Consultation Basic Assessment Report (Draft BAR)

CONSULTATION BASIC ASSESSMENT REPORT FOR THE PROPOSED BOLOBEDU POWERLINE ON BOLOBEDU 1024 LT, LIMPOPO PROVINCE

Short name: Bolobedu Powerline

February 2020

Commissioned by: Bolobedu Solar Farm PV (Pty) Ltd
Document version 1.0 – Draft
Compiled by: HP Jannasch & EA Grobler

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PROJECT APPLICANT

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DOCUMENT HISTORY

Report No	Date	Version	Status
1.0	February 2020	1.0	Consultation BA Report

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LIST OF APPENDICES

1 OBJECTIVE OF THE EIA PROCESS

According to Regulation No R 326 of April 2017, of the EIA Regulations, 2014, as amended, the objective of the EIA process is to, through a process of consultation:

a. Identify 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 th 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 – Engela Grobler and Hein Jannasch
Contact details of EAP:
Physical Address: 120 Marshall Street,
Polokwane, 0699
Telephone number: 015 291 1577
Fax number: 015 291 1577
Expertise of EAP: A Master's Degree in Environmental Management and 8 years of experience with the management and conducting of EIA's. A number of renewable energy projects which participated in the IPP Programme, issued 3rd August 2011 by the Department of Energy have been awarded Preferred Bidder Status. Curriculum Vitae of EAP is included in Appendix J.

3 LOCATION OF ACTIVITY

3.1 SURVEYOR GENERAL 21 DIGIT CODES OF DEVELOPMENT AREAS

Bolobedu 1024 LT - T0LT00000000010240000

3.2 PHYSICAL ADDRESS AND FARM NAME

The Farm Bolobedu 1024 LT, Limpopo Province, Greater Letaba local Municipality, Mopani District Municipality, Limpopo Province

3.3 COORDINATES OF LINEAR ACTIVITY

South West Point: 23º29'27.53"S
30º22'44.80"E
South East Point: 23º29'24.29"S
30º22'49.77"E
South Centre Point: 23º29'25.66"S
30º22'47.70"E
North East Point: 23º29'22.21"S
30º22'48.55"E

The proposed development site is located 49km south west of Giyani and 75 north-east of Tzaneen. Modjadjiskloof is 58km south west of the project site. The proposed development site is located on communal land and is surrounded by rural villages. The proposed power line runs from the Bolobedu Substation first in a south easterly direction and then turns in a south westerly direction until it reaches the Bolobedu solar park development site. The powerline continues into the Bolobedu solar park site for a short distance until it connects with the substation, located on the Solar Park site.
Please note that the farm Bolobedu 1024 LT is the result of an application for the consolidation of the Remainder of the Farm Kromrivierfontein 360 LT and the Remainder of the farm Worcerster 200 LT. This was done through a process in conjunction with the surveyor general and this area is now registered at the Deeds Office as the farm Bolobedu 1024 LT.

Some of the specialist reports might still refer to the study area as the Remainder of the Farm Kromrivierfontein 360 LT and the Remainder of the farm Worcerster 200 LT. However, the farm is now officially and legally consolidated and is now called Bolobedu 1024 LT.

4 PLAN OF THE PROPOSED ACTIVITY

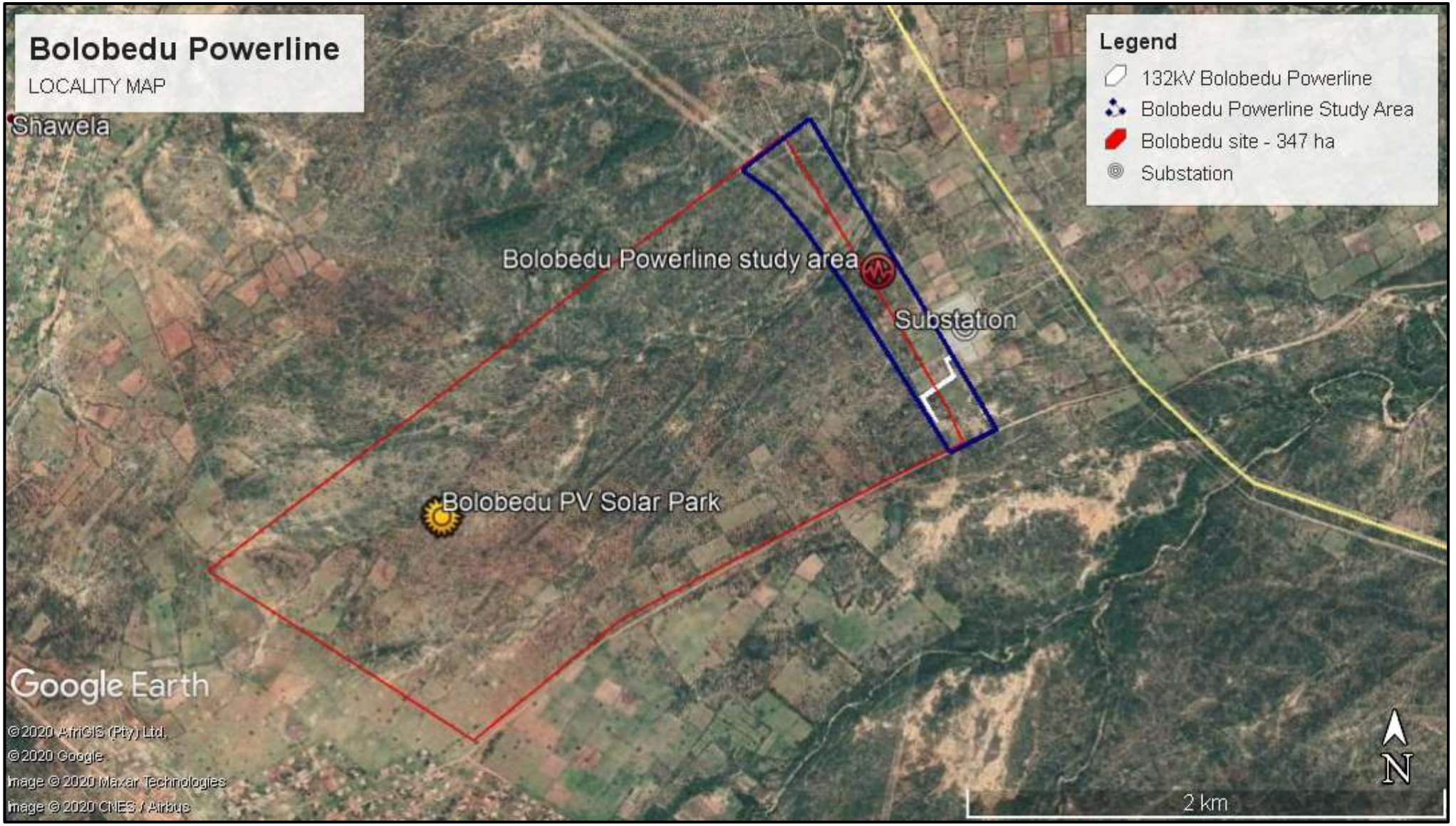

Figure 1 Location of the proposed Bolobedu Powerline

5 SCOPE OF THE PROPOSED ACTIVITY

5.1 LISTED ACTIVITIES TRIGGERED IN TERMS OF NEMA

Relevant notice	Description
GN R.327, Listing Notice 1 of the EIA Regulations, 2014 as amended **Activity 11** ***The development of facilities or infrastructure for the transmission and distribution of electricity -*** ***(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;***	The Bolobedu PV Power Plant requires connection infrastructure, which includes a 132kV powerline connecting the Substation with the PV Power Plant. It is located outside an urban area in a rural area.

5.2 DESCRIPTION OF ASSOCIATED STRUCTURES AND INFRASTRUCTURE RELATED TO THE DEVELOPMENT

The Bolobedu PV power plant requires infrastructure apart from the actual solar panels / PV arrays. A connection to the Eskom grid is required and this is achieved by means of a 132kV power line connecting the Bolobedu substation with the PV Power Plant.

Environmental Authorization was obtained for the PV Power Plant and this application is only for the connection power line. Most of the principles, for the PV Power Plant will apply for this application and there will be a lot of overlap and similarities between the PV Power Plant application and the Powerline application.

There is no production of any product and there is no effluent or emissions as a result of the development of the power line for the PV power plant. No accommodation is provided on site and security personnel and maintenance personnel will be employed in shifts and therefore, housing will not be required. The proposed development infrastructure will consist mainly of the following components and structures:

- Internal roads
- Lattice steel pylons
- Overhead powerlines
- Rail conductors
- Access Road

Structures and infrastructure at the development site is subject to the standardized design for a 132kV powerline.

The specific activity includes the development of infrastructure for the transmission and distribution of electricity.

6 LEGAL AND POLICY REQUIREMENTS

The following is a broad overview of the relevant policy and legal requirements related to the environment, applicable to the proposed project: Legislation is not limited to this list.

Table 1: Review of relevant legislation

National Legislation
Constitution of the Republic of South Africa (Act no. 108 of 1996)
Fencing Act (Act no. 31 of 1963)
Conservation of Agricultural Resources Act (Act no. 43 of 1983) Regulation 15 of GN R0148
Environment Conservation Act (Act no. 73 of 1989)
National Water Act (Act no. 36 of 1998)
National Forests Act (Act no. 84 of 1998)
National Environmental Management Act (Act no. 107 of 1998) NEMA EIA Regulations 2014 (GN R. 982, 983, 984, 985 of 4 December 2014)
National Heritage Resources Act (Act no. 25 of 1999)
National Environmental Management: Biodiversity Act (Act no. 10 of 2004) GN R150: Commencement of Threatened and Protected Species GN R15: Lists of critically endangered, vulnerable and protected species GN R152: Threatened Protected Species Regulations
National Environmental Management: Air Quality Act (Act no. 39 of 2004)
National Environmental Management: Waste Management Act (Act no. 59 of 2008) GN921 of 29 November 2013-Listed activities
National Veld and Forest Fires Act, 1998 (Act 101 of 1998)
Limpopo Environmental Management Act (2004)
Occupational Health and Safety Act (Act No. 85 of 1993)

7 NEED/DESIRABILITY FOR A 132KV POWERLINE

The approved Bolobedu PV Solar Park needs to connect to the Eskom grid, and this is done by means of a 132kV transmission line to the Bolobedu substation. The energy is fed into the Eskom grid for further distribution from the substation.

8 MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT WITHIN THE PREFERRED SITE

The current development footprint is based on the following:

- Connectivity to the Eskom Bolobedu Substation
- Recommendations from the Ecologist (Ecological Impact Assessment)
- Recommendations from Eskom
- Findings by Archaeologist (Archaeological Impact Assessment)

9 CONSIDERATION OF ALTERNATIVES

9.1 DETAILS OF ALTERNATIVE ROUTE CONSIDERED

The location of the site for the PV power plant was considered mainly due to the connectivity to the Eskom grid via the Bolobedu sub-station. This led to the grid connection being simple and the power line will be approximately 250m in length.

The route of the power line was also determined by the approved site lay out plan of the PV power plant. The transmission line route runs from the substation at the PV power plant (in the south east corner of the development site) to the Eskom Bolobedu substation.

The route of the powerline was determined with inputs from Eskom.

9.2 DETAILS OF REASONS FOR ALTERNATIVES NOT CONSIDERED

The current powerline route was chosen based on the shortest distance from the Substation to the PV power plant where the small substation at the PV plant, is located.

This route was chosen based on inputs from Eskom and is also based on the sensitivity map drawn by the ecologist. The route runs along the Low Sensitivity area, which comprises mostly of modified and degraded land. The archaeologist found Historical Period sites as well as Burial Sites. All these sites are located well north of the locality of the proposed powerline.

There are no other viable alternatives to consider other than the route applied for. This is based on findings by the ecologist, archaeologist and inputs from Eskom. However, there might be slight changes in the exact footprint once construction commences.

9.3 TECHNOLOGY ALTERNATIVES

Technology alternatives include mainly the structures to be installed for the power line and this might by monopoles or lattice structures. This can only be determined in the final design phase and will be done in accordance with Eskom's technical requirements.

9.4 NO-GO ALTERNATIVE

If the proposed development does not take place, then the No-Go Alternative will be in place which means the *status quo* remains.

If the power line is not developed, the Bolobedu PV solar park will not be connected to the Bolobedu Substation, and renewable energy will not be added to the national grid. With the construction of the solar park and associated infrastructure, which includes the powerline, the pressure on the Eskom grid will decrease and the possibility of power not readily being available will also decrease.

As a result of the fact that the PV plant and also the power line are located on community land, there will be a significant positive socio-economic impact on the local communities.

9.5 DETAILS OF APPLICATION FOR ENVIRONMENTAL AUTHORIZATION – BOLOBEDU SOLAR PARK

The National Department of Environment Affairs and Tourism (DEA) granted Environmental Authorisation for the application for Bolobedu Solar Park on 25 January 2019, with Reference Number 14/12/16/3/3/2/1054.

The Bolobedu Solar Park will have a capacity of 75mW, which needs to feed into the Eskom grid, hence the application for Environmental Authorization for a 132kV Transmission line.

9.6 DETAILS OF PUBLIC PARTICIPATION PROCESS UNDERTAKEN

The public participation process was followed according to Chapter 6 of the New EIA Regulations (2014), as amended. Notification posters were put up on site as well as in other areas of the development site on 28 November 2019. The poster notifications were both in English and Sepedi. Advertisements were published in English and Sepedi, and the application was advertised in the 06 December 2019 edition of the Mopane Herald. The I&APs were given 30 days to register as I&APs. Background Information Documents (BIDs) were sent to potential Interested and Affected Parties (I&APs) and all relevant Government Departments.

The time period from 15 December 2019 until 5 January 2020 was excluded from the public participation process and all timeframes were extended. The first phase of the public participation process concluded only on 20 February 2020.

The Consultation / Draft Basic Assessment Report (BAR) will be available for a commenting period of 30 days. Notifications will be sent out in order to inform all Registered I&APs that the Draft BAR is ready for review. Hard copies of the report will be sent out to all relevant government departments for comments. The final BAR will be submitted after the 30-day commenting period has concluded.

9.7 SUMMARY OF ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

There were no registered I&APs for the public participation process. However, there was extensive liaising with the local communities, especially the Modjadji Tribal Authority during the EIA process for the PV power plant. Because the land is governed by a community, the Department of Rural Development and Land Reform was involved in order to obtain the necessary community resolutions to proceed with the project. The community resolutions serve as the necessary landowner's consent to establish the Bolobedu PV solar plant as well as associated infrastructure such as powerlines.

No comments were received from any Government Departments.

9.8 ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PROPOSED POWERLINE

9.8.1 AREA SENSITIVITY

The ecological studies informed the classification of the area in different sensitivity classes and development zones. Different aspects like status of vegetation, soil types and composition and previous land use were used in the classification. The sensitivity map from the Ecological report from Exigo3 showing the sensitivity areas is included in Figure 22. The high sensitivity areas occur in the northern section of the study area and entail mainly the drainage lines running through the PV plant. The Medium sensitivity areas occur throughout the area and the Low sensitivity area occur mostly in the southern half of the study area. The sensitive drainage areas were excluded as an alternative site for the development of the powerline. The riparian woodland and drainage channels associated with the northern section of the site have a high sensitivity and should be preserved as important fauna and flora habitats. The Low sensitivity area in the southern half of the site was deemed the most suitable for the development of the transmission line from the PV plant to the Eskom substation.

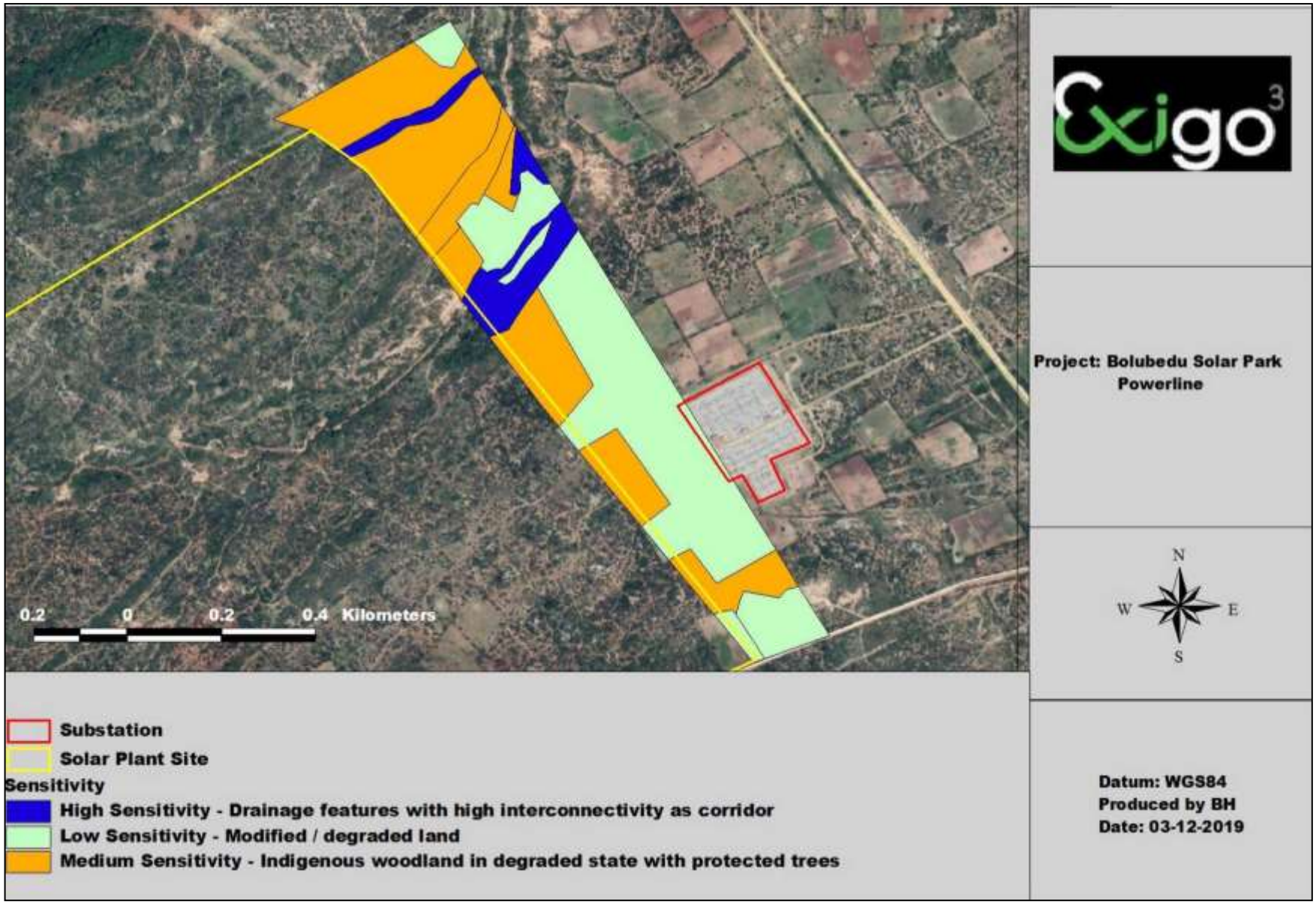

Figure 2 **Sensitivity map of the proposed development site**

9.8.2 BIODIVERSITY AND ECOLOGICAL ASPECTS

The wetland / riparian area, terrestrial ecology, and avifauna are biodiversity aspects that were assessed by Exigo3 and what follows are extracted from this report by Exigo3, which is included in Appendix D. This report was compiled after a site visit by the ecologist and an area adjacent to the Eskom substation was assessed in detail.

VEGETATION UNITS

The proposed development is planned on a landscape that varies from slightly undulating to flat plains. The proposed development site currently represents communal land utilised for livestock grazing and small-scale subsistence farming. The vegetation units on the site vary according to soil characteristics, topography and land-use. Most of the site has become encroached by dense stands of sickle bush due to the overgrazing. Vegetation units were identified and can be divided into distinct vegetation units according to soil types and topography.

The following vegetation units were identified during the survey.

1. Degraded *Dichrostachys cinerea* thickets on red-yellow apedal soils
    - *Dichrostachys cinerea – Vachellia – Combretum* mixed thickets (Variation)
    - *Dichrostachys – Kirkia – Ficus* rocky dykes (Variation)
    - *Dichrostachys cinerea – Terminalia sericea* woodland on leached sandy soils (Variation);
    - *Dichrostachys cinerea – Colophospermum mopane – Senegalia niogrescens* thickets (Variation)
2. Old fields / cultivated land
3. Drainage channels & riparian woodland.
4. Old quarries.

- **Degraded *Dichrostachys cinerea* thickets**

This vegetation unit occurs throughout the proposed development site and represent degraded woodland and secondary old fields that became encroached as a result of serious overgrazing from the community livestock. The woody structure is dense thickets dominated by Sickle Bush (*Dichrostachys cinereal).*

The vegetation unit is classified as having a medium sensitivity due to the widespread status in the Savanna Biome and the presence of protected trees and succulents in the degraded unit. The state of the vegetation is classified as degraded Woodland in an Encroached State.

- **Old fields / Cultivated Land**

This vegetation unit represent primary old fields and small-scale subsistence farming. The cultivated land occurs as pockets of small-scale subsistence farming on isolated areas. These areas do not represent a vegetation entity other than homogenous stands of crops and some exotic weeds and pioneer grasses. The old cultivated fields occur throughout the area and in this case only represent primary old fields.

A large percentage of the land in question does not appear to be of high conservation importance due to the impact from previously cultivated land, overgrazing and agricultural activities by the local communities. Most of the existing developed area consists of degraded grassland with occasional pockets of cultivated land. Much of the area is disturbed and used for grazing and cultivation purposes. The degraded areas have a low sensitivity due to the modified state of the vegetation. The state of the vegetation is classified as Completely Modified to Degraded.

- **Drainage channels & riparian woodland**

This vegetation unit includes the drainage channels and riparian woodland in the project area. The non-perennial channels on site can be described as water courses or channels. The vegetation structure associated with the water courses vary from the actual channels being a sandy riverbed with alluvial sand and conglomerates to closed woodland along the riverbanks. The narrow band of trees that occurs along the channel can be classified as riparian vegetation. The rivers flow from west to east. This channels and associated vegetation are very important for connectivity with adjacent vegetation as well as a migratory route for riparian animals.

The vegetation associated with the water courses has a high sensitivity with a high conservation priority. No major alteration of these important drainage areas is recommended, especially considering it to form part of an important catchment. The potential to impact on the habitat is high and therefore a sufficient buffer zone of 30 meters is applicable for the solar plant, while strict mitigation should be implemented for the access road to allow natural flow underneath the road surface.

All construction and maintenance activities should be conducted in such a way that minimal damage is caused to drainage features on site. The state of the vegetation is classified as Natural Riparian Woodland.

- **Old quarries**

The old sand and gravel mining quarries occur in the southern section of the proposed powerline corridor and represent areas that have been used for mining of sand and gravel by local communities. The cleared areas have recovered to a small extent and represent degraded grassland, with small depressions forming where water collect. The surrounding areas formed dense sickle bush thickets that are often impenetrable. The Area is classified as having a Low Sensitivity due to the state of degradation and unlimited development of the corridor can be supported in the area. See the complete report in Appendix D for more detail.

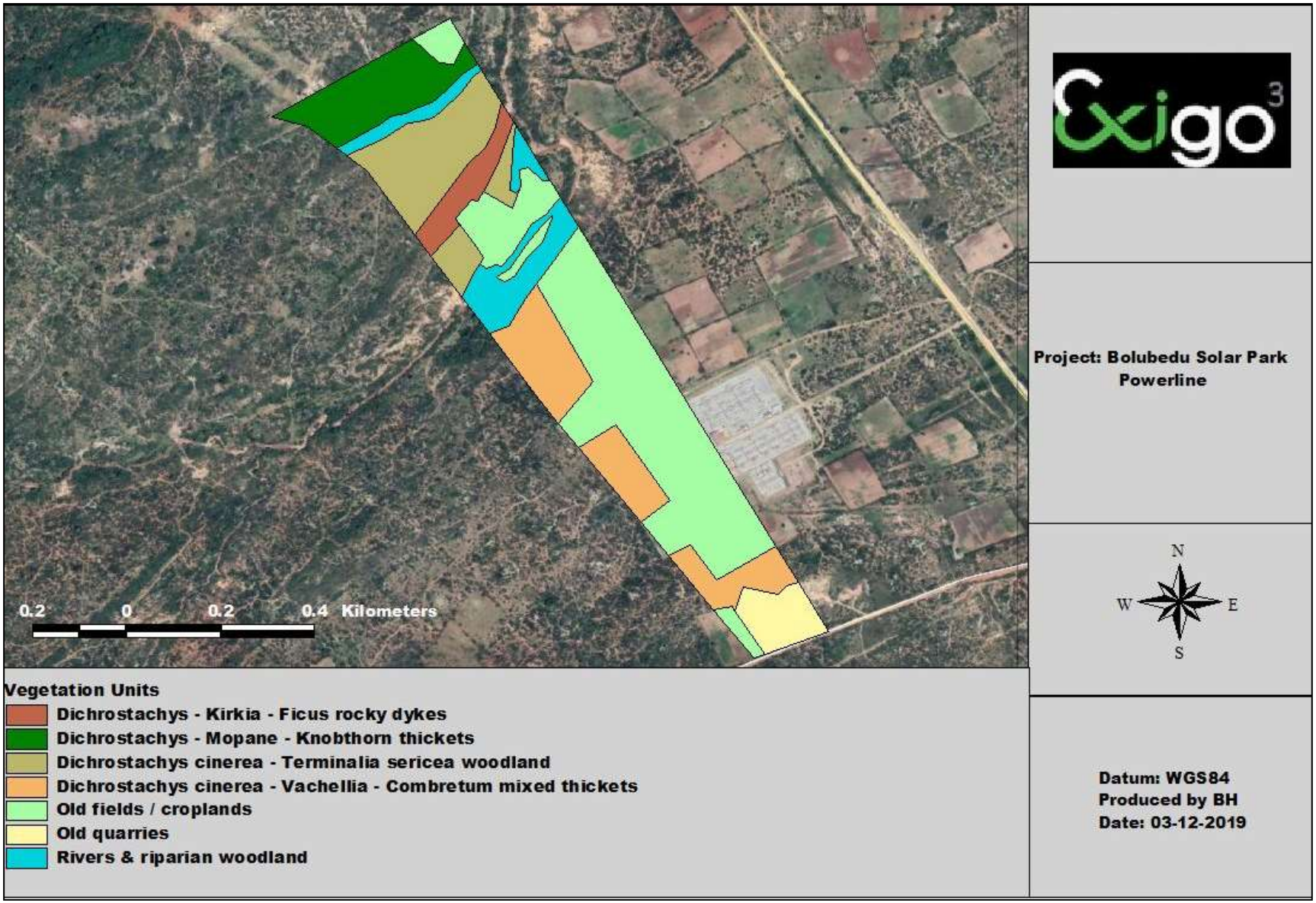

Figure 3 Vegetation Map: Bolobedu Powerline Study Area

A survey was conducted during December 2019 to identify specific fauna habitats, and to compare these habitats with habitat preferences of the different fauna groups (birds, mammals, reptiles, amphibians) occurring in the QDS. The area represents degraded grassland, cultivated fields, mixed woodland with some microphyllous and broadleaf elements in isolated areas, rocky outcrop and riparian woodland. Detailed fauna species lists for the area is included in the report in Appendix D.

During the site visit, mammals, birds, reptiles, and amphibians were identified by visual sightings through random transect walks. In addition, mammals were also recognized as present by means of spoor, droppings, burrows or roosting sites. The 500 meters of adjoining properties were scanned for important fauna habitats.

REPTILES

Species such as the southern rock python, the black mamba, puff adder, boomslang, vine snake, spotted bush snake and several members of the green snakes is expected to occur in the study 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 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.

Conservation actions which should be considered, with particular reference to pythons, are described in more detail in the Ecological Report in Appendix D. These actions include:

- Protection of optimal habitats
- Conservation Education and Awareness Creation for local communities
- Employment and Alternative Employment

AMPHIBIANS

The amphibians appear to be poorly represented on site. The most probable habitat to find frogs is in the seasonal pools associated with the drainage channels although this do not represent optimal habitats due to a lack of breeding habitat and water plants which will attract insect for foraging. The riparian zone of the drainage channels probably harbours a number of amphibian species but no particular hotspot for amphibian diversity is known from the site.

MAMMALS

Small antelope (e.g. grey duiker, steenbok) will still utilise the more natural areas of the site and a duiker and scrub hare were observed during the survey.

Feral cats and dogs from the township areas also move through this area on occasion.

The connectivity of the project site to the remainder of the larger area is Moderate to low due to other developments and roads. Of significance is the role of the river and riparian zone as zoogeographical dispersal corridor.

Most mammal species are highly mobile and will move away during construction. The impact will also be low if one compares the footprint of the development and the overall range of individual species. It is therefore considered highly unlikely that the species will be affected negatively by the development of the proposed power line.

INVERTEBRATES

Insects and spiders are very good indicators of the plant diversity and ecological sensitivity of an area. Butterflies can be used in the field as indicators of biodiversity. An insect and spider desktop survey was done in addition to the field observations.

All of the potential invertebrate habitats are well represented by a high family richness of insects and spiders. Spiders occur throughout all the habitats, and both web builders and active hunters find their ways in trapping and actively hunt around for potential food.

A number of invertebrate taxa are currently protected by Schedule B1 of the list of threatened and protected species issued in terms of Section 56(1) of the National Environmental Management: Biodiversity Act, 2004 and likely to occur on the study site.

AVIFAUNA ASSESSMENT

In the previous application process the Avifauna study was done by an avifauna specialist from the University of Limpopo, Prof. Engelbrecht, who has a master's degree in Zoology. His report is included in Appendix E. This avifauna assessment described and assessed the impact of powerlines associated with PV plants, in detail and is therefore applicable in this application.

According to the report by Prof. Engelbrecht, the proposed site is situated in severely modified and degraded bushveld (Tzaneen Sour Lowveld and Granite Lowveld Bushveld) characterised by currently cultivated and fallow fields, coppicing trees and shrubs as a result of fuel wood harvesting, soil erosion as a result of overgrazing and severe bush encroachment, mainly by Sickle Bush (*Dichrostachys cinerea*).

From an avifaunal perspective, there are three sensitive areas in relative close proximity to the proposed site: the riparian zones of two non-perennial tributaries of the Motlatswi River in the north and central parts of the study area, and the Masakulo River south of the study area, as well as the nearby Rasekwalo Hill to the north of the study area. Many species will use the taller trees associated with the riparian zones as dispersal avenues and for foraging and nesting purposes, while the hill will provide cover and serve as a refuge for many species.

Considering that only 56 species were recorded during the site visit which was undertaken in summer when most migrants are around, and many species are more vocal as a result of breeding activities, the site showed poor avifaunal diversity. All the species recorded are common and widespread in the region and thrive in disturbed areas or in areas where bush encroachment is evident.

The absence of surface water within the study area means that many water birds and water-dependent species are not attracted to the site.

The fact that there is only a single record of a Red Data species in the QDGS since 2007, suggests that the RED Data species recorded in the QDGS during SABAP1 are no longer present in the area and occur only sporadically or are present in extremely low densities. As for the only Red Data species recorded since 2007, the Black Stork, it was recorded quite a distance away from the proposed development site, and there is no suitable breeding habitat available for the species in or near the study area.

According to the findings by Prof Engelbrecht, the proposed siting of the PV power plant and associated powerline suggests the proposed development pose a negligible to low risk to the avifauna present at or in the vicinity of the study area.

9.8.3 SOIL ASPECTS AND AGRICULTURAL POTENTIAL STUDY

The assessment of the agricultural soil potential and land capability of the project site is detailed in a Soil, Land Use and Agricultural Potential Report from Exigo3, included in Appendix F.

The land type units which is used to determine the potential agricultural value of soils in an area and represented within the study area include the Ae326 land type. The land type, geology and associated soil type is presented in Table 2 below.

Table 2 Land types, geology and soil types of the development area.

Landtype	Soils	Geology
Ae326	Red-yellow apedal, freely drained soils; red, high base status, > 300 mm deep (no dunes)	Grey biotite gneiss and migmatite of the Goudplaats Gneiss in the north; leucocratic biotite granite of Vaalian age in the south and east; many diabase dykes.

The high variability in rainfall distribution within the area could however render dryland farming a risky venture, even under irrigated conditions. Higher day temperatures in summer months may hamper soil moisture storage for crop use. At present no irrigation or functional centre pivots occur in the project area. The climatic conditions are the main factor determining the soils to be marginally suitable for arable agriculture.

The site has a low to medium agricultural potential according to the characteristics of the soils and vegetation as well as rain fall in the area

The site has a medium to low potential for grazing due to the dense stands of sickle bush. When severe and prolonged overgrazing in the semi-arid savanna ecosystem occurs, the grass component is severely restricted in growth, or in moisture usage. Therefore, more moisture remains available in the soil to be used by the woody plants, and the result is bush encroachment, a structural change towards more strongly woody vegetation.

The grazing has a low palatability and the soil is in a degraded state at present due to previous overgrazing.

9.8.4 HYDROLOGICAL ASPECTS AND WATER COURSES ON SITE

The project site is located in the B81G quaternary catchment. Two primary drainage features occur in the PV Plant site, one in the north and the other in the south, both draining in an eastern direction. These drainage lines also run though the powerline study area.

The study area is located in the summer rainfall region of South Africa, with precipitation generally occurring as short, intense, thundery showers. The mean annual precipitation for the area as measured in the surrounding weather stations is 675 mm/annum. Average annual precipitation for the B81G quaternary catchment calculated by DWS during the GRA II study is given as 629 mm/annum.

For the purpose of this study only the riparian zones that bisect the proposed development site were assessed namely the northern water courses. In determining the integrity of these hydrogeomorphic units the condition of the site and the indirect and direct disturbances is taken into account. The roads, erosion, overgrazing, alien invasive vegetation species, *etc*. was taken into account in determining the Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) of these wetland units.

The non-perennial water courses and riparian woodland in the northern section of the project area have a 'Largely Natural' PES, with the only impacts being from livestock overgrazing and some isolated eroded areas. These well-defined channels have a 'Moderate' EIS and support ecosystem functioning, especially in terms of the connectivity towards the larger area.

Impacting activities which have altered the expected floristic composition include overgrazing, encroachment of woody layer, impoundment and road crossings.

9.8.5 VISUAL ASPECTS

A Visual Impact Assessment was conducted for the Bolobedu powerline and the report is attached in Appendix H.

From the report, it can be concluded that the impacts on visual sensitive receivers (VSRs) are mostly insubstantial with a few moderate incidences. The one incidence where an 'extreme' impact is anticipated would not be permanent in nature. This incidence occurs where travellers walking along Ga-Ramaroka footpaths are elevated above the vegetation line and / or breaks in the vegetation line allows for temporary views. These views would however include the existing substation and power line. It is therefore highly likely that the structures from the proposal would merge with these existing structures and become less noticeable. As stated, these views would also be temporary as the travellers pass by specific observation points along the routes. It might also be the case that travellers are not focussed on their environment and may not notice the presence of the proposal. Therefore, the insubstantial and moderate ratings are accurate reflections of the overall anticipated impact.

Moderate impacts are anticipated for:

- some residents from the villages of Ga-Ramaroka and Mohlabaneng
- some travellers on connecting road between Mohlabeng and Ga-Famane
- some travellers on Ga-Ramaroka connecting roads
- some areas of Subsistence farming

The ***significance*** of the impact from the project would be:

- ***negative, medium*** for Residential and Open Space / Recreational VSRs during both construction and operational phases
- ***negative, medium – high*** for Residential and Open Space / Recreational VSRs during both construction and operational phases

The high result of the rating is mostly due to the duration of the project life.

No night-time impacts are anticipated from this project.

Mitigation measures would mostly be effective during construction and decommissioning phases when dust clouds would arise from the activities and clearing of vegetation and structures would expose bare soil.

The final *EIA significance* of the impact from the project was rated as ***negative, medium*** for Residential and Open Space / Recreational VSRs during both construction and operational phases and as ***negative, medium – high*** for Travelling as well as Business / Occupational / Industrial VSRs during both construction and operational phases. No night-time impacts are anticipated from this project. Mitigation measures would mostly be effective during construction and decommissioning phases when dust clouds would arise from the activities and clearing of vegetation and structures would expose bare soil.

9.8.6 AIR QUALITY AND NOISE

The construction phase of the development will entail large earthmoving equipment to clear and level the area for the installation of the powerlines. The generation of dust, exhaust emissions and noise from the equipment and vehicles will be evident in the construction period.

9.8.7 HERITAGE RESOURCES

The archaeologist did an analysis of historical aerial imagery and archive maps of areas subject to this assessment suggests a landscape which has been subjected to historical farming activities possibly sterilising the area of heritage remains. However, heritage remains were encountered. The complete Archaeological Impact Assessment Report is included in Appendix G.

Four (4) historical sites were found towards the norther border and centre of the study area and is older than 60 years - and generally protected under the National Heritage Resource Act (NHRA 1999). However, the structures and features found are poorly preserved and no notable heritage or historical association could be established. All the sites are rated as of medium-low significance.

Two, single burial sites were found and the first is 260m from the nearest point of the powerline and the second is 450m from the powerline. These areas should be avoided and a 20m buffer must be established around each burial site. Undetected burial remains encountered during the construction phase should be reported to the archaeologist and SAHRA, immediately. The burial sights are deemed to be of a very high significance and should be managed as such.

9.8.8 CLIMATE

The climate for the region can be described as warm-temperate. The Giyani area which is near to the project site normally receives about 421mm of rain per year, with most rainfall occurring mainly during mid-summer. The area receives the lowest rainfall (0mm) in June and the highest (93mm) in January. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Giyani range from 23.9°C in June to 31°C in January. The region is the coldest during July when the mercury drops to 8°C on average during the night.

9.8.9 TOPOGRAPHY AND DRAINAGE

The project area is characterised by slightly undulating to flat plains with two major drainage channels bisecting the area. The topography across the site is slightly undulating with the average elevation of 580 mamsl. The site is located within the B81G quaternary catchment and is situated in the Letaba / Levuhu Water Management Area. Drainage occurs as sheet-wash towards the major rivers.

9.9 IMPACTS AND RISKS IDENTIFIED

The environmental impacts associated with a Transmission powerline include mainly the following potential impacts:

- Visual impact
- Impact on biodiversity (including the potential loss of plant life and animals)
- Impact on soils (mainly in terms of soil erosion)
- Impact on agricultural resources which will no longer be available.
- Potential impact on heritage resources and potential occurrences of graves as this is a rural, undeveloped area.
- Potential impacts on river systems, drainage channels and wetlands.
- Socio-economic impacts

Potential impacts identified include:

CONSTRUCTION PHASE:

- **Visual impacts.**
  - Extent: Locally at the proposed site
  - Duration: Duration of construction phase
  - Probability: Definite
  - *Significance: Medium-High*

- **Impacts Biodiversity;**
  - Extent: Locally – route and servitude of powerline
  - Duration: Duration of construction phase
  - Probability: Likely
  - *Significance: Low-Medium*

- **Geological, soil and erosion impacts;**
  - Extent: Locally at the proposed site
  - Duration: Duration of construction phase
  - Probability: Unlikely
  - *Significance: Low*

- **Impacts on agricultural potential;**
  - Extent: Surrounding villagers allowed to do subsistence farming.
  - Duration: Duration of construction phase
  - Probability: Definite
  - *Significance: Medium-High* (subsistence farmers will be compensated)

- **Impacts on heritage resources;**
  - Extent: Locally at the proposed site
  - Duration: Duration of construction phase
  - Probability: Unlikely
  - *Significance: Low* (with mitigation *i.e.* avoidance)

- **Impacts on drainage areas;**
  - Extent: Surrounding and adjacent land (B81G Quaternary Catchment)
  - Duration: Duration of construction phase (8-15 Months)
  - Probability: Unlikely
  - *Significance: Low* (Mitigation – avoidance)

- **Social impacts;**
  - Extent: Regional & Locally
  - Duration: Duration of construction phase
  - Probability: High
  - *Significance: High - Positive*

- **Noise impacts;**
  - Extent: Locally at the proposed site
  - Duration: Construction Phase
  - Probability: Likely
  - *Significance: Low-Medium* (temporary impact)

OPERATIONAL PHASE:

- **Visual impacts.**
  - Extent: Locally at the proposed site (adjacent Ga-Ramaroka village)
  - Duration: Life of the project (between 25 – 30 years)
  - Probability: Definite
  - *Significance: Medium-High*

- **Impacts Biodiversity - Avifauna;**
  - Extent: Locally at the proposed site – powerline structure
  - Duration: Life of the project (between 25 – 30 years)
  - Probability: Definite
  - *Significance: Low-Medium*

9.9.1 DEGREE TO WHICH THE IMPACTS CAN BE REVERSED

- The visual impact is resident for a long time (25-30 years). It can be reversed during decommissioning and rehabilitation of the area.
- Biodiversity impacts can be reversed at the decommissioning stage of the development. Plants can be replanted, and animals will return to the project area.
- Impacts on soil (erosion) can be reversed by careful handling of storm water on site.
- Impacts on water quality and quantity can be reversed at the decommissioning stage.
- 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.
- Socio-economic impacts can be reversed at the decommissioning phase, though this will have a nett negative effect on the area.

9.9.2 DEGREE TO WHICH THE IMPACTS MAY CAUSE IRREPLACEBLE 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 protected from development impacts.

9.9.3 DEGREE TO WHICH THE 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.

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

To assess the impacts on the environment, the process will be divided into two main phases namely the Construction phase and the Operational phase. The activities, products and services present in these two phases will be 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	Greater Letaba Municipality 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

9.11 ASSESSMENT CRITERIA

The terms of reference for the study 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 DEA in terms of the Environmental Impact Assessment. These criteria include:

Table 3: Impact Assessment Criteria

Nature of impact This is an appraisal of the type of effect the proposed activity would have on the affected environmental component. The description should include what's 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 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 The likelihood of impacts occurring. Impact may occur for any length of time during the life cycle of 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 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.

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 that 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.

9.12 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 the construction phase.
- The powerline is an important link with the PV power plant as the *generation of electricity* with photovoltaic cells will help to reduce the pressure on the electrical system in the country with far less 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 might have a negative impact on the *visual environment and biodiversity (avifauna)* in the area of the powerline.

9.13 POSSIBLE MITIGATION MEASURES AND RESIDUAL RISK

- The visual impact cannot be mitigated easily. However, the visual impact can be limited by building it on the proposed route as it will be in line with the current land use, sensitivity of the area and the approved PV solar plant.
- The impact on birds (collisions) can be limited by using bird-friendly powerline designs as approved by Eskom.
- The least sensitive area is selected for the powerline route and all drainage lines are avoided and the powerline will have the smallest impact on the ecology

9.14 MOTIVATION FOR NOT INVESTIGATING ALTERNATIVES

The preferred powerline route was determined based on the sensitivity map provided by the ecologist and based on inputs from Eskom. Any other route will have a higher impact on biodiversity and/or drainage lines and might not be feasible options or approved by Eskom.

9.15 CONCLUDING STATEMENT INDICATING THE PREFERRED ALTERNATIVE AND LOCATION OF THE ACTIVITY

The preferred alternative was selected based on the fact that it will have the smallest impact on the environment having been located on the least sensitive area, avoiding the sensitive drainage areas, potentially sensitive heritage sites and will be in line with Eskom requirements. The negative impacts can be effectively mitigated and managed to reduce the negative effect the impacts would have on the environment, so that the development with the positive effect of the socio-economic impact will have a positive effect on the environment that would offset the negative effects of the development.

The location of the preferred alternative is based primarily on the location of the Eskom Bolobedu substation and the approved location of the Bolobedu PV Solar Park with an approved site lay out plan.

The PV plant cannot be developed without a connection to the Eskom grid and this transmission is therefore vital for the success of the PV plant.

10 DESCRIPTION OF THE PROPOSED PROCESS TO IDENTIFY AND RANK THE 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.

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

The potential aspects to assess during the EIA process may include:

- Soils & agricultural potential;
- Avifauna aspects;
- Vegetation aspects;
- Heritage resources aspects;
- Noise aspects;
- Socio-economic aspects;
- Visual aspects.

The **decommissioning activities** of the PV plant mainly include the removal of the project infrastructure and the restoring of the site *status quo ante*.

The identification of impacts will be based on:

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

Potential impacts may include:

- Impacts on soils & agricultural potential;
- Impacts on avifauna;
- Impacts on vegetation;
- Impacts on heritage resources;
- Social impacts;
- Visual impacts.

The following possible Key environmental impacts were identified:

ENVIRONMENTAL ISSUES	POSSIBLE CAUSE	POTENTIAL IMPACTS
Air Pollution and noise		
Dust	• Construction machines and vehicles during clearing of the area and construction of the powerline	• Health problems • Air pollution • Public nuisance
Noise	• Construction noise	
Land/Soil degradation		
Soil contamination and degradation	• Spillages of oil, chemicals from machinery and vehicles during construction • Site clearing during construction • Use of Pesticides and Fertilizers • Loss of Agricultural potential of soil • Erosion if storm water is not correctly managed	• Pollution of soil • Soil degradation • Loss of topsoil • Effect soil characteristics, ecology & groundwater • Loss of topsoil
Biodiversity		
Decline in fauna and flora diversity	• Clearing of site for construction • Loss of habitat due to construction of powerline	• Loss of biodiversity • Loss of habitat • Negative impact on biodiversity (avifauna) • Negative impact on rare / endangered/ endemic species and habitats • Animal deaths.
Cultural/Heritage		
Possible loss of heritage sites	• Damage during construction or operation	• Possible loss of cultural heritage sites and graves
Visual impact		
Change in the visual characteristics of the site	• Clearing of vegetation for powerline (although minimal) • Presence of powerline	• Visual intrusion
Socio-economic impacts		
Job creation	• Increase in temporary and permanent work opportunities during the construction and operational phases. • Loss of land available for substance farming without fair compensation.	• Socio- economic benefit

10.2 IMPACTS & MITIGATION MEASURES OF CONSTRUCTION PHASE

All the possible impacts that can be predicted in both the construction and operational (limited) phase of the powerline are addressed. Specific mitigation measures are proposed, and the significance of these impacts is described with and without the mitigation measures. Furthermore, considering that all or part of the construction infrastructure 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.

10.2.1 ATMOSPHERIC POLLUTION AND NOISE

Construction Phase

During this phase there will be a concentration of earthmoving equipment and construction vehicles that will level the area, clear vegetation for construction purposes and in the process, will create dust and exhaust smoke that will impact on air quality. There will also be more noise created by the vehicles during this phase. Burning of waste and fires at construction sites may also create smoke.

Project Phase	Impact Atmospheric Pollution and noise								
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Earthworks and Vegetation clearance	Air pollution Dust	Low-medium	Medium-high	Medium	Medium-high	Medium-high	Low-medium	Medium
	Vehicle movement	Air pollution: Smoke	Low	Medium-high	Low-medium	Medium-high	Medium-high	Low	Low-Medium
	Vehicle movement	Air pollution: Dust	Low	Medium-high	Low-medium	Medium-high	Medium-high	Low	Low-Medium
	Vehicle movement	Noise pollution	Low-medium	Medium-high	Low-medium	Medium-high	Medium	Low	Low-Medium
	Burning of cleared vegetation, solid waste & veld fires	Air pollution by excessive smoke	Low-medium	Medium-high	Medium	Low-Medium	Medium	Low	Low-Medium
	Cooking fires of workers	Air pollution: Smoke	Low	Medium-high	Low-medium	Low-Medium	Medium	Low	Low-Medium

Mitigation measures - Construction Phase

- Vehicles must be well serviced so that it does not produce excessive smoke and noise.
- Speed of construction vehicles should be kept as low as possible to reduce generation of dust and noise.
- Construction areas must be damped/treated to prevent excessive dust formation.
- The clearing of the site should be done in phases as the construction progresses.
- Construction should only take place during the hours between sunrise and sunset on weekdays and Saturdays.
- Contractors must comply with Provincial noise regulations. The construction machinery must be fitted with noise mufflers and be maintained properly.
- Solid waste generated by the construction teams may not be burned on site or the surrounding areas but be regularly removed to the municipal waste disposal site.

- The cleared vegetation must be stock-piled and should be removed at regular intervals and be distributed amongst the local community members. The cleared vegetation may not be burned on site.
- Cooking on the construction site may not be done on open fires. Gas stoves can be used.

10.2.2 LAND AND 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.

Project Phase	Impact: Land and soils								
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Spilling of oil/diesel by construction machines or tanks	Contaminate soil	Low-medium	Medium-high	Low	Medium	Medium-high	Low	Low-Medium
	Spilling of chemicals/sewage	Contaminate soil	Low-medium	Medium-high	Low	Medium	Medium-high	Low	Low-Medium
	Solid waste disposal	Soil pollution & nuisance	Low	Medium-high	Low-medium	Medium-high	Medium-high	Low	Low-Medium
	Storm water over roads and cleared areas	Erosion	Low-medium	Medium-high	Low-medium	Low-Medium	Medium-high	Low	Low-Medium
	Trenches on the construction terrain.	Erosion	Low-Medium	Medium-high	Low	Low-Medium	Medium	Low	Low-Medium
	Moving of equipment over soils	Compaction of soils	Low-Medium	Medium-high	Low-Medium	High	Medium-high	Low-Medium	Medium
	Using land for power line	Sterilising of land for agriculture	Medium	Medium-high	Low-Medium	High	Medium	Low	Low-Medium

Mitigation measures - Construction Phase

- Clearance of vegetation should be restricted to the footprint area and access road.
- Construction activities should be restricted to the proposed development footprint.
- Construction vehicles must be well maintained and serviced to minimise leaks and spills.
- Spill trays must be used during refuelling of vehicles on site.
- Diesel storage must not exceed 30 000 litres at construction camp. Diesel tanks and other harmful chemicals and oils must be within a bunded area and water from this bunding must be channelled through an oil/water separator.
- Solid waste must be kept in containers and disposed of regularly at licensed dumping site.
- Building rubble must be removed to a licensed disposal site regularly during construction.

- Trenches that are dug for the supply of services and electrical cables must be filled up and compacted well and slightly higher than the areas around it.
- The clearing of the site should be done in phases as the construction progresses.
- Slopes produced by removing soil must be kept to a minimum to reduce the chances of erosion damage to the area.
- Soil should be handled when dry, to reduce compaction risk.
- During construction, sensitive soils with high risk of compaction (e.g. clayey soils) must be avoided by construction vehicles and equipment, wherever possible, in order to reduce potential impacts
- Institute a storm water management plan including temporary and permanent erosion control plans.
- Minimise bare areas-revegetate as soon as possible to prevent soil erosion
- Ensure that the development of the power line is restricted to the planned area to limit impacts on the wider area on the ecology and agricultural land (although the agricultural potential is low-medium)

10.2.3 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.

Project Phase	Impact: Loss of Archaeological, Cultural and social features								
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Earth moving and soil clearance	Destroy archaeological evidence and heritage and graves	Low-medium	Medium-high	Low	Low	Low-medium	Low	Medium-high

Mitigation measures – Construction and operational phases

Care must be taken during the construction process that if anything of archaeological value that is unearthed must be recorded. Please refer to the Heritage Impact Assessment (Appendix G). The archaeologist or SAHRA must be notified whenever anything of importance is discovered.
Current burial sites must be avoided and a buffer of at least 20m must be applied to these sites.

10.2.4 IMPACT OF THE DEVELOPMENT ON THE 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 (Appendix D & E) should be adhered to.

Operational phase

The operation of the development can have a negative impact on the biodiversity if the powerline with bird friendly devices are not maintained correctly.

Project Phase	Environmental Aspect: Ecology (Fauna and Flora)								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Earthworks and vegetation clearance at construction site	Loss of indigenous plant species & disturbance to sensitive habitat	Medium	Medium	Low-Medium	Medium	Medium-High	Low-medium	Medium
	Vegetation clearance and use of herbicides to control re-growth at different development areas	The eradication and control of exotic invasive plant species Loss of indigenous plant species	Medium	Medium	Medium	Low-Medium	Medium-High	Low-Medium	Medium
	The occurrence of veldt fires on site	Destruction of flora/habitats Loss of indigenous fauna	Medium-High	Medium	Medium	Medium-High	High	Medium	Medium-high
	Littering (e.g. cans and plastics) along access road and at construction site	Public nuisance and loss/death of indigenous fauna	Low-Medium	Medium	Medium	Medium-High	Medium	Low	Medium
	The control of animals on site Killing, poisoning or hunting of animals	Loss of indigenous fauna to the area	Medium-High	Medium	Medium	Medium	Low-Medium	Low-Medium	Medium
Operation	Pylons and powerline	Causing bird collisions	Medium	High	Medium	Low-Medium	Medium	Low-Medium	Medium
Cumulative Impacts	Increased potential negative impacts on ecology of the area	Increase in natural vegetation to be removed.	Medium-High	High	Medium-High	Medium-High	Medium	Low	Medium-High

Mitigation measures – Construction phase

- Clearance of vegetation should be restricted to the footprint area
- Construction activities should be restricted to development footprint.
- Care must be taken that unnecessary clearance of vegetation does not take place. Where possible, natural vegetation must be retained.
- The herbaceous layer should be revived after clearance of the vegetation and actively managed through slashing during the entire lifetime of the project.
- The herbicides used to control the invasive plant species should be chosen in consultation with an ecologist, as some of the agents might be detrimental to the surrounding indigenous fauna and flora.

- Poisons for the control of problem animals should rather be avoided since the wrong use thereof can have disastrous consequences for the raptors occurring in the area. The use of poisons for the control of rats, mice or other vermin should only be used after approval from an ecologist.
- Limit pesticide use to non-persistent, immobile pesticides and apply in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications.
- No Fires should be allowed within the construction camp and extra care should be taken to prevent veldt fires of occurring.
- Firebreaks should comply with the National Veldt and Forest Fire Act, 1998 (Chapter 4: Duty to Prepare and maintain firebreaks).
- Cleared areas should be rehabilitated by reintroducing a grass layer as soon as possible to limit the occurrence of erosion.
- The cleared vegetation may not be burned on site. The cleared vegetation should be stockpiled and distributed to the local communities.
- Solid waste must be kept in adequate animal proof waste bins at the construction camp and construction sites. Building rubble and various wastes should be removed on a regular basis to the closest available landfill site.
- Regular clean-up programs should be put into effect along the access road and throughout the premises 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. This can be done by restricting the height of the stockpiles, sandbagging and avoiding steep slopes.
- No animals may be killed, captured or hunted on site by construction workers. Do not feed any wild animals on site.
- Where trenches 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 trenches during construction process.
- Existing game (if found) on the developed area will be relocated when the proposed power line is developed. The relocation of the game will be done according to the relevant legislation.
- Cumulative impacts on the ecology of the area will not be significant. if the mitigation measures in place are adhered to. The potential is very low for significant negative impacts on the ecology of the area.
- The EMPr will have to be adhered to both during the construction phase and regular monitoring should be done to ensure that there is sound environmental practice at the powerline for the Bolobedu Solar Park.

Mitigation measures – Operational phase

- The high-risk sections of the power line should be marked with a suitable anti-collision marking device on the earth wire as per the Eskom guidelines.

10.2.5 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. The powerline will be in line with the Eskom substation and Bolobedu Solar Park development.

Operational phase

As a result of the size of the pylons and powerline for a 132kV powerline, mitigation is limited.

Project Phase	Impact: Visual disturbance								
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Pylons and powerline	Visual	Low	High	Low-Medium	High	High	Low-Medium	Medium
	Clearance of vegetation	Dust – Visual	Low-Medium	Medium	Low	Low	High	Low	Medium
	Lights	Visual	Low	Medium	Low-medium	Medium-high	High	Low-Medium	Medium
Operation	Pylons	Visual	Medium	High	Medium	High	High	Medium	Medium-High
	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	Low-Medium

Mitigation measures

- Only the footprint and a small “construction buffer zone” around the proposed components are exposed and the natural occurring vegetation, should be retained.
- Cumulative impacts will not be significant as the powerline will be over a short distance between the Eskom substation and the PV plant substation. The area is already used for electrical distribution infrastructure
- Ensure that dust suppressing techniques are in place at all times.
- Retain as much of the existing vegetation as possible.
- Where vegetation is cleared, a rehabilitation plan should be implemented. This should be done in conjunction with the Vegetation, Visual Impact and any other relevant specialists.
- Where possible and required, careful placement of new or transplanted vegetation should be planted in areas relevant to VSR site lines.
- Minimise the clearance of existing vegetation.
- Construction activities must be limited to daylight hours.
- In the case of monopoles earthy tones to greys with toned-down hues must be used instead of whites and creams.

10.2.6 SAFETY, SECURITY AND FIRE HAZARDS

Construction phase

Construction activities such as excavating of foundations and trenches, movement of construction vehicles, the use of equipment and the congregation of workers and staff on site further increases the risk of injury. The activities of construction personnel on site may contribute to an increase in the level of crime in the area and may also contribute to an increased fire risk.

Project phase	Impact: Safety, security and fire hazards								
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Construction activities – excavation of foundations, trenches etc.	Loss or injury to human life	Low-medium	Medium-high	Low	High	Medium	Low	Medium
	Security	Crime	Medium	Medium-high	Low-medium	Medium	Medium-high	Low - medium	Medium
	Fire hazards	Loss of human life and construction equipment etc.	High	Medium-high	Medium	Low	Low-Medium	Low-Medium	Medium
Cumulative Impacts	Higher number of people in the area increases safety risks	Potential for an increase in criminal activity	High	Medium	Medium -High	Low	Low	Low	Medium

Mitigation measures

- The Contractor shall conform to the Occupational Health and Safety act (Act 85 of 1993) and regulations. The Act requires the designation of a Health and Safety representative when more than 20 employees are employed.
- Open trenches or excavations must be marked with danger tape or safety netting.
- The number of construction workers to stay on site during construction should be limited to the minimum.
- Proper access control (I.D. cards) should be enforced to ensure that no authorised persons enter the site.
- No solid waste or vegetation may be burnt on the premises or surrounding areas.
- Firebreaks should comply with the National Veldt and Forest Fire Act, 1998 (Chapter 4: Duty to prepare and maintain firebreaks).
- Fire extinguishers and fire-fighting equipment must be available.
- A fence should be constructed along the boundary of the development.
- The cumulative impacts of this impact can be successfully mitigated if managed properly.

10.2.7 SOCIO-ECONOMIC IMPACT

Construction phase

The construction and operation phase of the development will have a positive impact on the socio-economic environment of beneficiary communities through employment opportunities and training and skills development. The adjacent Bolobedu solar plant will not be able to function without the transmission line to the Eskom substation and therefore, all opportunities linked to the development of the solar plant is linked to the development of the powerline.

Project phase	Impact: Job creation								
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Development	Job creation	Job Creation	High +	High +	Medium-high +	High +	High +	N/A	High +
Operation	Local Community development	Local Community development	High +	High +	high +	High +	High +	N/A	High +
Cumulative impacts	Increased potential for job creation.	Increased potential for local Community development	High +	High +	high +	High +	High +	N/A	High +

Mitigation measures

- During the construction and operational phases, jobs must be created for unemployed local people and skills must be transferred to them.
- Where viable, the work must be executed in a labour-intensive manner to create as many jobs possible.
- The cumulative impact of this impact is positive. As one of the poorest provinces in South Africa, the Limpopo Province is definitely in need of more job opportunities.

10.3 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:

i. Visual impacts
ii. Heritage impacts
iii. Impacts of veld fires on fauna & flora
iv. Job creation (Positive impact)

This impact will now briefly be discussed.

10.3.1 CUMULATIVE IMPACTS

i. The Eskom substation is already in place and a number of high voltage powerlines run from this substation. The transmission line from the Eskom substation to the PV plant will add to the electricity infrastructure in the area.
ii. There are burial sites at the PV power plant, as well and will be relocated. With consultation with the local community the same can be applied to these burial sites, but only with the permission of the local community.
iii. Increased activity in the area and the uncontrolled movement of people can lead to an increase in the possibility of veld fires and with the development with the powerline together with the PV power plant there might a cumulative impact.
iv. Job creation will be cumulative once the community projects are implemented.

10.3.2 NATURE OF IMPACT

i. This is an impact that is not easily mitigated as a result of the size and magnitude of the 132kV powerline and associated pylons.
ii. Impact could involve displacement or destruction of the burial sites.
iii. Impact could endanger the safety of people living and walking in the area and grazing land adjacent to the development site might be at risk.
iv. Local communities will benefit in various ways, including job opportunities, skills development and other projects, specifically designed for the local communities needs and requirements.

10.3.3 EXTENT AND DURATION OF IMPACT

i. The extent is only on the development area and duration is for the life of the development.
ii. The extent is local, and the duration is permanent.
iii. The extend is local and the duration will be temporary, during the construction phase.
iv. Extent is local and the duration is for the life of the development.

10.3.4 PROBABILITY OF OCCURRENCE

i. The probability is possible.
ii. It is improbable if the current powerline route is followed. However, if another route is followed the probability will change to definite.
iii. It is probable that veld fires could be started if workers and staff on site are not prevented to do so.
iv. The probability of occurrence is extremely high.

10.3.5 DEGREE TO WHICH IMPACT CAN BE REVERSED

i. Impact is reversible if decommissioning of the line takes place and / or if the line is installed underground.
ii. Impact is non-reversible.
iii. Impact is reversible if the impact is only ecological, but if human loss is involved, the impact will be non-reversible.
iv. Impact should not be reversed.

10.3.6 DEGREE TO WHICH IMPACT CAN CAUSE IRREPLACEABLE LOSS OF RESOURCE

i. This impact will not lead to an irreplaceable loss of any resources.
ii. If this impact is not mitigated, it can lead to an irreplaceable loss of a resource.
iii. The ecological resource is replaceable but human life is not.
iv. This impact will not lead to an irreplaceable loss of any resources.

10.3.7 DEGREE TO WHICH IMPACT CAN BE MITIGATED

i. Successful mitigation is possible
ii. Successful mitigation is possible
iii. Successful mitigation is possible
iv. This impact will not lead to an irreplaceable loss of any resources.

11 SUMMARY AND FINDINGS AND RECOMMENDATIONS OF SPECIALIST REPORTS AND HOW THESE FINDINGS HAVE BEEN INCLUDED IN THE FINAL ASSESSMENT REPORT

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

- Visual impacts
- Impact on biodiversity (bird collisions)
- Agricultural land availability
- Burial sites

Visual Impacts

The powerline will have a visual impact, but the powerline itself will be in line with activities and developments in the immediate area (Eskom substation and PV power plant).

Impact on biodiversity (bird collisions)

Eskom-approved, bird friendly devices should be attached to powerline to act as a deterrent for birds and to prevent fatal collisions, especially for larger birds.

Agricultural land availability

There is currently substance farming in the area conducted by members of the local communities. As part of the resolution process and social consultation process there will be compensation structure in place, which will be managed and administered by the Modjadji Traditional Council

Burial sites

There are burial sites on the study area but will be avoided if the current, preferred route for the power line is followed. Buffer areas of at least 20m will be established around the burial sites.

12 ENVIRONMENTAL IMPACT STATEMENT

12.1 SUMMARY KEY FINDINGS OF THE EIA

It can be concluded that there will be environmental impacts as a result of the proposed development of the Bolobedu 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 FINAL PROPOSED ALTERNATIVES RESPONDING TO THE IMPACT MANAGEMENT MEASURES, AVOIDANCE AND MITIGATION MEASURES IDENTIFIED IN THE 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 is 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
- Agricultural land availability – social consultation with traditional authorities and applicable government department.
- Degradation of burial sites.

14 ASPECTS WHICH WERE CONDITIONAL TO THE FINDINGS OF THE ASSESSMENT BY THE EAP OR SPECIALISTS WHICH ARE TO BE INCLUDED AS CONDITIONS OF AUTHORISATION

- Archaeological discoveries:
  If anything of archaeological significance is found, the archaeologist and SAHRA must be notified immediately.
  Strict monitoring should be done during the construction phase.
- Eskom-approved; bird friendly devices must be attached to the powerline to avoid bird collisions.
- Agricultural land availability – social consultation should be followed with traditional authorities and applicable government department departments.

15 ASSUMPTIONS UNCERTAINTIES AND GAPS IN KNOWLEDGE

The Bolobedu PV Solar Park obtained environmental authorization from the DEA. However, without a connection to the Eskom grid, it will serve no purpose.

16 UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP

I, Engela Grobler, appointed EAP for the proposed Bolobedu Solar Park application for Environmental Authorization, 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.

Signed …… Date…3 March 2020…….

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