



Site Sensitivity Verification Report

14/12/16/3/3/2/2301

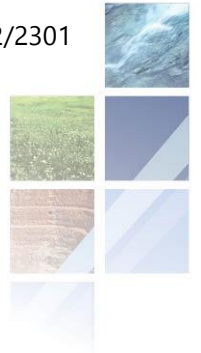
PROPOSED 275kV POWERLINE FOR THE CONNECTION OF FIVE MOPANE SOLAR PV PARKS (MOPANE CLUSTER) TO THE ESKOM CARMEL SUBSTATION, LOCATED IN THE MERAUFONG CITY LOCAL MUNICIPALITY, WEST RAND DISTRICT MUNICIPALITY, NORTH-WEST PROVINCE  
Short name: MOPANE POWERLINE

June 2023

Commissioned by: Voltalia South Africa (Pty) Ltd  
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**PROPOSED 275kV POWERLINE FOR THE CONNECTION OF FIVE MOPANE SOLAR PV PARKS (MOPANE CLUSTER) TO THE ESKOM CARMEL SUBSTATION, LOCATED IN THE MERAFOONG CITY LOCAL MUNICIPALITY, WEST RAND DISTRICT MUNICIPALITY, NORTH-WEST AND GAUTENG PROVINCE**  
**Short name: MOPANE POWERLINE**

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|                     | Gauteng Department of Agriculture and Rural Development(GDARD)        |
| Municipal Manager   | West Rand District Municipality                                       |
| Municipal Manager   | Merafong City Local Municipality                                      |
|                     | South African Heritage Resources Agency (SAHRA)                       |
|                     | Eskom Land & Rights   |
|                     | Registered Interested and Affected Parties (I&AP's)                   |

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**ABBREVIATIONS AND ACRONYMS**

|                       |   |
|-----------------------|---|
| AGES                  | Africa Geo-Environmental and Engineering Services (Pty) Ltd   |
| BID                   | Background Information Document   |
| CO                    | Carbon Monoxide   |
| CO <sub>2</sub>       | Carbon Dioxide  |
| CSP                   | Concentrating Solar Power   |
| DALRRD                | Department of Agriculture, Land Reform and Rural Development  |
| DFFE                  | National Department of Forestry, Fisheries and the Environment  |
| DMR                   | Department of Mineral Resources   |
| DME                   | Department of 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  |
| 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              | Remainder of the farm Douglasdale 95 IQ, Portion 2 of the farm Rooidraai 85 IQ (JB Marks Local Municipality, Dr Kenneth Kaunda District Municipality, North-West Province) and Portion 12 of the farm Blaauwbank 125 IQ (Merafong City Local Municipality, West Rand District Municipality, Gauteng Province) |
| Project site          | Ptn 12 of Blaauwbank 125 IQ, Rem & Ptn 1 of Wilverdiend 754 IQ, Ptn 2, 3, 4, 12, 18 & 19 of Varkenslaagte 119 IQ and Ptn 23 & 28 of Doornfontein 118 IQ (Merafong City Local Municipality, West Rand District Municipality, Gauteng Province)PV Photovoltaic  |
| RFP                   | Request for Qualification and Proposals for New Generation Capacity under the IPP Procurement Programme   |
| REIPPPP               | Renewable Energy IPP Procurement Programme  |
| RMIPPPP               | Risk Mitigation IPP Procurement Programme   |
| SAHRA                 | South African Heritage Resources Agency   |
| SANRAL                | South African National Roads Agency Limited   |
| SANS                  | South African National Standard   |
| Voltalia South Africa | Voltalia South Africa (Pty) Ltd (Applicant)   |

## 1. INTRODUCTION

VOLTALIA SOUTH AFRICA (PTY) LTD is proposing the establishment of one (1) new 275kV powerline for the connection of five (5) renewable energy generation facilities (Photovoltaic Power Plants) with associated infrastructure and structures on the Remainder of the farm Douglasdale 95 IQ and Portion 2 of the farm Roodraai 85 IQ, JB Marks Local Municipality, Dr Kenneth Kaunda District Municipality, North-West Province and Ptn 12 of the farm Blaauwbank 125 IQ, Merafong City Local Municipality, West Rand District Municipality, Gauteng Province.

The five (5) renewable Photovoltaic (PV) Power Plants will be connected to the Eskom grid via one new 275kV powerline (Mopane Powerline) between the five (5) proposed solar parks and the Eskom Carmel Main Transmission Substation (MTS). The Eskom Carmel MTS is located 11.5 km South-East of the project site, on Portion 23 of the Farm Doornfontein 118 IQ.

The name of the proposed facility will be MOPANE 275kV POWERLINE.

The geographical co-ordinates of the preliminary alignments of the 275kV 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 collector            | 26°22'55.02"S                        | 27°11'41.79"E                         | 0.00 km                |
| P02 Powerline turning point  | 26°22'55.80"S                        | 27°11'40.45"E                         | 0.04 km                |
| P03 Powerline turning point  | 26°23'0.92"S                         | 27°11'43.56"E                         | 0.22 km                |
| P04 Powerline turning point  | 26°22'16.45"S                        | 27°12'37.27"E                         | 2.22 km                |
| P05 Powerline turning point  | 26°22'17.89"S                        | 27°12'38.11"E                         | 2.27 km                |
| P06 Powerline turning point  | 26°22'20.98"S                        | 27°13'38.42"E                         | 3.95 km                |
| P07 Powerline turning point  | 26°23'46.24"S                        | 27°14'30.21"E                         | 6.95 km                |
| P08 Powerline turning point  | 26°24'00.45"S                        | 27°15'53.40"E                         | 9.3 km                 |
| P09 Powerline turning point  | 26°24'38.95"S                        | 27°17'07.50"E                         | 11.6 km                |
| P10 Powerline turning point  | 26°25'25.83"S                        | 27°17'59.34"E                         | 13.60 km               |
| P11 Powerline turning point  | 26°25'23.06"S                        | 27°18'06.36"E                         | 13.82 km               |
| P12 Powerline turning point  | 26°25'28.58"S                        | 27°18'11.20"E                         | 14.05 km               |
| P13 Powerline turning point  | 26°25'29.32"S                        | 27°18'16.39"E                         | 14.21 km               |
| P14 Powerline turning point (Within Carmel MTS)                        | 26°25'26.76"S                        | 27°18'19.20"E                         | 14.36 km               |
| P15 point of connection to a new 275kV bus-bay at the Eskom Carmel MTS | 26°25'26.68"S                        | 27°18'21.05"E                         | 14.4 km                |



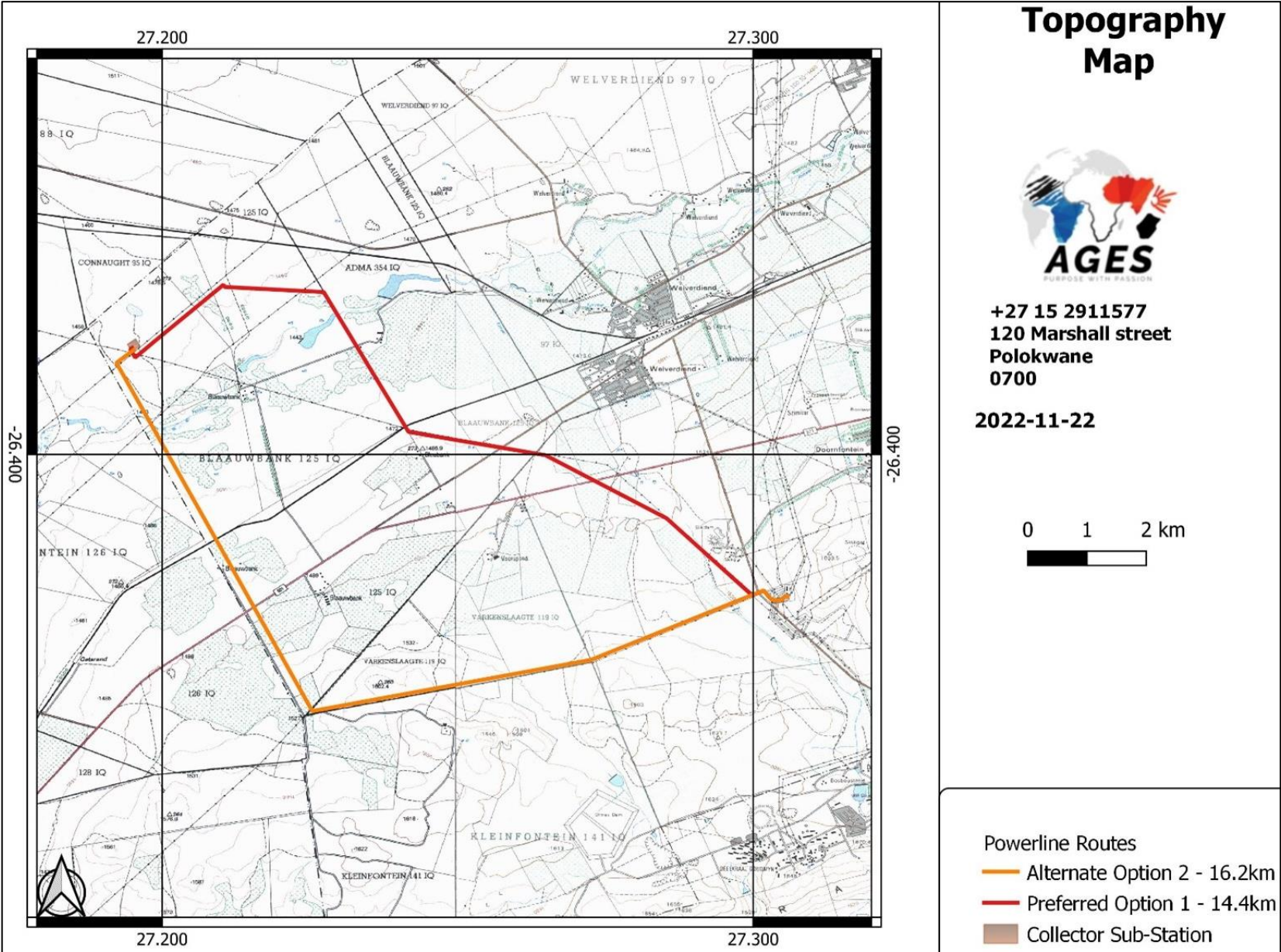


Figure 1. Topographical map of the Mopane Powerline project area



Figure 2. Regional location map of the Mopane Powerline project area

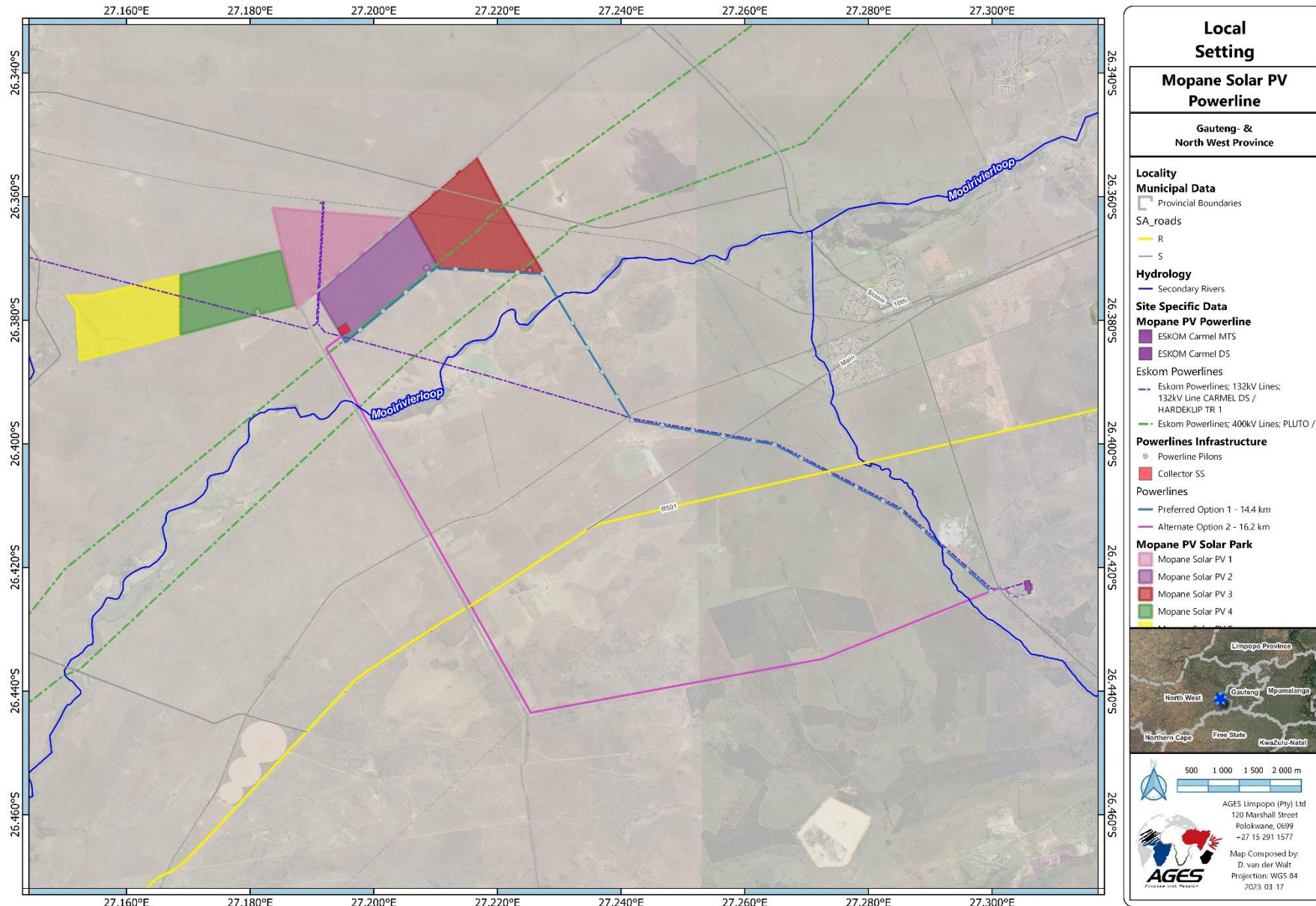


Figure 3. Aerial view map of the Mopane Powerline project area

## 2. PURPOSE OF THE REPORT

AGES Limpopo (Pty) Ltd was appointed by Voltalia South Africa (Pty) Limited to undertake the required Environmental Authorisation (EA) application process in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) promulgated under the National Environmental Management Act, 1998 (No. 107 of 1998; NEMA), for the proposed Mopane Powerline.

A Screening Tool Report for the proposed **Mopane Powerline** was generated as part of the EA application process. According to the Screening Tool Report, the following specialist assessments were identified and recommended to be undertaken as part of the environmental impact assessment (EIA) process:

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

In accordance with the Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of NEMA, this Site Sensitivity Verification Report (SSVR) was compiled to provide a rationale for the specialist studies undertaken as part of the environmental impact assessment (EIA) process.

### 3. DESKTOP ANALYSIS

The site is located within the C23E and C23G quaternary catchment and is situated in the Upper Vaal Water Management Area. Drainage occurs as sheet-wash into the drainage channels and wetlands on site that eventually drains into the major river namely the Mooi River and Mooiriviersloop River that bisect the project area.

The study area is situated within the summer and autumn rainfall region with very dry winters and frequent frost that occurs during the colder winter months. The climate for the region is warm-temperate, with overall mean annual precipitation of 593mm. The mean annual temperature for the area is 16.1°C, and the mean annual frost days is 37 days. Mean Annual Potential Evaporation is 2407mm, with Mean Annual Soil Moisture Stress of 78%.

The land type unit represented within the study area include the Fa14 and Fb15 land types (Land Type Survey Staff, 1987) (ENPAT, 2001). consisting of dolomite and chert of the Chuniespoort Group; chert gravels are abundant on middle and footslopes including valley bottoms where shales are present. Soils associated with the site vary between slightly deeper, loamy red apedal soils, to shallow rocky soils. The wetland areas are characterised by black clayey soils.

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 1460 meters above mean sea level (AMSL).

Most properties situated within a 500m radius are being used for livestock grazing and crop cultivation. The proposed development land is used for livestock farming at present. The natural vegetation of the varies from intact to planted pastures.

The most recent classification of the area by Mucina & Rutherford (2006) shows that the site is classified as Carletonville Dolomite Grassland with small pocket of Gauteng Shale Mountain Bushveld along the alternative power line route. Carletonville Dolomite Grasslands (Gh15) are predominantly found in the North West Province, in the regions around Potchefstroom, Ventersdorp and Carletonville. Vegetation and Landscape Features Carletonville Dolomite Grasslands occur on slightly undulating plains which are typically intersected by rocky chert ridges. They are species rich and according to Mucina and Rutherford (2006), dominated by many plant species.

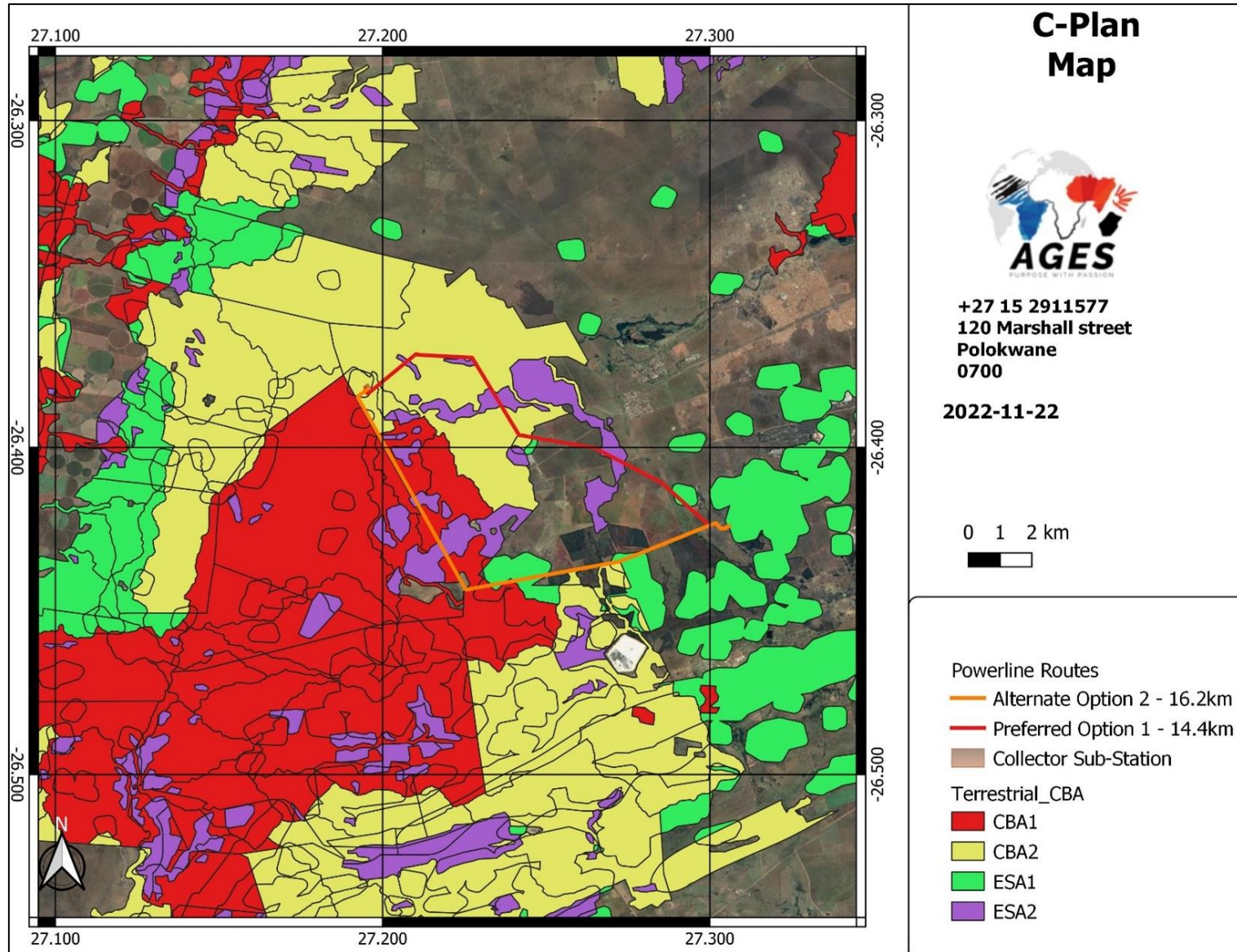


Figure 4. Location of CBA1, CBA2, ESA1 and ESA2 areas relative to the project area (Gauteng C-Plan map 2015)

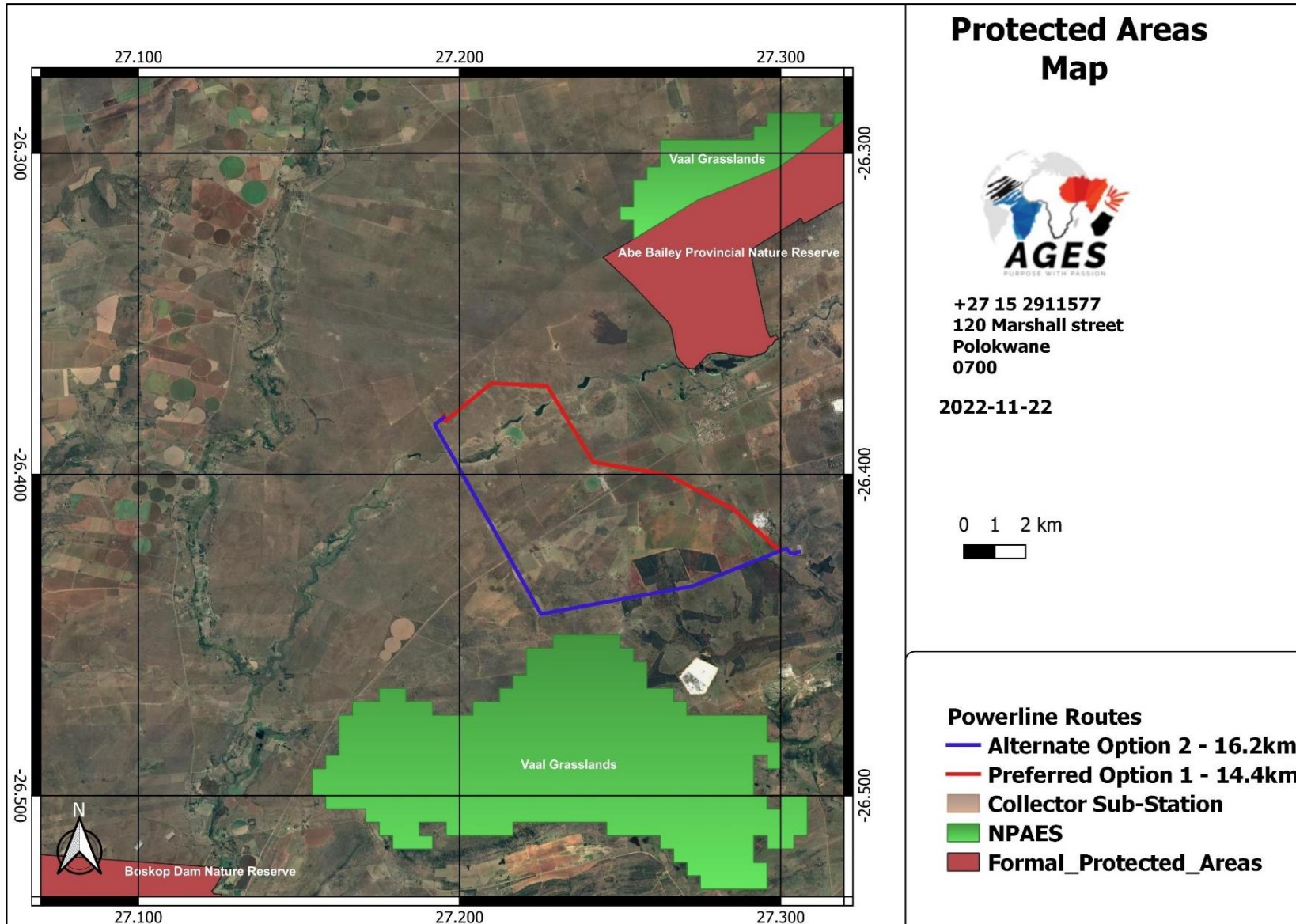


Figure 5. Location of the project area in relation to listed protected areas.

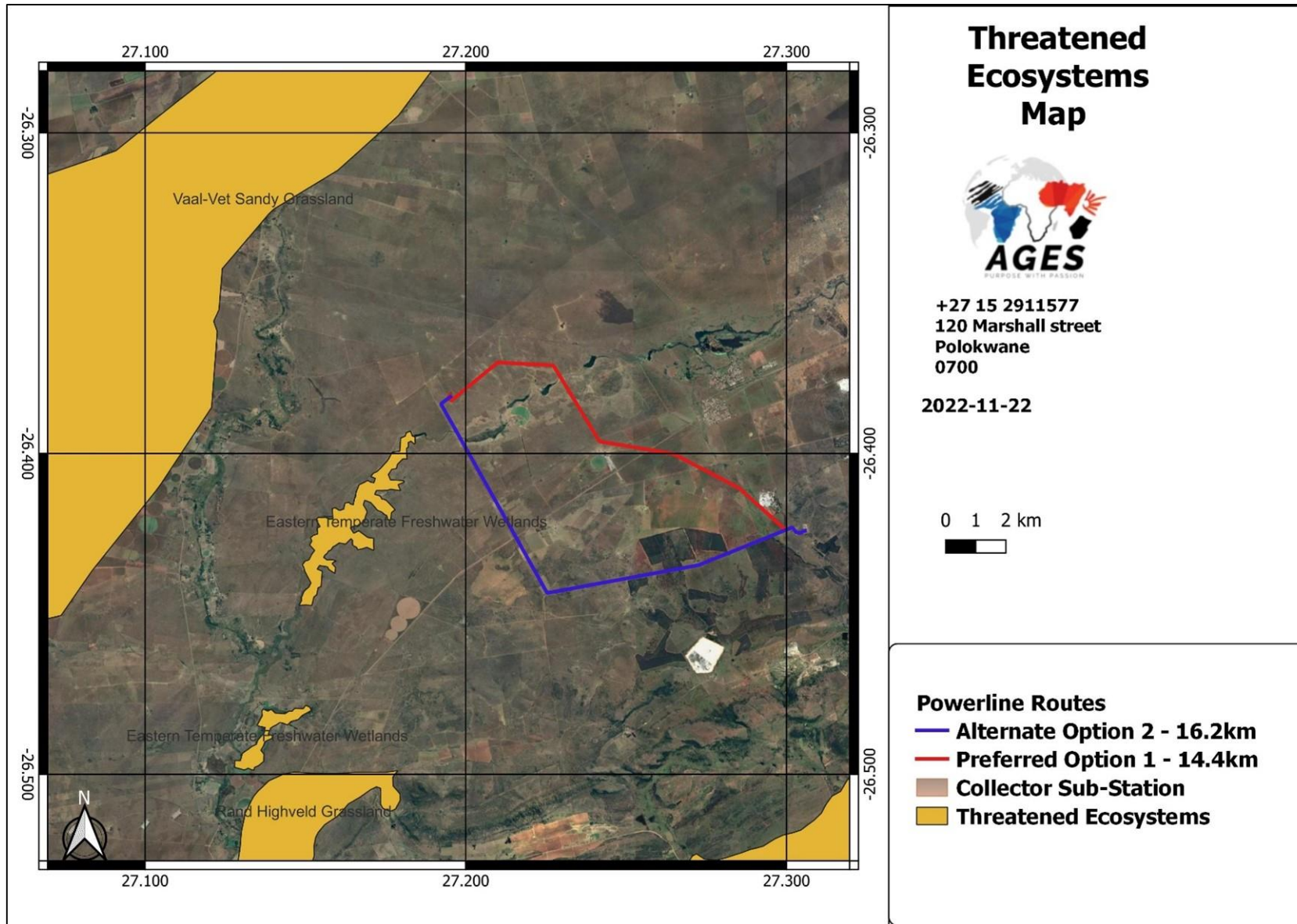


Figure 6. Listed threatened ecosystems in proximity to the proposed development site (SANBI).



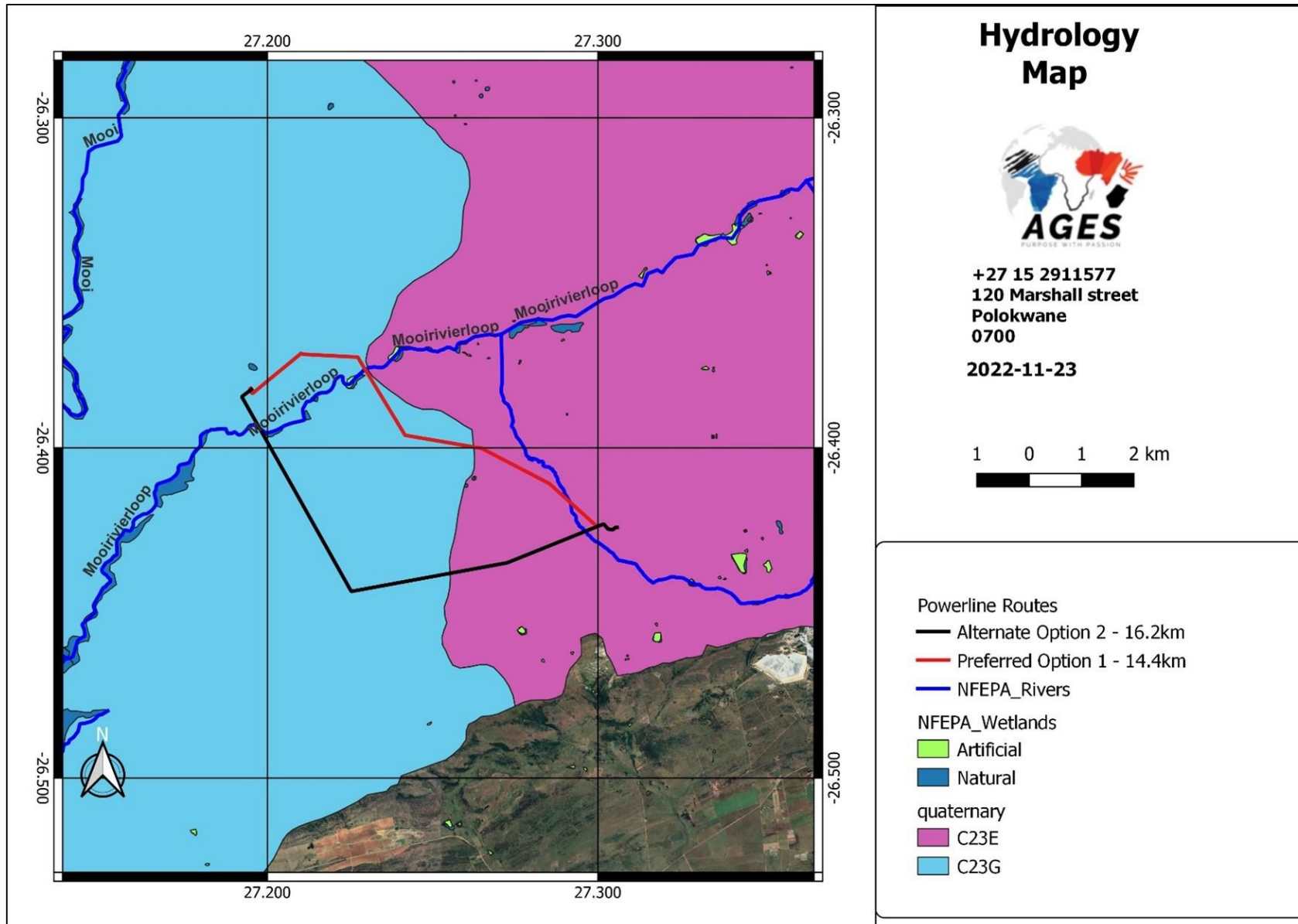


Figure 7. Location of the project area in relation to NFEPA Rivers and SWSA

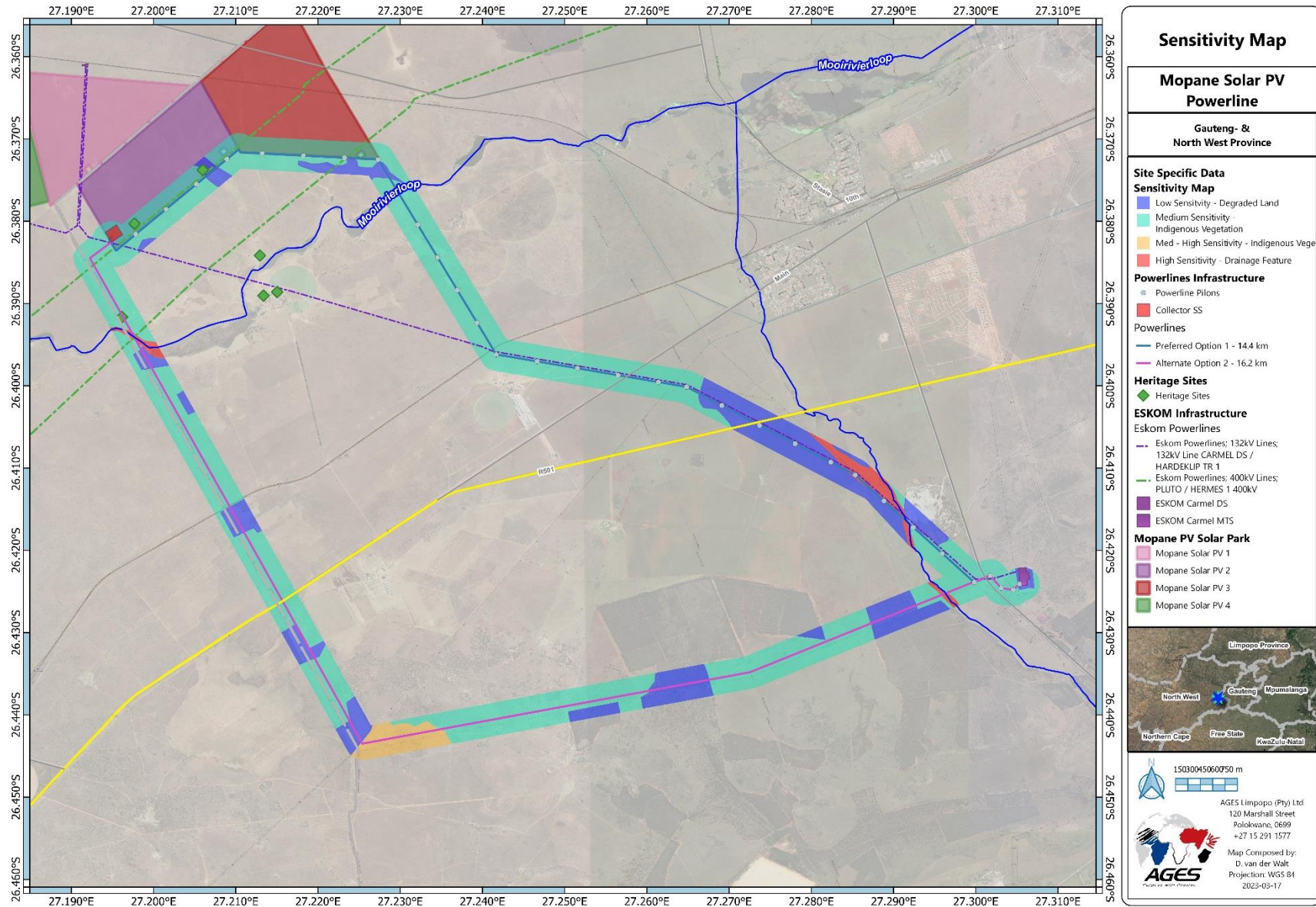


Figure 8. Sensitivity Map

#### 4. SITE ASSESSMENT

Desktop analysis and field-based surveys of the project site were undertaken by the following specialists between October 2022 and March 2023:

|  |                                   |
|--|-----------------------------------|
| Agro-Ecosystem                           | Dr B Henning                      |
| Avifauna                                 | Kemp Operations                   |
| Aviation                                 | Tappas Aviation Consultant        |
| Aquatic Biodiversity                     | Scientific Aquatic Services       |
| Geotechnical Investigation (Preliminary) | AGES                              |
| Heritage Impact Assessment               | Beyond Heritage                   |
| Noise                                    | Enviro-Acoustic Research          |
| RFI & Defence                            | PF Smuts                          |
| Terrestrial Biodiversity                 | Dr B Henning                      |
| Visual Impact Assessment                 | Graham Young Landscape Architects |

This Site Sensitivity Verification Report has used the information collected by the above-mentioned specialists to confirm or dispute (as may be applicable) the environmental sensitivity ratings identified by the National Screening Tool. A copy of the Screening Report is attached as Annexure T of the Consultation (Draft) Environmental Impact Assessment Report. The specialist assessments/theme and sensitivity ratings identified by the Screening Tool are summarised in Table 2 below.

Table 2. Specialist Assessments/themes and Sensitivity Ratings identified by DFFE Web-based Screening Tool

| Specialist Assessment / Theme   | Sensitivity rating as per Screening Report | Sensitivity rating as per Specialist Verification | Annexure |
|---|--|---|----------|
| <b>AGRICULTURAL</b>   | <b>High</b>                                | <b>Medium</b>                                     | <b>K</b> |
| <b>Rationale for and Results of Specialist Assessments</b>  |  |   |          |
| <p>The main purpose of this study was to assess the agricultural potential and value of the soil types on the site. This assessment is essential as it will contribute to meeting the requirements of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) in compliance with Gazette No. 43310 Government Notice R320.</p> <p>According to the national web-based environmental screening tool in terms of National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998), the site has a Medium or High Sensitivity from an Agricultural perspective. A site visit was therefore conducted to determine if a compliance statement would be sufficient.</p> <p>After the site visit the following was concluded:</p> <p>The areas located outside the urban edge have a Medium to Low Sensitivity from an Agricultural perspective due to the layout plan of the powerline impacting only along a limited area (linear activity) with very limited impacts anticipated on deep, sandy soils to deeper, more fertile red apedal soils on slightly undulating terrain. An Agricultural Agro-Ecosystem Impact Assessment was conducted according to the guidelines and criteria set by the National Department of Agriculture and the NEMA regulations. The study included a detailed soil assessment and interpretation.</p> <p>The results obtained from the study were done after field observations, 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 potential for arable agriculture considering the climatic conditions, soil physical characteristics and size of land potentially available.</p> |  |   |          |
| <b>Landscape/Visual</b>   | <b>None provided</b>                       | <b>Moderate-Low</b>                               | <b>J</b> |
| <b>Rationale for and Results of Specialist Assessments</b>  |  |   |          |
| <p>In accordance with Government Notice No. 320 of 20 March 2020, "Site sensitivity verification requirements where a specialist assessment is required but no specific assessment protocol has been prescribed" a site sensitivity verification which complies with Appendix 6 of the EIA Regulations was compiled. However, to document the visual baseline environment, identify and assess visual impacts and ensure that the visual/aesthetic consequences of the proposed project are understood, a comprehensive VIA was compiled.</p> <p>The intervisibility and the Project along with the other solar PV projects proposed in the sub-region, would over time, result in the nature and character of the study being impacted in a manner beyond the anticipated moderate negative impact of the proposed Project alone.</p> <p>The significance of the cumulative impact of these projects on the visual environment during their operational phases is assessed to have a moderate intensity and over the long-term with an unmitigated sub-regional impact extending beyond the site (to at least 3,0km beyond the site boundaries) and is assessed to be MODERATE</p>   |  |   |          |
| <b>Archaeological and Cultural Heritage</b>   | <b>Low</b>                                 | <b>Low</b>  | <b>G</b> |
| <b>Rationale for and Results of Specialist Assessments</b>  |  |   |          |
| <p>Subject to the National Heritage Resources Act, 1999, Act 25 of 1999, section 38, a Heritage Impact Assessment is required as the proposed development footprint and associated infrastructure. Appendix 6 of the GNR 326 Environmental Impact Assessment (EIA) Regulations published on 7 April 2017 provides the requirements for specialist reports undertaken as part of the environmental authorisation process.</p> <p>An Archaeological and Cultural Heritage Impact Assessment conducted on 20 December 2022.</p> <ul style="list-style-type: none"> <li>The topography of the study area is undulating with no major topographic features (such as pans or shelters) that would have been focal points for human activity in antiquity. However, chert outcrops mean that readily available raw material for lithic manufacture resulted in a background scatter (Orton 2016) of expediently knapped Stone Age artefacts to be present across the greater area attesting to some human occupation from the MSA onwards;</li> <li>During the survey no Earlier Stone Age material was noted and although few diagnostic pieces were recorded in the low-density open-air scatters, the lithics suggest human occupation of the area from the MSA onwards of the area the powerline traverse;</li> <li>Identified features affected by Option 2 are stone-walled enclosures;</li> </ul>   |  |   |          |

- Due to access restrictions portions of the powerline options were not subjected to fieldwork mostly because of landowner consent that is not in place and will only be confirmed after the preferred option is determined;
- From a heritage perspective both Power Line options are viable.

The impact on heritage resources is low, and the project can commence provided that the recommendations in the report are adhered to, based on the South African Heritage Resource Authority (SAHRA) 's approval.

With the implementation of the recommendations in this report the proposed project will have a low cumulative impact as no significant heritage resources will be adversely affected.

Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted on, but this cannot be quantified.

|                      |                  |            |          |
|----------------------|------------------|------------|----------|
| <b>Palaeontology</b> | <b>Very high</b> | <b>Low</b> | <b>H</b> |
|----------------------|------------------|------------|----------|

**Rationale for and Results of Specialist Assessments**

The palaeontological sensitivity of the study area is rated as very high by the South African Heritage Resources Agency (SAHRA), (<https://sahris.sahra.org.za/>), indicating that a field assessment and protocol for finds is required. To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) and in accordance with Government Notice No. 320 of 20 March 2020, "Site sensitivity verification requirements where a specialist assessment is required but no specific assessment protocol has been prescribed" a site sensitivity verification which complies with Appendix 6 of the EIA Regulations was compiled. The site visit and walk through in December 2022 (summer) by the palaeontologist confirmed that dolomites were common in the area but mostly covered by shallow soils. The proposed route for the grid connection is on weathered dolomites, cherts and soil.

There were NO TRACE FOSSILS such as stromatolites along the route. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr. It is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, developer, environmental officer or other designated responsible person once excavations for pole foundations or solar collector and infrastructure have commenced. Since the impact will be low, as far as the palaeontology is concerned, the project should be authorised.

There is no preferred route based on the palaeontological heritage.

|                                 |                  |                      |          |
|---------------------------------|------------------|----------------------|----------|
| <b>Terrestrial Biodiversity</b> | <b>Very high</b> | <b>High - Medium</b> | <b>D</b> |
|---------------------------------|------------------|----------------------|----------|

**Rationale for and Results of Specialist Assessments**

The Species Environmental Impact Assessments Guideline has been developed in support of the Terrestrial Biodiversity, Plant and Animal Species protocols that were gazetted 30th October 2020 (Government Notice number 1150).

According to the national web-based environmental screening tool in terms of National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998), the site has the following sensitivities:

- Terrestrial Biodiversity: Very High or LOW Sensitivity
- Animal Species Theme: Medium or High Sensitivity
- Plant Species Theme: Medium or Low Sensitivity

A pre-screening site visit was therefore conducted to determine if the assessment was accurate and if the studies recommended should be conducted. After the site visit the following was concluded:

- The site has a HIGH Sensitivity from a terrestrial biodiversity perspective due to the presence of indigenous woodland with protected tree species.
- The site has a Medium Sensitivity from an Animal Species Theme Perspective due to the presence of natural fauna habitats.
- The site has a Medium Sensitivity from a Plant Species Theme Perspective due to the presence of indigenous woodland with protected tree species.

After the assessment, it was concluded that a detailed terrestrial biodiversity, plant species theme and animal species theme assessment should be conducted.

|                      |               |               |          |
|----------------------|---------------|---------------|----------|
| <b>Plant species</b> | <b>Medium</b> | <b>Medium</b> | <b>D</b> |
|----------------------|---------------|---------------|----------|

These requirements will be addressed as part of the Terrestrial Biodiversity Impact Assessment conducted.

|                       |             |               |          |
|-----------------------|-------------|---------------|----------|
| <b>Animal species</b> | <b>High</b> | <b>Medium</b> | <b>D</b> |
|-----------------------|-------------|---------------|----------|

These requirements will be addressed as part of the Terrestrial Biodiversity Impact Assessment conducted.

| <b>Aquatic Biodiversity</b>   | <b>Very high</b>                 | <b>Low-Medium</b>  | <b>F</b>          |                                    |            |                    |            |                        |                                 |                               |                   |                   |                                    |                                 |                                  |                    |                   |                                    |
|---|----------------------------------|--------------------|-------------------|------------------------------------|------------|--------------------|------------|------------------------|---------------------------------|-------------------------------|-------------------|-------------------|------------------------------------|---------------------------------|----------------------------------|--------------------|-------------------|------------------------------------|
| <b>Rationale for and Results of Specialist Assessments</b>  |                                  |                    |                   |                                    |            |                    |            |                        |                                 |                               |                   |                   |                                    |                                 |                                  |                    |                   |                                    |
| <p>The Department of Forestry, Fisheries and the Environment (DFFE) National Web-based Environmental Screening Tool (2020), provides the criteria for the assessment and reporting of impacts on aquatic/freshwater biodiversity for activities requiring EA. The DFFE Web-based Environmental Screening Tool has designated the study area as being of very high aquatic biodiversity sensitivity.</p> <p>In terms of Government Gazette 43110, Government Notice 320 of 20 March 2020 "PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON AQUATIC BIODIVERSITY" the assessment took the following approach:</p> <ul style="list-style-type: none"> <li>• A desktop study was conducted, in which possible freshwater ecosystems were identified for on-site investigation, and relevant national and provincial databases were consulted;</li> <li>• The field assessment took place on the 10th and 14th of November 2022 during which two channelled valley-bottom wetlands were identified that are crossed by the proposed powerline options.</li> </ul> <p>The purpose of this report is to define the ecology of the freshwater ecosystems associated with the study and associated investigation area (defined as a 500 m radius around the various components that form part of the study area, in line with GN 509 as it relates to the National Water Act, 1998 (Act No. 36 of 1998) as amended in terms of freshwater characteristics, including mapping of the freshwater ecosystems, defining areas of increased Ecological Importance and Sensitivity (EIS) and defining the Present Ecological State (PES) of the freshwater ecosystems associated with the study area. The report also aims to define the socio-cultural and ecological service provision of the freshwater ecosystems and additionally outlines the Recommended Ecological Category (REC), Recommended Management Objective (RMO) and Best Attainable State (BAS) for the freshwater ecosystems.</p> <p>Two alternative options are proposed. Option 1 consist of a 14.4km overhead powerline which is located to the west of powerline option 2 and mostly runs in parallel with an existing powerline connected to the Carmel substation. Option 2 consists of a 16.2km overhead powerline which runs along an informal gravel road, southwest and then northwest across numerous farm portions.</p> <p>The site assessment confirmed the presence of two channelled valley bottom freshwater ecosystems that are traversed by the proposed powerline alternatives. The results of the assessment are summarised in the table below:</p> <table border="1"> <thead> <tr> <th><b>Freshwater ecosystem</b></th> <th><b>PES</b></th> <th><b>Ecoservices</b></th> <th><b>EIS</b></th> <th><b>REC / RMO / BAS</b></th> </tr> </thead> <tbody> <tr> <td>Channelled Valley-Bottom (CVB1)</td> <td>Category D (Largely Modified)</td> <td>Moderate-Very Low</td> <td>Category B (High)</td> <td>REC: D; BAS: B, RMO: C/D (Improve)</td> </tr> <tr> <td>Channelled Valley-Bottom (CVB2)</td> <td>Category C (Moderately Modified)</td> <td>Very High-Very Low</td> <td>Category B (High)</td> <td>REC: C; BAS: B, RMO: B/C (Improve)</td> </tr> </tbody> </table> <p>Following the freshwater ecosystem assessment, the DWS Risk Assessment Matrix (2016) was applied to determine the significance of impacts of the proposed development on the receiving freshwater environment. The activities associated with the construction and operation of all the proposed powerline alternatives pose a "Low" risk significance to the freshwater ecosystems within the study and investigation areas, provided that the supporting structures are placed outside the 10 m buffer (determined using the buffer tool developed by Macfarlane et al. (2017)) around the freshwater ecosystem boundaries.</p> |                                  |                    |                   | <b>Freshwater ecosystem</b>        | <b>PES</b> | <b>Ecoservices</b> | <b>EIS</b> | <b>REC / RMO / BAS</b> | Channelled Valley-Bottom (CVB1) | Category D (Largely Modified) | Moderate-Very Low | Category B (High) | REC: D; BAS: B, RMO: C/D (Improve) | Channelled Valley-Bottom (CVB2) | Category C (Moderately Modified) | Very High-Very Low | Category B (High) | REC: C; BAS: B, RMO: B/C (Improve) |
| <b>Freshwater ecosystem</b>   | <b>PES</b>                       | <b>Ecoservices</b> | <b>EIS</b>        | <b>REC / RMO / BAS</b>             |            |                    |            |                        |                                 |                               |                   |                   |                                    |                                 |                                  |                    |                   |                                    |
| Channelled Valley-Bottom (CVB1)   | Category D (Largely Modified)    | Moderate-Very Low  | Category B (High) | REC: D; BAS: B, RMO: C/D (Improve) |            |                    |            |                        |                                 |                               |                   |                   |                                    |                                 |                                  |                    |                   |                                    |
| Channelled Valley-Bottom (CVB2)   | Category C (Moderately Modified) | Very High-Very Low | Category B (High) | REC: C; BAS: B, RMO: B/C (Improve) |            |                    |            |                        |                                 |                               |                   |                   |                                    |                                 |                                  |                    |                   |                                    |
| <b>Civil Aviation (Powerline)</b>   | <b>High</b>                      | <b>Low</b>         | <b>L</b>          |                                    |            |                    |            |                        |                                 |                               |                   |                   |                                    |                                 |                                  |                    |                   |                                    |
| <b>Rationale for and Results of Specialist Assessments</b>  |                                  |                    |                   |                                    |            |                    |            |                        |                                 |                               |                   |                   |                                    |                                 |                                  |                    |                   |                                    |
| <p>The applicant intends to undertake an activity identified in the scope of the Protocol for the Specialist Assessment and minimum Report Content Requirements for Environmental Impacts on Civil and Military Aviation Installations.</p> <p>Tappas Aviation Consultant undertook a safeguarding assessment for the proposed five (5) renewable energy generation facilities and the two (2) proposed Power Lines in the vicinity of Carletonville Airport (FACR).</p> <p>The report was compiled in accordance with Government Gazette 43110, Government Notice no. 320 of 20 March 2020 "PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON CIVIL AVIATION INSTALLATIONS".</p> <p>Carletonville Airport and the project area was visited from 10 to 12 November 2022 for inspection and consulting with people involved with Carletonville Airport and the Johannesburg Sky Diving Club.</p> <p>There are no Military installations and also no promulgated Danger, Restricted and Prohibited areas according to the SACAA (South African Civil Aviation Authority) list in the vicinity of the Mopane Power Line project.</p> <p>Evidence from the assessment and the technical drawings show clearly that the Mopane Power Line Project will not interfere with the Obstacle Limit Surfaces and the Approach/Departure Surfaces of Carletonville Airport (FACR) and also not interfere with the Landing Zone of the Johannesburg Sky Diving Club, present and in the long term.</p>  |                                  |                    |                   |                                    |            |                    |            |                        |                                 |                               |                   |                   |                                    |                                 |                                  |                    |                   |                                    |

|  |                          |                          |                      |
|--|--------------------------|--------------------------|----------------------|
| <b><u>RFI (Minimum Assessment)</u></b><br><b><u>Defense (Minimum Assessment)</u></b>   | <b>Low</b><br><b>Low</b> | <b>Low</b><br><b>Low</b> | <b>M</b><br><b>M</b> |
| Rationale for and Results of Specialist Assessments  |                          |                          |                      |
| <p>The National Screening Tool did not require a specialist assessment to be conducted for the Defence combined sensitivity theme, and indicates a Defence combined sensitivity as being low. For an RFI combined sensitivity classification of “low” the prescribed assessment protocol required stated: “Where a specialist assessment is required and no specific environmental theme protocol has been prescribed, the required level of assessment must be based on the findings of the site sensitivity verification and must comply with Appendix 6 of the EIA Regulations”</p> <p>With closer inspection of the power line route it can be seen that the power line corridor crosses, or overlaps, multiple farming areas and the R501 and some local roads. No registered radio and/or communication sensitive installations (as per the screening tool) are identified on the preferred power line route and with the requirement that all equipment used by this project, will be subjected to the standard ICASA transmission/reception regulations and type approved1, this project will not pose any risk to RF Interference to existing old and new equipment.</p> <p>After evaluation and consideration of all activities identified, it is still considered to be classified as low sensitivity to RFI. For the proposed development referred to in this report, there should be no unacceptable impact on existing and potential, future installations if all equipment to be used permanently or temporarily has acceptable EMI/RFI levels that have been subjected to ICASA requirements and power lines and sub-stations are installed according to ESKOM best practices and standards adopted.</p> <p>No Cumulative RFI effects are expected at any of the adjacent sites and whether there are one or five PV solar sites the outcome will be the same.</p> <p>No Defence impact is foreseen or can be envisaged but a final approval will be required from the DoD as future planning for this area is not available at this time.</p>   |                          |                          |                      |
| <b><u>Geotechnical (Preliminary)</u></b>   | <b>None provided</b>     | <b>Medium-High</b>       | <b>I</b>             |
| Rationale for and Results of Specialist Assessments  |                          |                          |                      |
| <p>In accordance with Government Notice No. 320 of 20 March 2020, “Site sensitivity verification requirements where a specialist assessment is required but no specific assessment protocol has been prescribed” a site sensitivity verification (preliminary stage geotechnical investigation which complies with Appendix 6 of the EIA Regulations) was compiled.</p> <p>Four alternative routing options have been proposed, with this assessment yielding information of a morphological, geological, and geotechnical nature to inform the site selection process.</p> <p><b>Based on the results of this preliminary stage geotechnical investigation, it is recommended that Routing Option 4 be selected.</b></p> <p>The following aspects of a geological and geotechnical nature is of importance to note with regard to the construction of this powerline:</p> <ul style="list-style-type: none"> <li>• The movement of mainly wheeled vehicles during construction will be hampered by slippery topsoil conditions during and after rainfall events, the inferred reduction in topsoil strength when wet, and the localized occurrence of boulders at surface.</li> <li>• Construction delays can be expected in the summer rainfall season to allow drying-out of the topsoil (dissipation of perched water tables).</li> <li>• Excavation of foundation trenches and earthworks for access roads is predominantly possible by hand or light mechanical excavator (TLB-type), although bedrock outcrops and sub-outcrops will have to be removed by means of a heavy mechanical excavator, power tools, ripping, or blasting.</li> <li>• The design and construction of pylon foundation &amp; other structures will have to incorporate measures to counter the effects of moderate consolidation under loading and/or when saturated (given the expected seasonal ponding of surface water), slight heave/ shrinkage, and sporadic, relatively low intensity, mining-induced seismic events.</li> <li>• The natural soil-like overburden to be removed during construction is NOT considered ideally suited for re-use in compacted earth fills without significant reworking. More suitable material should be obtained from proven sources in the area.</li> <li>• Although no obvious signs of surface instability could be observed along the route, the status of the dolomitic hazard at each pylon position is currently undetermined.</li> </ul> <p>Responses (marked with a black background) of a geotechnical nature regarding all four routing options, based on the results of this assessment,</p> |                          |                          |                      |

| QUESTIONS   | REPOSSES |    |          |    |          |    |          |    |
|---|----------|----|----------|----|----------|----|----------|----|
|   | OPTION 1 |    | OPTION 2 |    | OPTION 3 |    | OPTION 4 |    |
| Shallow water table (less than 1.5 m deep):                   | YES      | NO | YES      | NO | YES      | NO | YES      | NO |
| Dolomite, sinkhole, or doline areas:                          | YES      | NO | YES      | NO | YES      | NO | YES      | NO |
| Seasonally wet soils (often close to water bodies):           | YES      | NO | YES      | NO | YES      | NO | YES      | NO |
| Unstable rocky slopes or steep slopes with loose soil:        | YES      | NO | YES      | NO | YES      | NO | YES      | NO |
| Dispersive soils (soils that dissolve in water):              | YES      | NO | YES      | NO | YES      | NO | YES      | NO |
| Soils with a high clay content (clay fraction more than 40%): | YES      | NO | YES      | NO | YES      | NO | YES      | NO |
| Any other unstable soil or geological feature:                | YES      | NO | YES      | NO | YES      | NO | YES      | NO |
| An area sensitive to erosion:                                 | YES      | NO | YES      | NO | YES      | NO | YES      | NO |

It is recommended that a full Geotechnical investigation be conducted prior to commencement of the construction phase.

|                 |             |                        |          |
|-----------------|-------------|------------------------|----------|
| <b>Avifauna</b> | <b>High</b> | <b>Very high - Low</b> | <b>E</b> |
|-----------------|-------------|------------------------|----------|

Rationale for and Results of Specialist Assessments

In accordance with Government Notice No. 1150 "Protocol for specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species" an Avifauna Specialist Assessment Report was compiled, compliant with the Best Practice Guidelines for Birds & Solar Energy (Jenkins et al. 2017) and the Environmental Impact Assessment (EIA) guidelines for renewable energy projects.

A detailed field survey was carried out from 28 to 30 October 2022 (the start of the wet season). However, based on the National Screening Tool (<https://screening.environment.gov.za/screeningtool/#/pages/welcome>), the proposed animal species theme sensitivity site is classified as medium sensitivity due to the following species (*Tyto capensis* and *Eupodotis senegalensis*) and the avian theme sensitivity is classified as high sensitivity due being within 20 km of known vulture supplementary feeding site.

A field survey aid in filling in any information gaps identified from pilot investigations and published data. Bird communities were surveyed on the proposed Mopane Solar Park Connection Power Line and surrounding environments using point counts as stipulated in the Best Practice Guidelines Birds & Solar Energy (Jenkins et al. 2017).

The proposed development of the Connection Power Line falls within a Priority Focus Area. It is important to note that power line option 1 mainly avoids this Priority Focus area.

The proposed development is not located within an IBA, but the closest is the Magaliesberg IBA, located North of the proposed development. This IBA is home to a huge variety of bird species and home to two Cape Vulture (*Gyps coprotheres*) colonies with ~300-400 active breeding pairs (Hirschauer et al. 2021). In addition, the African Grass Owl (*Tyto capensis*) and Secretarybird (*Sagittarius serpentarius*) are regularly recorded within the area. However, the area is also important for other reptiles, mammals and amphibians.

Site ecological importance for various habitats on site were rated Very High (water habitat), Medium (grassland) and Low (transformed).

The assessment of impacts identified by Birdlife SA as significant for PV developments has revealed that most of these impacts fall within the low to moderate-risk category. As most threats to birds and other wildlife posed by PV facilities are poorly understood, the Mopane Solar Parks, if endorsed, have the potential to provide an ideal platform for monitoring the impact of Solar Parks on the avifaunal communities in grasslands close to wetlands and a river system. Birds within these systems usually stick to them but can occasionally fly between these systems, which increases the risk of a negative interaction with the Solar Park. The Solar Parks might have a negligible effect on the overall bird community, as more than 38% of the landscape has already undergone some anthropogenic disturbance, and even the proposed area is used for grazing livestock. However, as discussed in this report, the biggest threat will come from the overhead power lines between the Solar Park and the substation. The proposed development allows institutions to conduct valuable and relevant research into threats posed to avifauna and whether certain mitigations are successful or not that will allow for better implementation of these mitigations for future investigations as described in the Best Practice Guidelines Birds & Solar Energy (Jenkins et al. 2017).

The proposed Mopane Connection Power line Option 1 would have a low to medium impact on the bird communities. It will cause a slight impact on the ecological process of the overall bird community. However, with existing power lines set up along this route, it is worth out of doubt the best route to minimise the cumulative effect and set up a new feature within the landscape However, the issuing authority must consider all prescribed mitigation measures and recommendations when reviewing the application.



| Noise  | None provided | Low | N |
|--|---------------|-----|---|
| Rationale for and Results of Specialist Assessments  |               |     |   |
| <p>As the online screening tool does not identify noise as an environmental theme requiring further investigation for a photovoltaic facility, this report considers the requirements of SANS 10328:2008 to assess whether noise is a potential issue of concern.</p> <p>Generally, noises associated with a power line relates to construction activities associated with the pylons, though such noises are generally of a short duration and normally only associated with the day-time period (reducing the probability of a noise impact occurring).</p> <p>Excluding power line option 2, considering the distance between NSR and the locations where pylons may be developed, the temporary to short nature of construction noise impacts, the development of the Mopane Power Line will not influence ambient sound levels at the NSR in the vicinity of the project site.</p> <p>When considering power line alternative option 2, power pylons may be developed within 50 m from a number of NSR. When considering the low to medium intensity of the noise level, the temporary nature of the activities, as well as the expected low probability of a noise impact occurring, the significance of the noise impact associated with power line alternative option 2 will be low.</p> <p>It is therefore the opinion of the author that no further Scoping or other acoustical studies would be required for the proposed development of the Mopane Power Line and it is recommended that the project be authorized (in terms of acoustics). In terms of acoustics, there is a slight preference for route alternatives 1, 3 and 4.</p> |               |     |   |

## 5. CONCLUSION

Based on the outcome of this Site Sensitivity Verification Report, the following specialist studies were undertaken during the scoping phase for the proposed project:

- Agro-Ecosystem Dr B Henning
- Avifauna Kemp Operations
- Aviation Tappas Aviation Consultant
- Aquatic Biodiversity Scientific Aquatic Services
- Terrestrial Biodiversity Dr B Henning
- Heritage Impact Assessment Beyond Heritage
- Palaeontological Impact Assessment Prof Marion Bamford
- Visual Impact Assessment Graham Young Landscape Architects
- Geotechnical Investigation (Preliminary) AGES
- Noise Enviro-Acoustic Research
- RFI & Defence PF Smuts

The terms of reference of these investigations have been designed to address all the issues that were identified by the EIA project team. As part of these studies, specialists will gather data relevant to identifying and assessing environmental impacts that might occur as a result of the proposed project in their particular field of expertise. They will provide baseline information and identify and assess impacts according to predefined rating scales. Specialists will also suggest ways in which negative impacts could be mitigated and benefits could be enhanced. The results of the specialist studies were integrated into an EIA Report.