas should be avoided wherever possible during construction. Where unavoidable impacts will occur on woodlands, strict mitigation measures and legislation should be implemented (licence for eradication of protected plants, IWUL application etc.).

Monitoring of threatened species: Many endemic and protected species have been recorded in region. The EMP for the development should highlight the conservation status of these species and note that steps must be undertaken in conjunction with conservation authorities to protect or translocate any populations encountered during project actions. Ecological monitoring is recommended for the construction phase of the development considering the presence of protected trees and potential red data fauna on areas surrounding the site.

A sensitivity analyses was conducted to identify the most suitable site for the development. From this investigation and ecological surveys, the following main observations was made:

- Most of the natural woodland have a Medium Sensitivity and development can be supported in the area provided certain mitigation measures are implemented. Where the clearance of the vegetation would cause protected trees or other fauna to be removed, permits should be obtained from the relevant authorities.
- The secondary woodland areas have a Medium-low Sensitivity due to the state of succession and degradation in the area.

The protected tree species marula, shepherd's tree and violet tree occur on the site and specific mitigation measures (permit applications, avoidance, relocation) should be implemented to avoid negative impacts on the species.

Some potential rare fauna may occur in the area, and specific mitigation measures need to be implemented to ensure that the impact of the development on the species' habitat will be low. Specific mitigation relating to red data fauna includes the following:

- Disturbances in close vicinity of the development (periphery) should be limited to the smallest possible area in order to protect species habitat;
- Corridors between the development zones are important to allow fauna to move freely between the areas of disturbance.
- Specific mitigation should be implemented around wetlands and drainage features in the area to prevent negative impacts, while an avifauna specialist study should be conducted for the powerline development.

Several ecological potential impacts were identified and assessed. A few of these were assessed as having potentially medium or high significance, including the following:

- Destruction or disturbance to ecosystems leading to reduction in the overall extent of a particular habitat;
- Impairment of the movement and/or migration of animal species resulting in genetic and/or ecological impacts (habitat fragmentation);
- Increased soil erosion;
- Destruction/permanent loss of individuals of rare, endangered, endemic and/or protected species;
- Establishment and spread of declared weeds and alien invader plants;
- Soil and water pollution due to spillages;
- Air pollution as a result of dust;
- Negative effect of human activities on the fauna and flora of the area during construction.

Mitigation measures are provided that would reduce these impacts from a higher to a lower significance. A monitoring plan is recommended for the construction phase of the development should the proposed application be approved.

The proposed development should avoid sensitive areas such as wetlands and riverine areas, while also allowing corridors of indigenous grassland and outcrops on areas outside the development footprint to be preserved. This can be done successfully with the careful placing of pylons. Where sensitive areas of natural vegetation cannot be avoided, a few mitigation measures have been recommended to minimise and/or offset impacts (licence application for eradication of protected species.). Negative impacts can be minimised by strict enforcement and compliance with an Environmental Management Programme (EMPr) which considers the recommendations for managing impacts detailed above.

According to the Ecological Specialist, provided that the proposed development and layout plans is consistent with the sensitivity map and all the mitigation measures are taken into consideration stipulated in this report, the planned development can be supported.

10.6.9 Avifauna

An Avifauna Impact Assessment (Annexure E) was conducted by Kemp Operations (Pty) LTD ((Ryno Kemp (*Pr.Sci.Nat.*)) in order to determine whether the proposed development of the powerlines would have negative impact on avifauna.

A detailed field survey was carried out 3-4 September 2022 (dry season). Based on the National Screening Tool (<https://screening.environment.gov.za/screeningtool/#/pages/welcome>), the proposed site sensitivity is classified as high due to the following species that might occur in the area; (*Neotis denhami* (Denham's bustard), *Falco biarmicus* (Lanner falcon), *Torgos tracheliotos* (Lappet-faced vulture), *Plemaetus bellicosus* (Martial eagle), *Aquila verreauxii* (Verreaux's eagle), *Mycteria ibis* (Yellow-billed stork), *Saggittarius serpentarius* (Secretarybird), *Eupodotis senegalensis* (White-bellied bustard), *Podica senegalensis* (African finfoot), *Tyto capensis* (African grass owl), *Hydroprogne caspia* (Caspian tern), *Aquila rapax* (Tawny eagle). A field survey aid in filling in any information gaps identified from pilot investigations and published data. Bird communities were surveyed along the proposed power line development using line transects as stipulated in the **Best Practice Guidelines Birds & Solar Energy** (Jenkins *et al.* 2017). ArcGIS was used to create random points along the surveying area for the proposed power line connection, which was located using a GPS. Thirty-seven random points were plotted along the proposed development with a minimum distance of 188 m apart to ensure sufficient bird assemblage coverage.

Each point was visited twice, either during the morning survey (06:30-09:30) or afternoon survey (14:30 - 18:00). Surveys were restricted to early mornings and late afternoons to avoid midday air temperatures known to reduce bird activity (Kemp *et al.* 2020).

During the survey, two observers were used. Upon arrival at the survey point, the observer waited 2 minutes before the start of the 10-minute survey as stipulated in the **Best Practice Guidelines Birds & Solar Energy** (Jenkins *et al.* 2017).

The proposed development is not located within an Important Bird and Biodiversity Area (IBA), but the closest is the Nyl River Floodplain and the Waterberg system is located north of the proposed site. These IBAs are home to more than 400 bird species but attract a large number of rare and locally threatened waterbirds and large terrestrial bird species.

More than 500 full protocol pentads have been surveyed in the area. Therefore, it would not make sense to repeat the survey during the winter months as suggested in the Best Practice Guidelines Birds & Solar Energy (Jenkins *et al.* 2017). The desktop analysis recorded a total of 348 species that have been recorded during SABAP2 in the 9 pentads surrounding the proposed Bela Bela Powerline connection between the Eskom substation and Bela Bela Solar Park. Twelve threatened, or near-threatened species have been recorded in the greater region during the desktop survey.

During the field investigation, various flight paths were observed from non-priority species and small birds that are able to avoid potential collisions with power lines. Priority species such as Cape Vultures were seen soaring outside the proposed development at a very high altitude stipulated in the Best Practice Guidelines Birds & Solar Energy (Jenkins *et al.* 2017). However, one Cape Vulture was also roosting on the power line close to the solar park. Therefore, no distinct flight paths across the site were observed for large terrestrial birds, which will ensure all power lines are mitigated to avoid future incidents.

The proposed site is classified as disturbed shrublands near the substation, gradually transforming into disturbed woodlands close to the approved solar park. The proposed power line will be adjacent to one power line for two-thirds of the line and between two high voltage power lines for the other third. Habitat at the proposed site is dominated by disturbed shrubs and woodlands, resulting in high diversity.

Renewable infrastructure is essential to ensure a stable power supply in South Africa and has the potential to reduce the dependence on fossil fuels. However, renewable infrastructure can still have a negative impact on the environment, especially connection powerlines between renewable infrastructure and substations if the wrong locality is selected. Bird collisions are possible on new power lines although this threat can be mitigated by marking the entire line with effective bird diverting devices.

The exact spans requiring marking must be subject to an avifaunal walk down once the line has been surveyed and pegged. If this is done, the impact of collisions is seen as acceptable for this project.

The findings of this report and the relevant impact assessment concluded that the development of the proposed power line between the approved Bela Bela PV Power Plant to the Eskom Warmbad MTS substation would have a medium impact on the bird communities and will cause a slight impact on the ecological process of the overall bird community. The biggest concern is the threat the power lines within this area hold to threatened large terrestrial species such as vultures, korhaan, etc. and high-risk species such as herons, etc. Therefore, careful considerations need to be taken in terms of the proposed power line, as the impact can be catastrophic. Still, the issuing authority must consider all prescribed mitigation measures and recommendations set out to minimise the impact of the proposed power line.

10.6.10 Visual

A Visual Impact Assessment (Annexure J) was conducted by Mitha Cilliers an independent visual Specialist to determine the visual impact of the proposed powerline.

The current land use of the project site is and Eskom power line corridor. Adjacent farms are either utilized for agricultural purposes including crop planting and livestock grazing as well as game farming and / or tourism activities. Crop production includes squash butternut, quash hubbarb, onions, watermelons, cabbage, sweetcorn, pumpkin grey, pumpkin white, beetroot, carrots, peppers. Fruit production includes, grapes, citrus and peaches. Crop production includes maize, cotton, millet, tobacco, lucerne, cowpeas, groundnuts, wheat, jugo beans, china beans, and sunflower. Livestock farming and crop farming is currently in decline due to a preference for game farming.

The landscape is characterised as a typical rural landscape with a combination of agricultural crop lands and grazing activities, several tourist destinations as well as the town and township of Bela Bela serving the community. The wide-open plain is contained the northwest by the Waterberg Mountain series. The sense of place can be described as 'rural' and 'pastoral'.

Visually Sensitive Receptors (VSR) within the study area with a *high sensitivity* included farmsteads/residences, agricultural holdings/clusters of residences/other small communities, the Town of Bela Bela and associated township, various tourist attractions as well as a section of the exit route from Buyskop Lodge Accommodation.

The generalised *Relevance* for all Residential and Business VSRs was classified as *moderate* whereas the generalised *Relevance* for all Transport and Open Space Users/Recreational VSRs is considered *slight*.

Proposed mitigation measures did not have a significant effect on the duration, extent, intensity, frequency, probability and compliance of the visual impacts, rather it would add to good practice found in an Environmental Management Programme.

The *Significance* of the impact was rated as *medium* for all VSRs during all phases of the project.

There are already other existing power lines in the development area which assist to minimise the visual impact on the new proposed power line.

10.7 AGRICULTURAL POTENTIAL

An Agricultural Potential Impact Assessment on soils potential (Annexure F) was conducted by Dr BJ Henning.

Based on the requirements for an agricultural agro-ecosystem assessment in the newly published protocols as published on 20 March 2020 in Government Notice R. 320, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) for the proposed connection from the Eskom Warmbad" substation to the approved Bela Bela PV Power Plant, the soils of the project area can be classified as having Moderate to Low potential soils because of the following:

It is low potential on the shallow soils because:

- The sandy nature of the soil makes the potential to cultivate crops under arable conditions basically impossible, especially considering that the shallow soils would not allow ploughing of the topsoils. Therefore, the site should be classified as not suitable for arable agriculture due to its physical characteristics.

It is of Moderate to marginal arable potential on the reddish apedal soils because:

- Although the soil texture and depth are suitable for arable agriculture, the climatic conditions render the soils unsuitable for arable agriculture.

The results indicate that the agricultural potential of soils on the proposed development area varies from low (shallow, soils or very sandy to sandyloam soils with limited suitability for grazing) to moderate (deeper, red apedal soils with moderate potential for grazing). The results obtained from the study were done after field observations were done to verify the soil potential classified by the Department of Agriculture on a small scale. The site should subsequently be considered as moderate potential grazing land with Moderate to low potential for arable agriculture considering climatic conditions, soil physical characteristics and size of land potentially available.

Provided that the proposed development of the powerline takes all the mitigation measures into consideration stipulated in the aforementioned report, the planned development can be supported.

10.8 CULTURAL AND HERITAGE RESOURCES

An Archaeological Impact Assessment (Annexure H) was conducted by Mr. Neels Kruger to ascertain whether there are any remains of significance in the area that will be affected by the proposed powerline development.

10.8.1 Recommendations by the Archaeologist

The larger landscape around the project area indicates a rich heritage horizon encompassing Iron Age Farmer and Colonial / Historical Period archaeology primarily related to farming, rural expansion and warfare of the past century. Locally, the project area has seen transformation by agriculture activities and rapid urbanization potentially sterilising surface and subsurface of heritage remains, especially those dating to pre-colonial and prehistorical times. Cognisance should nonetheless be taken of archaeological material that might be present in surface and sub-surface deposits along drainage lines and in pristine areas. The following recommendations are made based on general observations in the proposed Bela-Bela Power Line BA Project area:

- A potential religious meeting place possibly associated with the ZCC occur within the project area and the site is of unknown heritage significance. It is recommended that the site and any activities in its surrounds be monitored in order to avoid the destruction of previously undetected heritage remains. It is suggested that local communities be consulted with regards to the religious meeting place in the project area and their possible social meanings. This could form part of the Public Participation (PP) and Stakeholder Engagement processes for the project.
- A small stone cairn feature occurring in an eastern portion of the project area is of unknown provenience and function but the possibility of the cairn indicating a human burial should not be excluded. Should the feature prove to be a burial site, it is of high heritage significance and the site would require mitigation and / conservation measures. The careful monitoring if the site is essential during all phases of development and it is recommended that that placements of pylons and related infrastructure be designed as to avoid the site in its entirety. Should impact on any human burial prove inevitable, full grave relocations are recommended for these burial grounds. This measure should be undertaken by a qualified archaeologist, in accordance with relevant legislation, permitting, statutory permissions and subject to any local and regional provisions and laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials (see Addendum B).
- A fenced-off section of the project alignment of approximately 800m on the farm Tweefontein could not be accessed and this area was not surveyed. However, this section falls within the existing ESKOM power line servitude which is largely clear of surface

vegetation and surface features, and it is highly unlikely that heritage resources will be encountered in this section.

- Considering the localised nature of heritage remains, the general monitoring of the development progress by an ECO or by the heritage specialist is recommended for all stages of the project. Should any subsurface palaeontological, archaeological or historical material, or burials be exposed during construction activities, all activities should be suspended, and the archaeological specialist should be notified immediately.
- It should be stated that it is likely that further undetected archaeological remains might occur elsewhere in the Study Area along water sources and drainage lines, fountains and pans would often have attracted human activity in the past. Also, since Stone Age material seems to originate from below present soil surfaces in eroded areas, the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits. Burials and historically significant structures dating to the Colonial Period occur on farms in the area and these resources should be avoided during all phases of construction and development, including the operational phases of the development.

Many sites/features may be covered by soil and vegetation and might only be located during sub-surface investigations. If subsurface archaeological deposits, artefacts or skeletal material were to be recovered in the area during construction activities, all activities should be suspended and the archaeologist should be notified immediately (cf. NHRA (Act No. 25 of 1999), Section 36 (6)).



Figure 7. Aerial image indicating the location of heritage occurrences and landscape features discussed in the text

10.9 PALAEOLOGICAL RESOURCES

A Palaeontological Impact Assessment (Annexure I) was conducted by Prof. Bruce Rubidge.

There is no possibility that the Precambrian rocks could metazoan fossils. However, the rocks of the Clarens Formation, in both the Main Karoo Basin and also the Tuli and Tshipise basins are known to host Jurassic-aged fossil tetrapods, particularly sauropodomorph dinosaurs, therapsids, crocodylomorphs and therapsids. No fossils have yet been discovered in the study area. This is because there are very few rock outcrops in the study area and the areas affected by the proposed development are overlain by Quaternary unconsolidated alluvium covered by thick vegetation.

10.9.1 Recommendations of the Palaeontological Specialist

Because rock successions underlying the area of the proposed development are covered by vegetation growing in alluvial cover, there is very little chance that the proposed development will have any effect on palaeontological heritage.

As the rocks of the Karoo Supergroup are noted for their wealth of tetrapod and plant fossils there is the slight possibility that the proposed powerline development could expose fossils in the sandstones of the Clarens Formation. Also, there is the slight possibility that overlying Quaternary deposits could contain fossils. In the unlikely event that fossils are exposed it will create a unique opportunity to explore the area for fossils. It is thus recommended that if fossils are exposed as a result of development activities, a qualified palaeontologist must be contacted to assess the exposure for fossils before further development takes place so that the necessary rescue operations are implemented. Depending on the nature of the fossils discovered this could entail excavation and removal to a registered palaeontological museum collection.

10.10 RADIO FREQUENCY INTERFERENCE ASSESSMENT

The following findings are made with respect to the RFI sensitivity of this project:

- There is no requirements for RFI Sensitivity analysis when only electrical power lines are installed and thus it is not foreseen that there will be any RFI interference present that could affect the power line corridor or *vice versa*.
- This assessment is applicable to the proposed development footprint as it is shown in this document. No corridors or buffer areas are identified or required within or close to the project footprint.

- It is suggested that where the power line is connected to a source of power, and in this case a PV Solar plant installation, that the RFI sensitivity be done as per the Screening tool requirements.

10.11 AVIATION IMPACT REPORT

The proposed Bela Bela Powerline's location is outside the flight paths of runway 03/21 and will therefore not interfere with the standard departures and arrivals flight paths on these runways. It will thus not be necessary to investigate the Obstacle Identification Surfaces of these runways.

The proposed Bela Bela Powerline's location is outside the area of the Nylstroom General flying Area and will therefore not interfere with activities in the flying area.

From the drawings it can be verified that there will be no interference of the Bela Bela Powerline project into the Approach/Departure surfaces of the Bela Bela Airport as the location of the Bela Bela Powerline is outside the Approach/Departure Surfaces. It can also be verified that there will be no interference of the Bela Bela Powerline into the Nylstroom General Flying Area as it is located outside the Nylstroom General Flying Area.

The location of the Bela Bela Proposed Powerline location is safe for aircraft's approach and landing at Bela Bela Airport and are safe for aircraft flying in the Nylstroom General Flying Area.

Evidence from the assessment and the technical drawings show clearly that the Bela Bela powerline will not interfere with the safeguarding of the Approach/Departure Surfaces of Bela Bela Airport (FAWA) and the safeguarding of the Nylstroom General Flying Area.

10.12 IMPACTS AND RISKS IDENTIFIED

A clear statement is made, here, identifying environmental impacts of construction, operation, maintenance and management of the proposed project. As far as possible, the suite of potential environmental impacts identified, and the impacts were assessed. Each impact was assessed and rated. The assessment of the data, whereas possible was based on broadly accepted scientific principles and techniques. Assessments were based on the specialist's professional expertise and experience. Construction activities for the establishment of the proposed power line include:

- limited land clearing activities necessary for preparation of the site;
- limited excavation and filling activities;
- construction of one 132 kV power line, for a connection of the Bela Bela PV power plant.

EXTENT

The extent of most of the construction activities is localized and impacts will only occur in the powerline corridor.

DURATION

The impact of construction activities will only be for the duration of the construction phase, after which it will cease completely.

PROBABILITY

The probability of impacts occurring during the construction phase is high as there will be impacts on the vegetation as most will be removed to make way for the proposed development.

The identification of impacts were based on:

- legal and administrative requirements;
- the nature of the proposed activity;
- the nature of the receiving environment;
- specialist studies and
- issues raised during the public participation process.

Potential impacts may include:

- **Impacts on soils & agricultural potential;**
 - Extent: Locally at the proposed site
 - Duration: Life of the project (approx. 30 years)
 - Probability: High
 - Significance: Low
- **Impacts on ground water;**
 - Extent: Surrounding and adjacent land
 - Duration: Life of the project (approx. 30 years)
 - Probability: Medium
 - Significance: Low
- **Geological, soil and erosion impacts;**
 - Extent: Locally at the proposed site
 - Duration: Life of the project
 - Probability: Low
 - Significance: Low
- **Impacts on avifauna;**
 - Extent: Locally at the proposed site
 - Duration: Life of the project
 - Probability: Low
 - Significance: Low
- **Impacts on vegetation;**
 - Extent: Locally at the proposed site
 - Duration: Life of the project
 - Probability: Low

- Significance: Medium
- **Impacts on heritage resources;**
 - Extent: Locally at the proposed site
 - Duration: Life of the project
 - Probability: Low
 - Significance: Low
- **Visual impacts.**
 - Extent: Locally at the proposed site
 - Duration: Life of the project
 - Probability: Definite
 - Significance: to be determined

10.12.1 Degree to which the impacts can be reversed

- The visual impact is resident for a long time. It can be reversed during decommissioning and rehabilitation of the area.
- Biodiversity impacts can be reversed at the decommissioning stage of the development.
- Careful placement of pylons and distancing will reverse impacts which occurred during the construction phase.
- Impacts on soil (erosion) can be reversed by careful handling of storm water on site.
- Agricultural resources will again become available after decommissioning of the facility.
- Impacts on Heritage resources could be permanent without mitigation.
- The potential impacts on river systems, drainage channels and wetlands will be minimal. Impacts on these resources can be reversed successfully.

10.12.2 Degree to which impacts may cause irreplaceable loss of resources

The only impact which can cause an irreplaceable loss of resources is an impact on the heritage resources where heritage sources are destroyed. This should not happen as the heritage resources are well surveyed and will be either protected from development impacts or well-studied and documented and heritage resources can be avoided by careful placing of pylons and routing of powerlines.

10.12.3 Degree to which impacts can be avoided, managed or mitigated

It is not possible to completely avoid the impacts of the development on the environment. By following the mitigation and management measures detailed in the impact section in this report, most of the impacts and the effects it can have on the environment can be successfully lowered to a lower degree of significance to the environment. This can be done to a point where the impacts are acceptable and where the benefits of the development are greater than the detriment to the environment.

Negative impacts can mostly be avoided by careful placing of pylons and thorough planning of the powerline routes within the powerline corridor.

10.13 METHODOLOGY USED IN RANKING THE NATURE, SIGNIFICANCE, CONSEQUENCES, EXTENT, DURATION AND PROBABILITY OF POTENTIAL IMPACTS AND RISKS ASSOCIATED WITH ALTERNATIVES

To assess the impacts on the environment, the process was divided into two main phases namely the Construction phase and the Operational phase. The activities, products and services present in these two phases was studied to identify and predict all possible impacts. In any process of identifying and recognising impacts, one must recognise that the determination of impact significance is inherently an anthropocentric concept. Duinker and Beanlands, (1986) in DEAT 2002. Thompson (1988), (1990) in DEAT 2002 stated that the significance of an impact is an expression of the cost or value of an impact to society.

However, the tendency is always towards a system of quantifying the significance of the impacts so that it is a true representation of the existing situation on site. This will be done by using where possible, legal and scientific standards which are applicable.

The significance of the aspects/impacts of the process will be rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

The consequence matrix uses parameters like severity, duration and extent of impact as well as compliance to standards. Values of 1-5 are assigned to the parameters that are added and averaged to determine the overall consequence. The same process is followed with the likelihood that consists of two parameters namely frequency and probability. The overall consequence and the overall likelihood are then multiplied to give values ranging from 1 to 25. These values as shown in the following table are then used to rank the significance. It must be said however that in the end, a subjective judging of an impact can still be done, but the reasons for doing so must be qualified.

Significance ratings (Plomp 2004)

Significance	Low -	Low-Medium -	Medium -	Medium-High -	High -
Overall Consequence X Overall Likelihood	1-4.9	5-9.9	10-14.9	15-19.9	20-25

Significance	Low +	Low-Medium +	Medium +	Medium-High +	High +
Overall Consequence X Overall Likelihood	1-4.9	5-9.9	10-14.9	15-19.9	20-25

Description of the parameters used in the matrixes

Severity:

Low	Low cost/high potential to mitigate. Impacts easily reversible, non-harmful insignificant change/deterioration or disturbance to natural environments.
Low-medium	Low cost to mitigate. Small/ potentially harmful Moderate change/deterioration or disturbance to natural environment.
Medium	Substantial cost to mitigate. Potential to mitigate and potential to reverse impact. Harmful Significant change/ deterioration or disturbance to natural environment.
Medium-high	High cost to mitigate. Possible to mitigate Great/Very Harmful Very significant change/deterioration or disturbance to natural environment.
High	Prohibitive cost to mitigate. Little or no mechanism to mitigate. Irreversible. Extremely Harmful Disastrous change/deterioration or disturbance to natural environment.

Duration:

Low	Up to one month
Low-medium	One month to three months
Medium	Three months to one year
Medium-high	One to ten years
High	Beyond ten years

Extent:

Low	Within footprint area
Low-medium	Whole of site
Medium	Adjacent properties
Medium-high	Communities around site area
High	Bela Bela Municipal area

Frequency:

Low	Once/more a year or once/more during operation
Low-medium	Once/more in 6 months
Medium	Once/more a month
Medium-high	Once/more a week
High	Daily

Probability:

Low	Almost never/almost impossible
Low-medium	Very seldom/highly unlikely
Medium	Infrequent/unlikely/seldom
Medium-high	Often/Regularly/Likely/Possible
High	Daily/Highly likely/definitely

Compliance:

Low	Best Practise
Low-medium	Compliance
Medium	Non-compliance/conformance to policies etc. - internal
Medium-high	Non-compliance/conformance to legislation etc. - external
High	Directive, prosecution of closure or potential for non-renewal of licences or rights

10.14 ASSESSMENT CRITERIA

The terms of reference for the EIA study will include criteria for the description and assessment of environmental impacts. These criteria are drawn from the *Integrated Environmental Management Guidelines Series, Guideline 5: Assessment of Alternatives and Impacts*, published by the DFFE in terms of the Environmental Impact Assessment. These criteria include:

Table 10. Impact Assessment Criteria

Nature of impact This describes the type of effect the proposed activity would have on the affected environmental component. The description must include what is being affected, and how.		
Extent The physical and spatial size of the impact.	Site	The impact could affect the whole, or a measurable portion of the above-mentioned properties.
	Local	The impacted area extends only as far as the activity, e.g. a footprint.
	Regional	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.
Duration The lifetime of the impact; this is measured in the context of the lifetime of the proposed base.	Short term	The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than any of the phases.
	Medium term	The impact will last up to the end of the phases, where after it will be entirely negated.
	Long term	The impact will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter.
	Permanent	The only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.

Intensity	Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.
	Medium	The affected environment is altered, but function and process continue, albeit in a modified way.
	High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
Probability This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time.	Improbable	The possibility of the impact occurring is very low, due either to the circumstances, design or experience.
	Probable	There is a possibility that the impact will occur to the extent that provisions must be made therefore.
	Highly probable	It is most likely that the impacts will occur at some or other stage of the development. Plans must be drawn up before the undertaking of the activity.
	Definite	The impact will take place regardless of any prevention plans, and there can only be relied on mitigation actions or contingency plans to contain the effect.
Determination of significance. Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.	No significance	The impact is not substantial and does not require any mitigation action.
	Low	The impact is of little importance but may require limited mitigation.
	Medium	The impact is of importance and therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.
	High	The impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

10.15 CUMULATIVE IMPACTS

Cumulative impacts were assessed in relation to other powerlines in the proximity from the proposed Bela Bela Powerline. Mitigation measures are proposed, in order to mitigate the impacts that may result from the establishment of the Bela Bela Powerline to an acceptable level. The general approach to this study has been guided by the principles of Integrated Environmental Management (IEM). In accordance with the IEM Guidelines issued by the DEA, an open, approach, which encourages accountable decision-making, was adopted. The principles of the IEM require:

- informed decision-making;
- accountability for information on which decisions are made;
- a broad interpretation of the term “environment”;
- an open participatory approach in the planning of proposals;
- consultation with I&APs;
- due consideration of alternatives;
- an attempt to mitigate negative impacts and enhance positive impacts of proposals;
- an attempt to ensure social costs of developments are outweighed by social benefits;
- democratic regard for individual rights and obligations;
- compliance with these principles during all stages of the planning, implementation and decommissioning of proposals; and
- the opportunity for public and specialist input in the decision-making process.

Other powerlines in the area

The new proposed Bela Bela powerline will run parallel to the current high voltage Warmbad/Witkop 1 275kV Eskom powerline from the substation in Bela Bela until it enters into the PV Solar Park development site. From there the Warmbad/Witkop Eskom powerline continues.

10.15.1 Cumulative Impacts on Terrestrial Biodiversity

No habitats of threatened species that could easily be isolated are known to be impacted locally in the larger study area. Overall because most of the Bela-Bela area appears to be ideal to avoid very sensitive habitats such as larger pristine wetlands and avoid highly sensitive habitat pockets of threatened species, the development of the power line for the solar plant appear to be more ideal on a national scale than at many other areas. Therefore, an important mitigation measure is to leave corridors with indigenous vegetation in between the power line corridor.

Because of the powerline route (along an established power line servitude) and restricted nature of powerline development and no emissions and pollutants when operational, soil and water cumulative impacts to the environment are limited. Ultimately the development of the powerline development route will have limited additional cumulative impacts compared to the potential impacts already identified.

10.15.2 Cumulative Impacts on Wetlands and Drainage Channels

There are no drainage lines and/or wetlands in the powerline corridor. The wetland that was identified is located on the PV Solar Park development site and the new powerline will turn north as it enters the site and from there to the on-site substation, it will no longer run parallel to the current powerline. The proposed powerline is situated outside the wetland area whereas the current Eskom high voltage powerline runs through the wetland area.

10.15.3 Cumulative Impacts on Avifauna

Cumulative impacts are assessed within a 30km buffer around the proposed development as described in the Best Practice Guidelines Birds & Solar Energy. The total area amounts to 30 000ha, but the majority of the area is still intact. The project footprint is less than 200ha and similar projects existing within the 30km buffer zone are less than 2 000ha resulting in cumulative habitat loss of less than 6% as the majority of the proposed development runs along existing lines or transformed landscape features. Thus, the cumulative impact is considered to be low.

10.15.4 Cumulative Impacts on Agricultural Resources

On the shallow soils the agricultural potential is low according to the Agricultural Agro-Ecosystem Assessment as the sandy nature of the soil makes the potential to cultivate crops under arable conditions basically impossible, as the ploughing of the topsoil will not be possible. The site is not suitable for arable agriculture due to its physical characteristics. On the reddish apedal soils the agricultural potential is moderate to marginal. Although the soil texture and depth are suitable for arable agriculture, the climatic conditions render the soils unsuitable for arable agriculture. Limited grazing can be practised in the area. The addition of a powerline will not have a negative impact on agricultural resources as agricultural resources at the site is severely limited and grazing can still take place underneath the powerlines.

10.15.5 Cumulative Visual Impacts

In the Visual Impact Assessment Report, it is indicated that the study area already contains various powerline corridors consisting of powerlines of various sizes. The proposed power line would be located within one of these corridors and would follow a route alongside a powerline with larger pylons than what is currently proposed for the new powerline. The proposed power line would thus contribute cumulatively to the effect of the existing powerline within the context of the receiving environment. In this instance the additional, cumulative, effect would be less intrusive than would the line have followed a new route.

10.15.6 Cumulative Impacts on Archaeological Resources

The cumulative impacts on archaeological resources were evaluated in the Archaeological Impact Assessment Report, specifically in Section 6.1.2 of the report in Annexure H. It is indicated that there will be NO cumulative impacts on any archaeological resources as a result of the proposed powerline.

10.16 POSITIVE AND NEGATIVE IMPACTS THAT THE PROPOSED ACTIVITY AND ALTERNATIVES WILL HAVE ON THE ENVIRONMENT AND THE COMMUNITY

- The positive impact that the development will have on the environment and community is a Socio-economic impact. It will create temporary jobs during construction phase.
- The proposed power line with the connection from the PV Solar Parks to the Eskom grid will help to reduce the pressure on the Eskom grid in the country with fewer negative impacts on the natural resources of the area than in the case of power generation using other sources like coal, gas, water and nuclear energy.
- During the operational phase the powerline may have a negative impact on the visual environment and biodiversity (avifauna).

10.17 POSSIBLE MITIGATION MEASURES AND RESIDUAL RISK

- To mitigate the visual impact, screening of the facility can be done with vegetation.
- No clearance of vegetation will be allowed during the construction phase. Holes will be made for the **monopole structures** supporting the electrical cables.
- Use monopole structures for the powerlines and bird flappers as deterrents on lines to limit impact on birds in the area.
- Domestic waste must be removed from the site on a regular basis not to impact on the soils or water bodies in the area.

10.18 MOTIVATION FOR NOT INVESTIGATING ALTERNATIVES

There are no location alternatives. There is only one powerline corridor because the proposed Bela Bela Photovoltaic Power Plant must be connected to the Eskom grid in the area from the approved locality, specifically to the Eskom Warmbad Bela MTS which is the closest available point of connection.

The proposed Bela Bela PV Power Plant is already located outside ecological sensitive areas, which limits space for alternative powerline corridors.

The power line route was chosen to avoid going through the Bela-Bela residential settlement that is located between the Bela-Bela Solar Park and the Eskom Warmbad MTS. The preferred route will follow an existing powerline route where corridors have already been established with no trees/vegetation and where formal servitudes have already been secured for powerlines.

After extensive liaising with Eskom it was found that the incoming powerline connection has to come from the south into the Eskom Warmbad substation. The point of connection also plays a role in determining the powerline route towards the Eskom Warmbad MTS.

11 DESCRIPTION OF THE PROPOSED PROCESS TO IDENTIFY AND RANK ENVIRONMENTAL IMPACTS THAT THE ACTIVITY, ASSOCIATED STRUCTURES AND INFRASTRUCTURE WILL IMPOSE ON THE PREFERRED LOCATION THROUGH THE LIFE OF THE ACITIVITY

An environmental impact is defined as a change in the environment, be it the physical/chemical, biological, cultural and or socio-economic environment. Any impact can be related to certain aspects of human activities in this environment and this impact can be either positive or negative. It could also affect the environment directly or indirectly and the effect of it can be cumulative.

11.1 DESCRIPTION OF ENVIRONMENTAL ISSUES AND RISKS IDENTIFIED DURING THE EIA PROCESS

The potential aspects to assess during the Basic Assessment process may include:

- Soils & agricultural potential;
- Avifauna aspects;
- Vegetation aspects;
- Heritage resources aspects;
- Traffic impacts.

The following possible Key environmental impacts were identified:

ENVIRONMENTAL ISSUES	POSSIBLE CAUSE	POTENTIAL IMPACTS
Air Pollution and noise		
Dust	<ul style="list-style-type: none"> • Construction machines and vehicles during clearing and construction of the powerline. 	<ul style="list-style-type: none"> • Health problems • Air pollution • Public nuisance
Emissions	<ul style="list-style-type: none"> • During operation of construction equipment. • During veld fires. 	
Noise	<ul style="list-style-type: none"> • Construction noise. 	
Water quality		
Pollution of water sources Pollution by <i>E.coli</i>	<ul style="list-style-type: none"> • Spillages of fuel & oil from vehicles during construction. • Pollution from solid general. • By using insecticides and herbicides. • Poorly planned and managed sanitation facilities. 	<ul style="list-style-type: none"> • Pollution of surface and groundwater • Health risk • Lower water quality • Soil degradation
Water quantity		
Impact on amount of water resources available Over-use of water	<ul style="list-style-type: none"> • Use of water during construction of the powerline. 	<ul style="list-style-type: none"> • Loss of a scarce resource • Increased pressure on water supply sources

ENVIRONMENTAL ISSUES	POSSIBLE CAUSE	POTENTIAL IMPACTS
Land/Soil degradation		
Soil contamination and degradation	<ul style="list-style-type: none"> • Spillages of oil, chemicals from machinery and vehicles during construction • Site clearing during construction • Use of Pesticides and Fertilizers • Erosion on site 	<ul style="list-style-type: none"> • Pollution of soil • Soil degradation • Loss of topsoil • Effect soil characteristics, ecology & groundwater
Biodiversity		
Decline in fauna and flora diversity	<ul style="list-style-type: none"> • Clearing of site for construction • Loss of habitat due to construction of powerline • Electrocuting/ collisions by/with powerlines 	<ul style="list-style-type: none"> • Loss of biodiversity • Loss of habitat • Negative impact on biodiversity • Negative impact on rare / endangered/ endemic species and habitats • Bird mortalities
Cultural/Heritage		
Possible loss of heritage sites Damage to palaeontological resources	<ul style="list-style-type: none"> • Damage during construction 	<ul style="list-style-type: none"> • Possible loss of cultural heritage sites paleo-resources
Visual impact		
Change in the visual characteristics of the site	<ul style="list-style-type: none"> • Clearing of vegetation • Presence of powerlines 	<ul style="list-style-type: none"> • Visual intrusion

11.2 IMPACTS & MITIGATION MEASURES OF CONSTRUCTION PHASE

All the possible impacts that can be predicted in both the construction and operational phases of the Bela Bela powerline is addressed. Specific mitigation measures are proposed, and the significance of these impacts is described with and without the mitigation measures. Considering that the proposed Bela Bela powerline may be owned and/or operated by Eskom, the mitigation measures described in the following paragraphs and in particular in the attached Environmental Management Plan can be the responsibility of Eskom or of the developer.

11.2.1 Atmospheric Pollution and Noise

Construction Phase

During this phase there will be a concentration of earthmoving equipment and construction vehicles that will clear vegetation for the installation of the **steel or aluminium monopole structures** to be installed approximately 200 - 260m apart, with supporting electrical cables, and will create dust and exhaust smoke that will impact on air quality, in the process. There will also be more noise created by the vehicles during this phase. Burning of waste and fires at the temporary construction sites may create smoke.

Operational phase

The operation of the powerline only requires periodical inspections in order to inspect the poles and to ensure that vegetation does not affect the cables. Therefore, no impact on air quality is expected in this phase.

BELA BELA 1 X 132kV POWER LINES PROPOSED ALIGNMENTS									
Project Phase	Impact Atmospheric Pollution and Noise							Significance	
	Activity/ Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	With Mitigation	Without Mitigation
Construction	Earthworks and Vegetation clearance	Air pollution Dust	Low	Low-Medium	Low-medium	Medium-high	Medium-high	Low-medium	Medium
	Vehicle movement	Air pollution: Smoke	Low	Low-Medium	Low-medium	Medium-high	Medium-high	Low-medium	Medium
	Vehicle movement	Air pollution: Dust	Low	Low-Medium	Low-medium	Medium-high	Medium-high	Low-medium	Medium
	Vehicle movement	Noise pollution	Low-medium	Low-Medium	Low-medium	Medium-high	Medium-high	Low-medium	Medium
	Burning of cleared vegetation, solid waste & veld fires	Air pollution by excessive smoke	Low-medium	Low	Low-medium	Low-Medium	Low-Medium	Low	Low-Medium
	Cooking fires of workers	Air pollution: Smoke	Low	Low-Medium	Low-medium	Medium-high	Medium	Low	Medium
Cumulative impacts	Pollution & Noise	Increase in release of smoke and increase in noise levels	Low	Low-Medium	Low-medium	Medium-high	Medium	Low	Low-Medium

Mitigation measures - Construction Phase

- Vehicles must be well serviced so that it does not produce excessive smoke and noise.
- Refuelling shouldn't be allowed on site.
- Vehicle maintenance shouldn't be allowed on site.
- Speed of construction vehicles must be kept as low as possible to reduce the generation of dust and noise.
- No clearance of vegetation will be allowed during the construction phase. Holes will be made for the **monopole structures** supporting the electrical cables.
- Construction should only take place during the hours between sunrise and sunset on weekdays and Saturdays.
- Contractors must comply with provincial noise regulations and be maintained properly.
- Vegetation cleared from the site and solid waste generated by the construction team may not be burned on site or the surrounding areas.
- Solid waste must be regularly removed to the municipal waste disposal site.
- The cleared vegetation must be stock-piled and should be removed to a composting facility.

11.2.2 Groundwater and Surface Water Pollution

Construction phase

Spillage of fuel and lubricants from construction vehicles could occur. Storm water contamination by solid waste could lead to groundwater and surface water pollution. In this phase the vegetation is removed and storm water over the area could cause erosion as well as siltation of watercourses. Road construction within the powerline servitude will also increase the possibility of erosion although the area is almost flat.

Operational Phase

The operation of the powerline only requires periodical inspections in order to inspect the poles and to ensure that vegetation does not affect the cables. No impact on groundwater is expected in this phase.

BELA BELA 1 X 132KV POWER LINES PROPOSED ALIGNMENTS									
Project Phase	Impact: Groundwater and Surface Water Pollution							Significance	
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	With Mitigation	Without Mitigation
								Low	Medium
Construction	Spillage of fuel and lubricants from construction vehicles	Groundwater Pollution	Medium	Medium	Low-medium	Medium	Medium	Low	Medium
	Clearing of vegetation	Erosion	Low	Low-Medium	Low-medium	Medium	Low-Medium	Low	Low-Medium
	Solid waste disposal water resources	Pollution of freshwater resources	Low	Low-Medium	Low-medium	Medium-high	Medium	Low	Low-Medium
	Sanitation seepage from chemical toilets	Water Pollution	Low-Medium	Low-Medium	Low-medium	Medium	Low-Medium	Low	Low-Medium
Cumulative impacts	Water pollution	Increased potential for water pollution	Low-Medium	Low-Medium	Low-medium	Medium	Low-Medium	Low	Low-Medium

Mitigation measures – Construction phases

The following precautionary measures are recommended to prevent surface or groundwater pollution:

- No clearance of vegetation will be allowed during the construction phase. Holes will be made for the **monopole structures** supporting the electrical cables.
- Construction activities will be restricted to the powerline servitude and pylon positions.
- Refuelling and vehicle maintenance will not be allowed in on site.
- Chemical sanitation facilities near construction site must be serviced regularly to ensure no spills or leaks to surface and groundwater take place.
- Solid waste must be kept in adequate waste bins. Building rubble and various waste products should be removed on a regular basis to the municipal landfill site.
- If water pollution is restricted and prevented, there will be no cumulative impacts as a result of the establishment of the Bela Bela 1 x 132kV Powerline.

11.2.3 Water Use / Water Quantity

Construction phase

During this phase, a small amount of water may be utilized for casting of the foundations for the steel monopole structures. The water needed for the construction activities will be provided from the Bela Bela Local Municipality.

Operational phase

Operation of the powerline requires periodical inspections to inspect poles and to ensure that vegetation does not affect cables. There will be no water abstraction during operational phase.

BELA BELA 3 X 132kV POWER LINES PROPOSED ALIGNMENTS									
Project Phase	Impact: Water Use							Significance	
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	With Mitigation	Without Mitigation
								Low	Low-Medium
Construction	Construction process	Overuse of a scarce resource	Low-medium	Medium	Medium	Medium-high	Low	Low	Low-Medium
Cumulative impacts	Water use	Increased pressure on local water resources	Low-medium	Medium	Medium	Medium-high	Low	Low	Low-Medium

Mitigation measures – Construction Phase

- Water should be used sparingly, and it should be ensured that no water is wasted.
- Vehicle maintenance(washing) will not be allowed on site.
- An eradication and rehabilitation plan should be compiled for exotic invasive plant species within the powerline servitude. An ecologist should be consulted to assist in this regard.

11.2.4 Land & Soils

Construction phase

During construction, the vehicles used have the potential to spill diesel and lubricants that can pollute the soil. The storage of solid waste before it can be disposed of has the potential to pollute the soil and becomes a nuisance.

Operational phase

The operation of the powerline only requires periodical inspections to inspect the poles and to ensure that vegetation does not affect the cables. Therefore, no impact on land and soils is expected in this phase.

BELA BELA 3 X 132kV POWER LINES PROPOSED ALIGNMENTS										
Project Phase	Impact: Land and Soils								Significance	
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	With Mitigation	Without Mitigation	
								Low	Medium	
Construction	Spilling of oil/diesel by construction machines	Contamination of soil	Medium	Low-Medium	Low-medium	Medium	Medium	Low	Medium	
	Solid waste disposal	Soil pollution + nuisance	Low	Low-Medium	Low-medium	Medium-high	Medium	Low	Low-Medium	
	Storm water over roads and cleared areas	Erosion	Low	Medium	Low-medium	Medium	Low-Medium	Low	Low-Medium	
Cumulative impacts	Water pollution	Increased potential for water pollution	Low-Medium	Low-Medium	Low-medium	Medium	Low-Medium	Low	Low-Medium	

Mitigation measures - Construction Phase

- No clearance of vegetation will be allowed during the construction phase. Holes will be made for the **monopole structures** supporting the electrical cables.
- Clearing of powerline servitude must not entail removal of vegetation except for foundations and access road.
- Construction activities must be restricted to the proposed powerline servitude.
- Refuelling will not be allowed at the site.
- Vehicle maintenance will not be allowed at the site.
- Construction vehicles must be well maintained and serviced to minimise leaks and spills.
- Solid waste must be kept in covered containers and disposed of at the municipal landfill site.
- Building rubble must be removed regularly to a licensed disposal site during construction.
- Slopes produced by removing soil must be kept to a minimum to reduce erosion damage.

11.2.5 Archaeological, Cultural and Social Features

Construction phase

The clearing of the site may have a negative impact on the archaeological features of the site. Care must be taken in the excavations and moving of soil to observe any other archaeological, previously undetected, features of importance, which must be left and reported to the archaeological consultant for comments and actions.

A potential religious meeting place possibly associated with the ZCC occur within the project area and the site is of unknown heritage significance. It is recommended that the site and any activities in its surrounds be monitored in order to avoid the destruction of previously undetected heritage remains. It is suggested that local communities be consulted with regards to the religious meeting place in the project area and their possible social meanings. This could form part of the Public Participation (PP) and Stakeholder Engagement processes for the project.

A small stone cairn feature occurring in an eastern portion of the project area is of unknown provenience and function but the possibility of the cairn indicating a human burial should not be excluded.

Operational phase

The operation of the powerline only requires periodical inspections to inspect the poles and to ensure that vegetation does not affect the cables. Therefore, no impact on heritage or palaeontological sites is expected in this phase.

BELA BELA 1 X 132kV POWER LINES PROPOSED ALIGNMENTS									
Project Phase	Impact: Loss of Archaeological, Cultural and Social Features							Significance	
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	With Mitigation	Without Mitigation
								With Mitigation	Without Mitigation
Construction	Earth moving and soil clearance	Destroy archaeological evidence and heritage resources	Low-medium	High	Low	Low	Low	Low	Low-Medium
	Earth moving and soil clearance	Destroy fossils	Low-Medium	High	Low	Low	Low-medium	Low-Medium	Low-Medium
Cumulative impacts	Activities on site during construction and operational	Increase in potential to unearth archaeological and fossils	Low-medium	High	Low	Low	Low-medium	Low	Low-Medium

Mitigation measures – Construction and operational phases

- Care must be taken during the construction process that anything of archaeological and/or palaeontological value that is unearthed must be recorded.
- The archaeologist and SAHRA must be notified if anything of importance is discovered.
- The Fossil Finds Procedure included as Appendix 2 of the Palaeontological Impact Assessment provides guidelines in the event of fossil finds in the excavations.
- If a significant occurrence of fossil bones is discovered. a professional palaeontologist must be appointed to collect them and to record their contexts.
- Care must be taken during the construction process that anything of archaeological value that is unearthed must be recorded (see Heritage Impact Assessment in Annexure H. The archaeologist or SAHRA must be notified whenever anything of importance is discovered.
- Monitoring of development progress by an ECO or heritage specialist is recommended for all stages of the project. Should any subsurface palaeontological, archaeological or historical material, or burials be exposed during construction activities, all activities must be suspended, and the archaeological specialist should be notified immediately.

11.2.6 Impact of the Development on Ecology (Fauna & Flora) of the Area

Planning and construction phase

The removal of natural vegetation and destruction of habitat will have a negative effect on the biodiversity. The specific mitigation measures included in the Ecological and Avifauna Impact Assessment (Annexures C & E) should be adhered to.

Operational phase

The operation of the powerline only requires periodical inspections to inspect poles and to ensure that vegetation does not affect the cables. Operational phase botanical impacts of the powerline are likely to be of minor significance. The primary operational phase impact of these components is the spreading of invasive alien plants in the area around the disturbed construction footprints, facilitated by the soil disturbance during construction.

Loss of ecological connectivity and habitat fragmentation is not considered to be a significant impact as the vegetation will be undisturbed along most of the route and the disturbed corridor will recover to some degree.

Impacts on Avifauna, during the operational phase, will be Medium before mitigation and Low after mitigation measures are implemented and refers mostly to electrocutions and collisions of birds with powerlines.

BELA BELA 1 X 132KV POWER LINES PROPOSED ALIGNMENTS									
Project Phase	Environmental Aspect: Ecology (Fauna and Flora)							Significance	
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	With Mitigation	Without Mitigation
								With Mitigation	Without Mitigation
Construction	Earthworks and vegetation clearance at construction site	Loss of indigenous plant species & disturbance to sensitive habitat	Low-Medium	Medium	Low	Low-Medium	High	Low	Low-Medium
	Vegetation clearance	The spread of exotic invasive plant species	Low-Medium	Medium	Low-Medium	Low-Medium	Medium	Low	Low-Medium
	The occurrence of veldt fires on site	Destruction of flora/habitats Loss of indigenous fauna	Medium	Low-Medium	Low-Medium	Low	Low	Low	Medium
	Littering (e.g. cans and plastics) along access road and at construction site	Public nuisance and loss/death of indigenous fauna	Low	Low-Medium	Low-Medium	Medium-High	Medium	Low	Low-Medium
	The control of animals on site Killing, poisoning, or hunting of animals	Loss of indigenous fauna to the area	Medium	Medium	Low-Medium	Low-Medium	Low-Medium	Low	Low-Medium

BELA BELA 1 X 132KV POWER LINES PROPOSED ALIGNMENTS										
Project Phase	Environmental Aspect: Ecology (Fauna and Flora)								Significance	
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	With Mitigation	Without Mitigation	
								Low	Medium	
Operation	Increased potential of negative impacts on ecology of the area	Increase in natural vegetation to be removed	Medium	High	Medium	Low-Medium	Low-Medium	Low	Medium	
	Birds colliding with powerline & electrocution	Killing of birds	Medium-High	High	Medium	Low-Medium	Low-Medium	Low	Medium	
Cumulative Impacts	Increased potential of negative impacts on ecology of the area	Increase in natural vegetation to be removed Electrocution of birds	Medium-High	High	Low-Medium	Low-Medium	Low	Low	Low-Medium	

Mitigation measures – Construction phase

- No clearance of vegetation will be allowed during the construction phase. Holes will be made for the **monopole structures** supporting the electrical cables.
- Construction should ideally be undertaken during the dry season (November – April), to minimise impact on bulbs and annuals.
- Construction activities should be restricted to the proposed powerline servitude.
- Unnecessary clearance of vegetation should not take place.
- No protected plant species should be removed without authorisation from LEDET.
- Ongoing alien invasive plant management must be undertaken in the Medium botanical sensitivity areas.
- No spraying of herbicide should be undertaken in these areas as this kill numerous non-target species, and no further soil disturbance should be allowed.
- Fires should not be allowed, and extra care should be taken to prevent veldt fires.
- The cleared vegetation should not be burned on site. The cleared vegetation should be stockpiled and taken to a composting facility.
- Raptor friendly pole design that minimises electrocution risk must be used.
- Bird flight diverters (Flappers) must be installed along the entire length of the line in accordance with the latest Eskom Technical Standards.
- Where subsequent towers are located at equal elevation (so as not to create a wider collision band) and where practically possible, the double circuit parallel line’s towers should be staggered to increase visibility of the lines.
- Long-term monitoring and management of potential and actual impacts by the developer and operator must be conducted in the construction and operational phases.
- Periodic post-construction surveys of the powerlines for bird fatalities. It is important that these be performed during both the wet and dry seasons. In addition, provision needs to be made for periodic checking and, when necessary, replacement of bird flight diverters.
- Maintenance must be conducted outside of the winter breeding season.

- Nests are not to be removed from pylons and that no maintenance activities may be conducted on pylons with nests without prior approval of the avifaunal specialist.
- Solid waste must be kept in adequate animal proof waste bins. Building rubble and various wastes should be removed regularly to an available landfill site.
- Regular clean-up programs should be put into effect along the servitude to limit the impact of littering caused by construction activities.
- The stockpiled topsoil and construction material should be managed in such a way that the material is not transported by wind or rain.
- No animals may be killed, captured or hunted on site by construction workers. Do not feed any wild animals on site.
- Where excavations pose a risk to animal safety, they should be adequately cordoned off to prevent animals falling in and being trapped and/or injured. This could be prevented by the constant excavating and backfilling of excavations during construction process.
- Cumulative impacts on the ecology of the area will be very low, provided that the mitigation measures are implemented.
- The EMPr will have to be adhered to during the construction phase and regular monitoring should be done to ensure that there is sound environmental practice at Bela Bela Powerline.

Mitigation measures – Operational phase

- Nests are not to be removed from pylons and that no maintenance activities may be conducted on pylons with nests without prior approval of the avifaunal specialist.
- No maintenance activities to be conducted on any pylons with nests without prior approval of an avifaunal specialist
- Long-term monitoring and management of potential and actual impacts by the developer and operator must be conducted in the operational phase.
- Risk of mortalities can be affected by season and it is important that post-construction surveys are done during the wet and dry seasons. Provision must be made for periodic checking and, when necessary, replacement of bird flight diverters.
- Maintenance must be conducted outside of the winter breeding season.
- Ongoing alien invasive plant management must be undertaken annually. The focus must be on removing alien invasive shrubs and large herbs, including invasive alien grasse.

11.2.7 Visual Impacts

Construction phase

The natural aesthetic character of the site will be changed. However, the local communities will be informed of the development stages and impacts on them during the construction phase.

Operational phase

Powerlines will have a visual impact on surrounding properties.

BELA BELA 1 X 132kV POWER LINES PROPOSED ALIGNMENTS									
Project Phase	Impact: Visual disturbance							Significance	
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	With Mitigation	Without Mitigation
								Low-Medium	Medium
Construction	Construction vehicles and dust	Visual	Low	High	Low-Medium	High	High	Low-Medium	Medium
	Electrical lines	Visual	Low	High	Low	High	High	Low-Medium	Low-Medium
Cumulative Impacts	Increased visibility of more powerlines in the area	Increased visual intrusion and nuisance	Medium-High	Medium	Medium	Low-Medium	High	Low-Medium	Medium

Mitigation measures

- The powerline will have a visual impact on surrounding receptors, but significance of impact was rated as medium for all VSRs during all phases of the project.
- Power lines will add to the visual clutter of existing power lines within the study area.
- The study area is criss-crossed with existing power lines of various sizes.

11.2.8 Safety, Security and Fire Hazardous

Construction phase

Construction activities such as movement of construction vehicles and the use of equipment further increases the risk of injury.

Operational phase

The operation of the powerline only requires periodical inspections in order to inspect poles to ensure that vegetation does not affect the cables. Therefore, no impact on safety is expected in this phase.

BELA BELA 1 X 132kV POWER LINES PROPOSED ALIGNMENTS									
Project phase	Impact: Safety, security, and fire hazards							Significance	
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	With Mitigation	Without Mitigation
								Low	Low-Medium
Construction	Construction activities –erection of powerline structures	Loss or injury to human life	High	Low-Medium	Low	Low	Low	Low	Low-Medium
	Security	Crime	Medium	Low-Medium	Low-medium	Low	Medium	Low	Low-Medium
	Fire hazards	Loss of human life and construction equipment etc.	High	Medium	Low-Medium	Low	Low	Low	Low-Medium
Cumulative Impacts	Higher number of people in the area increases safety risks	Potential for an increase in criminal activity	High	Medium	Medium	Low	Low	Low	Low-Medium

Mitigation measures

- Contractor shall conform to the Occupational Health and Safety act, 1993 (Act No. 85 of 1993) and regulations.
- Access to the powerline servitude should be monitored and allowed only to the workers of the construction team (10-15 people).
- No construction activities should be allowed during the night. Workers should not be allowed to stay on site during the night.
- Open excavations must be marked with danger tape.
- No solid waste or vegetation may be burnt on the premises or surrounding areas.
- Fire extinguishers must be available.
- Fires will not be allowed, and extra care should be taken to prevent veldt fires occurring.
- The developer must comply with requirements of the National Veld and Forest Fire Act, 1998.
- Refuelling will not be done at the site.
- Vehicle maintenance will not be allowed at the site.

11.2.9 Traffic and Road Safety

Construction phase

Trip generation during the construction phase will be much higher than during operational phase. It is assumed that construction of the powerline will take 12 months. If 10% of the trips occur in the peak hour approximately 4 trucks will arrive and leave in the peak hour. Private vehicles will also be used by construction supervision and admin staff to access the site as well as the construction workers who will arrive via bus or taxi.

Operational phase

Operation of the powerlines only requires periodical inspections in order to inspect poles to ensure that vegetation does not affect the cables. Therefore, no impact on traffic is expected in this phase.

BELA BELA 1 X 132kV POWER LINES PROPOSED ALIGNMENTS									
Project phase	Impact: Traffic and Road Safety							Significance	
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	With Mitigation	Without Mitigation
								Low	Medium
Construction	Construction activities –Increase in traffic	Loss or injury to human life	Medium	Medium-high	Low	High	Medium	Low	Medium
	Road Safety	Increase in vehicle accidents	Medium	High	Low-medium	High	High	Low	Medium-High
	Physical impact on roads and surfaces	Damage to road surfaces	Low	Medium	Low	Low-Medium	Low-Medium	Low	Low-Medium
Cumulative Impacts	Road Safety	Increase in vehicle accidents	Medium	High	Low-medium	High	High	Low	Medium-High

Mitigation measures

- Intersection sight distances for access intersection need to be complied with.
- Construct access intersection with dedicated right-turn lane on southern approach and left-turn deceleration taper on northern approach.
- Provide a dedicated loading and off-loading area on site and ensure that contractors make use of it and not stop within Road R101 road reserve at the proposed access intersection to load and off-load workers.

11.3 ASSESSMENT OF POTENTIALLY SIGNIFICANT IMPACTS AND RISKS

Impacts with a rating of Medium-high or High are impacts which are regarded as potentially significant, rated without any mitigation measures. In this impact assessment, the following impacts were regarded as potentially significant impacts. None of the impacts rated Medium-high or High.

11.3.1 Nature of Impact

None of the impacts rated Medium-high or High.

11.3.2 Extent and Duration of Impact

None of the impacts rated Medium-high or High.

11.3.3 Probability of Occurrence

None of the impacts rated Medium-high or High.

11.3.4 Degree to which impact can be reversed

None of the impacts rated Medium-high or High.

11.3.5 Degree to which impact can cause irreplaceable loss of resource

None of the impacts rated Medium-high or High.

11.3.6 Degree to which impact can be mitigated

None of the impacts rated Medium-high or High.

12 SUMMARY AND FINDINGS AND RECOMMENDATIONS OF SPECIALIST REPORTS AND HOW FINDINGS HAVE BEEN INCLUDED IN THE ASSESSMENT REPORT

The main issues identified as a result of the specialist studies include the following:

Terrestrial Biodiversity impact assessment

- Where sensitive areas of natural vegetation cannot be avoided, a few mitigation measures have been recommended to minimise and/or offset impacts (licence application for eradication of protected species).
- Negative impacts can be minimised by strict enforcement and compliance with an Environmental Management Plan which considers the recommendations for managing impacts detailed above.

Avifauna impact assessment

- The findings of this report and the relevant impact assessment concluded that the development of the proposed power line between the approved Bela Bela PV Power Plant to the Eskom Warmbad substation would have a medium impact on the bird communities and will cause a slight impact on the ecological process of the overall bird community. The biggest concern is the threat the power lines within this area hold to threatened large terrestrial species such vultures, korhaan, etc. and high risk species such as herons. Therefore, careful considerations need to be taken in terms of the proposed power line. The competent authority must consider all prescribed mitigation measures and recommendations set out to minimise the impact of the proposed power line.
- From an avifaunal perspective the proposed powerline is acceptable provided it is at least provided with bird diverters from the time the line is initiated.

Visual impact assessment

- Visually Sensitive Receptors (VSRs) in the study area with a *high sensitivity* includes farmsteads/residences, agricultural holdings/clusters of residences/other small communities, the Town of Bela Bela and associated township, various tourist attractions as well as a section of the exit route from Buyskop Lodge Accommodation.
- The generalised *Relevance* for all Residential and Business VSRs was *moderate* whereas the generalised *Relevance* for all Transport and Open Space Users/Recreational VSRs is *slight*.
- Proposed mitigation measures did not have a significant effect on the duration, extent, intensity, frequency, probability and compliance of the visual impacts, rather it would add to good practice found in an Environmental Management Programme.
- The *Significance* of the impact was rated as *medium* for all VSRs during all phases of the project. There are already other existing power lines in the development area which assist to minimise the visual impact on the new proposed power line.

Heritage impact assessment

- The larger landscape around the project area indicates a rich heritage horizon encompassing Iron Age Farmer and Colonial/Historical Period archaeology primarily related to farming, rural expansion and warfare of the past century. Locally, the project area has been transformed by agricultural activities and rapid urbanization potentially sterilising surface and subsurface heritage remains, especially those dating to pre-colonial and prehistorical times. Cognisance should be taken of archaeological material that might be present in surface and sub-surface deposits along drainage lines and in pristine areas.
- A potential religious meeting place possibly associated with the ZCC occur in the project area and the site is of unknown heritage significance. It's recommended that the site and any activities in its surrounds be monitored to avoid the destruction of previously undetected heritage remains. It is suggested that local communities be consulted regarding the religious meeting place and their possible social meanings.
- A small stone cairn feature occurs in an eastern portion of the project area, of unknown provenience and function but the possibility of the cairn indicating a human burial cannot be excluded. If the feature proves to be a burial site, it is of high heritage significance and would require mitigation and/or conservation measures. Careful monitoring is essential during all phases of development, and it is recommended that placements of pylons and related infrastructure be designed to avoid the site entirely. **Should impacts on any human burial prove inevitable, full grave relocations are recommended for the burial grounds. This measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation, permitting, statutory permissions and subject to any local and regional provisions and laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with mitigation of cemeteries and burials.**
- A fenced-off section of the project alignment on the farm Tweefontein could not be accessed and this area was not surveyed. However, this section falls within the existing Eskom powerline servitude which is largely clear of surface vegetation and surface features, and it is highly unlikely that heritage resources will be encountered in this section
- Considering the localised nature of heritage remains, the general monitoring of the development progress by an ECO or by the heritage specialist is recommended for all stages of the project. Should any subsurface palaeontological, archaeological or historical material, or burials be exposed during construction activities, all activities should be suspended, and the archaeological specialist should be notified immediately.
- It is likely that further undetected archaeological remains might occur in the study area and since Stone Age material seems to originate from below present soil surfaces in eroded areas, the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits. Burials and historically significant structures dating to the Colonial Period occur on farms in the area and these resources must be avoided during all phases of construction and development, including the operational phase.

Paleontological impact assessment

- There is no possibility that the Precambrian rocks could metazoan fossils. However, the rocks of the Clarens Formation, in both the Main Karoo Basin and also the Tuli and Tshipise basins are known to host Jurassic-aged fossil tetrapods, particularly sauropodomorph dinosaurs, therapsids, crocodylomorphs and therapsids. No fossils have yet been discovered in the study area. This is because there are very few rock outcrops in the study area and the areas affected by the proposed development are overlain by Quaternary unconsolidated alluvium covered by thick vegetation.

Radio Frequency Interference Assessment

- There are no requirements for RFI Sensitivity analysis when only electrical power lines are installed and thus it is not foreseen that there will be any RFI interference present that could affect the power line corridor or vice versa.
- This assessment is applicable to the proposed development footprint as it is shown in this document. No corridors or buffer areas are identified or required within or close to the project footprint.
- It is suggested that where the power line is connected to a source of power, and in this case a PV Solar plant installation, that the RFI sensitivity be done as per the Screening tool requirements.

Aviation Impact Assessment

- The proposed Bela Bela Powerline's location is outside the flight paths of runway 03/21 and will therefore not interfere with the standard departures and arrivals flight paths on these runways. It will thus not be necessary to investigate the Obstacle Identification Surfaces of these runways.
- The proposed Bela Bela Powerline's location is outside the area of the Nylstroom General flying Area and will therefore not interfere with activities in the flying area.
- The location of the Bela Bela Proposed Powerline location is safe for aircraft's approach and landing at Bela Bela Airport and are safe for aircraft flying in the Nylstroom General Flying Area.
- Evidence from the assessment and the technical drawings show clearly that the Bela Bela powerline will not interfere with the safeguarding of the Approach/Departure Surfaces of Bela Bela Airport (FAWA) and the safeguarding of the Nylstroom General Flying Area.

13 ENVIRONMENTAL IMPACT STATEMENT

13.1 SUMMARY KEY FINDINGS OF THE BASIC ASSESSMENT

It can be concluded that there will be environmental impacts as a result of the proposed development of the Bela Bela Powerline. However, all the impacts can be mitigated to some extent. Most of the impacts can be avoided and potential impacted areas will be demarcated as no-go areas, therefore limiting the possible negative environmental impacts to an acceptable level.

13.2 CUMULATIVE ENVIRONMENTAL IMPACT STATEMENT

Taking into account all the findings of the specialist assessments on the proposed construction of the powerlines and comparing the cumulative impact assessment the cumulative impacts all rated as Low-Medium or Medium.

- The botanist confirmed that the cumulative impacts on the flora of the area will be Low Negative, both during the construction and operational phases. Provided that the proposed development and layout plans are consistent with the sensitivity map and take all the mitigation measures into consideration stipulated in this report, the planned development can be supported.
- The avian specialist confirmed that the cumulative impacts will be Low with implemented mitigation at both alternatives during the construction and operational phases.
- The cumulative impacts on archaeological resources were evaluated in the Archaeological Impact Assessment Report, specifically in Section 6.1.2 of the report in Annexure H. It is indicated that there will be NO cumulative impacts on any archaeological resources as a result of the proposed powerline.
- The cumulative impacts on paleontology might even be positive if fossils are found, rescued, and preserved.
- It is confirmed by the visual specialist that the powerline running parallel to the current powerline will be less intrusive than constructing a new powerline in a new corridor.
- The powerline will not have a negative cumulative impact on agricultural resources as agricultural resources at the site is severely limited and grazing can still take place underneath the powerlines.
- The proposed powerline is situated outside any wetland areas and does not cross any drainage channels, rivers or canals.

The cumulative impacts are not of such a significance that it will prevent the development from taking place. It is proposed that the development can proceed.

13.3 SUMMARY OF POSITIVE AND NEGATIVE IMPACTS AND RISKS OF THE PROPOSED ACTIVITY AND IDENTIFIED ALTERNATIVES

Positive impacts

- Socio economic upliftment in the area. The Bela Bela Power Plant that rely on a powerline connection to the Eskom grid will bring needed jobs to the people of the communities of the development area. The powerline will also provide some jobs in the construction phase for an area that has a high number of jobless people.
- Electricity supply will be more secure for the farmers, businesses and communities in the greater Bela Bela area.

Negative impacts

- The construction of the powerlines can have low negative impacts on the air quality, water quality, soil quality and safety of the area.
- The impacts on fauna and birds will be low negative.
- The impacts on flora will be low negative.
- Visual and heritage impacts will be low for the preferred route.
- The negative impacts of the development can however be mitigated effectively by application of the mitigation measures in this report and in the EMPr.

13.4 ASPECTS CONDITIONAL TO THE FINDINGS OF THE ASSESSMENT BY THE EAP OR SPECIALISTS TO BE INCLUDED AS CONDITIONS OF AUTHORISATION

- Permits are needed if any protected plants are affected by the development and consequently have to be removed from the construction area.
- Raptor-friendly pole design (in line with latest Eskom technical Standards) that minimises electrocution risk must be used. These are designs that create separation between conductors of differing electric potentials, by placing insulation over conductors, and provide safe places for birds to perch.
- The entire powerline must be fitted with bird flight diverters.
- Long-term monitoring and management of potential and actual impacts by the developer and operator must be conducted in the construction and operational phases.
- Periodic post-construction surveys of powerlines for bird fatalities. Given that the risk of mortalities can be affected by season, it is important that these be performed during both the wet and dry seasons. In addition, provision needs to be made for periodic checking and, when necessary, replacement of bird flight diverters.
- Maintenance must be conducted outside of the winter breeding season.
- Nests are not to be removed from pylons and that no maintenance activities may be conducted on pylons with nests without prior approval of the avifaunal specialist.

- Pylons must be checked in advance of any major planned maintenance activities. Should nests be present, an avifaunal specialist must be contacted to identify the species and breeding status of the nest. Any planned major maintenance activities on pylons should be conducted outside of the winter breeding season (Oct - May).
- Only vegetation inside the powerline servitude and preferably only at the pylon's footprint areas may be removed.
- Minimise construction and vehicular disturbance footprint through Medium and High sensitivity areas.
- Minimise vehicular disturbance in High and Medium sensitivity areas during operation; ongoing alien invasive plant removal within High and Medium sensitivity parts of corridor
- An avifaunal walkthrough must be conducted by an avifaunal specialist within one month prior to the commencement of construction to identify breeding sites and ground-truth the final layout.
- Any management measures to protect the breeding sites recommended by the avifaunal specialist following the walkthrough must be implemented.
- Where subsequent towers are located at equal elevation (so as not to create a wider collision band) and where practically possible, the double circuit parallel line's towers should be staggered, to increase visibility of the double-circuit line.
- It should be stated that it is likely that further undetected archaeological remains might occur elsewhere in the Study Area along water sources and drainage lines, fountains and pans would often have attracted human activity in the past. Also, since Stone Age material seems to originate from below present soil surfaces in eroded areas, the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits. Burials and historically significant structures dating to the Colonial Period occur on farms in the area and these resources should be avoided during all phases of construction and development, including the operational phases of the development.
- Inform staff of the need to watch for potential fossil occurrences.
- Inform staff of the procedures to be followed in the event of fossil occurrences.
- Monitor for presence of fossils, especially fossil bones.
- Obtain permit from SAHRA for collection of fossil finds.

14 FINAL PROPOSED ALTERNATIVES RESPONDING TO IMPACT MANAGEMENT MEASURES, AVOIDANCE AND MITIGATION MEASURES IDENTIFIED IN ASSESSMENT

The preferred alternative was identified after all possible negative impacts were mapped and demarcated as no-go zones.

In order to minimize negative environmental impacts, there are areas that are not available for future developments of any kind. In order to mitigate for most of the negative impacts, avoidance seemed to be the best option in terms of the main issues, including:

- Visual impacts
- Bird collisions - limit occurrences
- Impacts on soils
- Impacts on biodiversity
- Degradation of archaeological sites/paleontology.

15 ASSUMPTIONS UNCERTAINTIES AND GAPS IN KNOWLEDGE

Uncertainties could be limited by implementing a thorough ground-truthing process before construction commences.

It is assumed that the developer will always act responsibly towards the environment during the development and will comply with the conditions of the environmental authorization at all times.

16 REASONED OPINION FOR AUTHORISATION OF ACTIVITY AND CONDITIONS IN RESPECT OF THAT AUTHORISATION

It is the opinion of the EAP that the environmental impacts associated with the proposed development were identified and that the mitigation measures proposed to mitigate the negative impacts will decrease the environmental negative impacts to acceptable levels.

The EAP respectfully request comments from the competent authority to enable AGES to compile the Final Basic Assessment Report.

Conditions to be included in the environmental authorisation

- Appoint an environmental control officer on site during construction of the development to monitor the development for compliance with the conditions of the environmental authorization.
- Permits are needed if any protected plants will be affected by the development and consequently have to be removed from the construction area.
- Invader plants must be controlled through removal and destroying the plants.
- Only vegetation inside the development footprint may be removed for construction.

- The site should be monitored by an informed ECO in order to avoid the destruction of previously undetected heritage remains and potential human burials which might occur at the site.
- Should any previously undetected surface or subsurface paleontological or archaeological material be exposed during development activities, all activities should be suspended, and the archaeological specialist should be notified immediately.

17 PERIOD OF ENVIRONMENTAL AUTHORISATION AND DATE OF CONCLUSION OF ACTIVITY

The period for which the EA is required is for 10 Years from date of Environmental Authorisation.

The date on which the activity will be concluded is in 10 years from date of Environmental Authorisation. Post construction monitoring must be done for at least 2 Years after finalisation of construction.

18 UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP

I, Anton von Well, appointed EAP for the proposed Bela Bela 1 x 132kV Powerline application for Environmental Authorisation, hereby confirm:

- Correctness of the information provided in this report
- All comments and inputs and responses from stakeholders and I&APs are included here.
- All inputs and recommendations from the specialist reports where relevant, are included.
- Any information provided by the EAP to interested and affected parties and responses by the EAP to comments or inputs made by Interested and affected parties will form part of the Final report.



Signed

Date 13/12/2022

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