TERRESTRIAL BIODIVERSITY STUDY: PROPOSSED CONSTRUCTION OF THE BORUTHO-SILIMELA POWERLINE, LIMPOPO PROVINCE, SOUTH AFRICA

Prepared for: NTC Group
Prepared by: EcoSolve Consulting & MORA
Ecological Services (Pty) Ltd
26 Earlston Street Centurion, 0157
Contact person: Mokgatla Molepo
Cell: (081) 410 3763
E-mail: mokgatlajm@gmail.com

2024

DOCUMENT CONTROL

Project title	Terrestrial Biodiversity Impact Assessment for the Proposed Borutho-Silimela Powerline, Limpopo Province, South Africa
Report reference	TBIA/BOR-SIL/23
Document prepared for	NTC Group
Document prepared by	MORA & ECOSOLVE
Physical address	26 Earlston Street Centurion 0157
Primary author	Mokgatla Molepo (MSc. Zoology) *Pr. Nat. Sci*. (009509) 
Contact details	Email: mokgatlajm@gmail.com Contact: (081) 410 3763

EXECUTIVE SUMMARY

Eskom Holdings SOC Limited (herein referred to as Eskom) has appointed NTC Group (Pty) Ltd as an independent Environmental Assessment Practitioner (EAP) to undertake a Basic Assessment (BA) Process for the proposed construction of the Borutho-Silimela 400kV powerline and its associated infrastructure. The length of the powerline is approximately 150km. The proposed power line is located between the Borutho Substation on farm Gillimberg 861 in Mokopane. It runs south to the Silimela Substation on farm Loskop Noord 12, near Marble Hall within the Lepelle-Nkumpi, Mogalakwena, Modimolle-Mookgophong and Ephriam Mogale Local Municipalities, Limpopo Province.

The proposed project will trigger some listed activities in terms of the EIA Regulations as promulgated under the National Environmental Management Act (NEMA), Act 107 of 1998, under Regulations R982 to R985 of 2014 as amended in 2017, respectively.

The ecology of the proposed powerline and existing substations was investigated. Four major vegetation types were identified, namely, Makhado Sweet Bushveld, Polokwane Plateau Bushveld, Central Sandy Bushveld and Springbokvlakte Thornveld. The route runs along open communal lands, commercial farms and nature reserve. However, no faunal species were recorded during the surveys.

There are several individuals of protected Marula trees (*Sclerocarya* birrea) within Witvinger and Potgietersrus Nature Reserve. Due to the presence of protected tree species, a walkthrough is recommended for this area, to ensure that trees are avoided for construction of the line. Where avoidance is inevitable, relevant tree permits should be obtained. Overall, there is no objection for the proposed powerline development to continue. It is the opinion of the specialist that the proposed powerline project be considered by the Competent Authority, provided that the mitigations and recommendations are adhered to.

SPECIALIST INFORMATION AND LEGAL REQUIREMENTS

National Environmental Management Act, 1998 (Act No. 107 of 1998) and Environmental Impact Regulations 2014 (as amended) Requirements for Specialist Reports (Appendix 6):

The details of -	
○ the specialist who prepared the report; and	Page 62
○ the expertise of that specialist to compile a specialist report including a curriculum vitae;	Page 62
A declaration that the specialist is independent in a form as may be specified by the competent authority;	Page 7
An indication of the scope of, and the purpose for which, the report was prepared;	
○ An indication of the quality and age of base data used for the specialist report;	Page 18
○ A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Page 47
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Page 17
A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Page 17
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Page 21,22 & 42
An identification of any areas to be avoided, including buffers;	Page 42 & 51
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Page 42
A description of any assumptions made and any uncertainties or gaps in knowledge;	Page 16
A description of the findings and potential implications of such findings on the impact of the proposed activity, or activities;	Page 44-46
Any mitigation measures for inclusion in the EMPr;	Page 47-51
Any conditions for inclusion in the environmental authorisation;	
Any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Page 47-51
A reasoned opinion-	
○ whether the proposed activity, activities or portions thereof should be authorised;	Page 51
○ regarding the acceptability of the proposed activity or activities; and	Page 51
○ if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Page 51

TABLE OF CONTENTS

List of Figures

DECLARATION BY THE SPECIALIST

I, Mokgatla Jerry Molepo, declare that:

• I act as the independent specialist in this application;

• I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;

• I declare that there are no circumstances that may compromise my objectivity in performing such work;

• I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;

• I will comply with the Act, Regulations and all other applicable legislation;

• I have no, and will not engage in, conflicting interests in the undertaking of the activity;

• I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;

• all the particulars furnished by me in this form are true and correct; and

• I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

Ecosolve

Name of Company

20/02/2024

Date

INTRODUCTION & BACKGROUND

Eskom Holdings SOC Limited (herein referred to as Eskom) has appointed NTC Group (Pty) Ltd as an independent Environmental Assessment Practitioner (EAP) to undertake a Basic Assessment (BA) Process for the proposed construction of the Borutho-Silimela 400kV powerline and its associated infrastructure. The length of the powerline is approximately 150km. The proposed power line is located between the Borutho Substation on farm Gillimberg 861 in Mokopane and runs south to the Silimela Substation on farm Loskop Noord 12, near Marble Hall within the Lepelle-Nkumpi, Mogalakwena, Modimolle-Mookgophong and Ephriam Mogale Local Municipalities, Limpopo Province.

The proposed project will trigger some listed activities in terms of the EIA Regulations as promulgated under the National Environmental Management Act (NEMA), Act 107 of 1998, under Regulations R982 to R985 of 2014 as amended in 2017, respectively.

MORA Ecological Services (Pty) Ltd was requested by the appointed EAP, NTC Group (Pty) Ltd to conduct an avifaunal specialist study towards their pursuit of obtaining powerline construction rights by means of transforming land. Specialist studies are essential for obtaining the requisite environmental authorisations for the proposed project.

PROJECT AREA

The proposed development is located in the Limpopo Province of South Africa as shown in Figure 1 below. Limpopo is the northernmost province of South Africa. Based on Figure 1, the extent of the authorized corridor runs on the N11 national route and the R518 and R519 highway. Within the Limpopo Province, the proposed development footprint falls on three Local Municipalities, namely, Ephraim Mogale, Modimolle-Mookgophong and Mogalakwena. Within the Limpopo Province of South Africa, the aforementioned local municipalities are within the Sekhukhune and Waterberg District Municipalities. The geographic coordinates of the northern region of the approved corridor are 23°52'34.76"S (latitude) and 28°55'40.55"E (longitude). The geographic coordinates of the southern region are 25° 5'22.72"S (latitude) and 29°17'48.23"E (longitude).

The construction of the power line will aid Eskom in strengthening the power supply with the following scope:

- Extend Borutho Substation to accommodate 1 x 400kV feeder bay for Silimela Line 1;
- Extend Silimela Substation to accommodate 1 x 400kV feeder bay for Borutho Line 1; and
- Build approximately 150km 400kV line from Borutho Substation to Silimela Substation, with associated extensions at the terminal substations.

The powerline study corridor is 250m wide and the servitude within the route will not be more than 90m wide.

Borutho Subtation falls under the Waterberg District Municipality, in the Limpopo Province, South Africa. It is ensconced between the towns of: Steenbokpan (i.e., a village town) located west of Lephalale (former Elisras – Medupi located approximately 17.9km west of the town), Marken (i.e., a village town), Mokopane in the south-east (i.e., approximately 31km from Borutho substation) and the town of Polokwane in the east (i.e., the capital town of Limpopo - Borutho is approximately 48km). The existing Silimela Substation is situated on the farm Loskop Noord 12, near Marble Hall within the Capricorn District Municipality, in the Limpopo Province.

The proposed development falls within three Local Municipalities, namely, Ephraim Mogale, Modimolle-Mookgophong and Mogalakwena, Limpopo Province. The Local Municipalities fall within the jurisdiction of the Sekhukhune and Waterberg District Municipalities.
The geographic coordinates are as follows:

- Start: 23° 54’24.97 S; 28° 58’41.96 E;
- Middle 24° 31’21.81 S; 28° 57’45.01 E .
- End: 25° 05’13.31 S; 29° 17’57.47 E.

The powerline will transverse the following properties:

▪ Portion 0 of Farm Ga Puka	▪ Portion 73 of Farm Piet Potgietersrust KS
▪ Portion 0 of Farm Gillimberg 861 LR	▪ Portion 47 of Farm Piet Potgietersrust KS
▪ Portion 7 of Farm Gillimberg 861 LR	▪ Portion 49 of Farm Piet Potgietersrust KS
▪ Portion 9 of Farm Gillimberg 861 LR	▪ Portion 2 of Farm Weltevrede
▪ Portion 17 of Farm Gillimberg 861 LR	▪ Portion 9 of Farm De Hoop
▪ Portion 8 of Farm Gillimberg 861 LR	▪ Portion 1 of Farm De Hoop
▪ Portion 6 of Farm Gillimberg 861 LR	▪ Portion 6 of Farm Klavervalley
▪ Portion 30 of Farm Gillimberg 861 LR	▪ Portion 2 of Farm Ceres
▪ Portion 10 of Farm Gillimberg 861 LR	▪ Portion 7 of Farm Geluksfontein
▪ Portion 29 of Farm Gillimberg 861 LR	▪ Portion 5 of Farm Springhaan Slaagte
▪ Portion 47 of Farm Gillimberg 861 LR	▪ Portion 0 of Farm Rondeberg
▪ Portion 1521 of Farm Piet Potgietersrust KS	▪ Portion 7 of Farm Conterberg
▪ Portion 1489 of Farm Piet Potgietersrust KS	▪ Portion 17 of Farm Conterberg
▪ Portion 1567 of Farm Piet Potgietersrust KS	▪ Portion 1 of Farm Weltevrede
▪ Portion 1435 of Farm Piet Potgietersrust KS	▪ Portion 9 of Farm Conterberg
▪ Portion 1566 of Farm Piet Potgietersrust KS	▪ Portion 11 of Farm Haarde Kraal
▪ Portion 1486 of Farm Piet Potgietersrust KS	▪ Portion 5 of Farm Klavervalley
▪ Portion 1443 of Farm Piet Potgietersrust KS	▪ Portion 1 of Farm Doornlaagte
▪ Portion 1446 of Farm Piet Potgietersrust KS	▪ Portion 2 of Farm Rondeberg
▪ Portion 1533 of Farm Piet Potgietersrust KS	▪ Portion 2 of Farm Mooigelegen
▪ Portion 1491 of Farm Piet Potgietersrust KS	▪ Portion 3 of Farm De Hoop
▪ Portion 1517 of Farm Piet Potgietersrust KS	▪ Portion 3 of Farm Doornstock

▪ Portion 1481 of Farm Piet Potgietersrust KS	▪ Portion 1 of Farm Rondeberg
▪ Portion 1482 of Farm Piet Potgietersrust KS	▪ Portion 23 of Farm Conterberg
▪ Portion 1539 of Farm Piet Potgietersrust KS	▪ Portion 3 of Farm De Bults Punt
▪ Portion 1529 of Farm Piet Potgietersrust KS	▪ Portion 4 of Farm De Bults Punt
▪ Portion 1474 of Farm Piet Potgietersrust KS	▪ Portion 3 of Farm Springhaa Nslaagte
▪ Portion 1568 of Farm Piet Potgietersrust KS	▪ Portion 8 of Farm De Hoop
▪ Portion 1438 of Farm Piet Potgietersrust KS	▪ Portion 0 of Farm Springhaa Nslaagte
▪ Portion 1432 of Farm Piet Potgietersrust KS	▪ Portion 2 of Farm Oranjefon Tein
▪ Portion 1427 of Farm Piet Potgietersrust KS	▪ Portion 3 of Farm Oranjefon Tein
▪ Portion 1426 of Farm Piet Potgietersrust KS	▪ Portion 5 of Farm Conterberg
▪ Portion 1520 of Farm Piet Potgietersrust KS	▪ Portion 12 of Farm Springhaa Nslaagte
▪ Portion 1537 of Farm Piet Potgietersrust KS	▪ Portion 7 of Farm Klavervalley
▪ Portion 1483 of Farm Piet Potgietersrust KS	▪ Portion 1 of Farm Doornstock
▪ Portion 1440 of Farm Piet Potgietersrust KS	▪ Portion 10 of Farm Conterberg
▪ Portion 1439 of Farm Piet Potgietersrust KS	▪ Portion 3 of Farm Ceres
▪ Portion 48 of Farm Piet Potgietersrust KS	▪ Portion 4 of Farm Hartebeest Fontein
▪ Portion 52 of Farm Piet Potgietersrust KS	▪ Portion 1 of Farm Haakdoorn Kuil
▪ Portion 17 of Farm Piet Potgietersrust KS	▪ Portion 0 of Farm Rondom
▪ Portion 98 of Farm Piet Potgietersrust KS	▪ Portion 3 of Farm Klipgat
▪ Portion 100 of Farm Piet Potgietersrust KS	▪ Portion 0 of Farm Knoppiesdo Ornboom
▪ Portion 144 of Farm Piet Potgietersrust KS	▪ Portion 0 of Farm Zoetfontein
▪ Portion 41 of Farm Piet Potgietersrust KS	▪ Portion 0 of Farm Haardekraal

▪ Portion 40 of Farm Piet Potgietersrust KS ▪ Portion 58 of Farm Uitloop 3 ▪ Portion 46 of Farm Gillimberg 861 LR ▪ Portion 59 of Farm Uitloop 3 ▪ Portion 55 of Farm Uitloop 3 ▪ Portion 62 of Farm Piet Potgietersrust KS ▪ Portion 35 of Farm Piet Potgietersrust KS ▪ Portion 175 of Farm Uitloop 3 ▪ Portion 57 of Farm Piet Potgietersrust KS ▪ Portion 140 of Farm Piet Potgietersrust KS ▪ Portion 80 of Farm Piet Potgietersrust KS ▪ Portion 75 of Farm Piet Potgietersrust KS	▪ Portion 4 of Farm Klavervalley ▪ Portion 0 of Farm Doornlaagte ▪ Portion 8 of Farm Geluksfontein ▪ Portion 16 of Farm Conterberg ▪ Portion 1 of Farm Mooigelegen ▪ Portion 1 of Farm Rondom ▪ Portion 0 of Farm Gegund

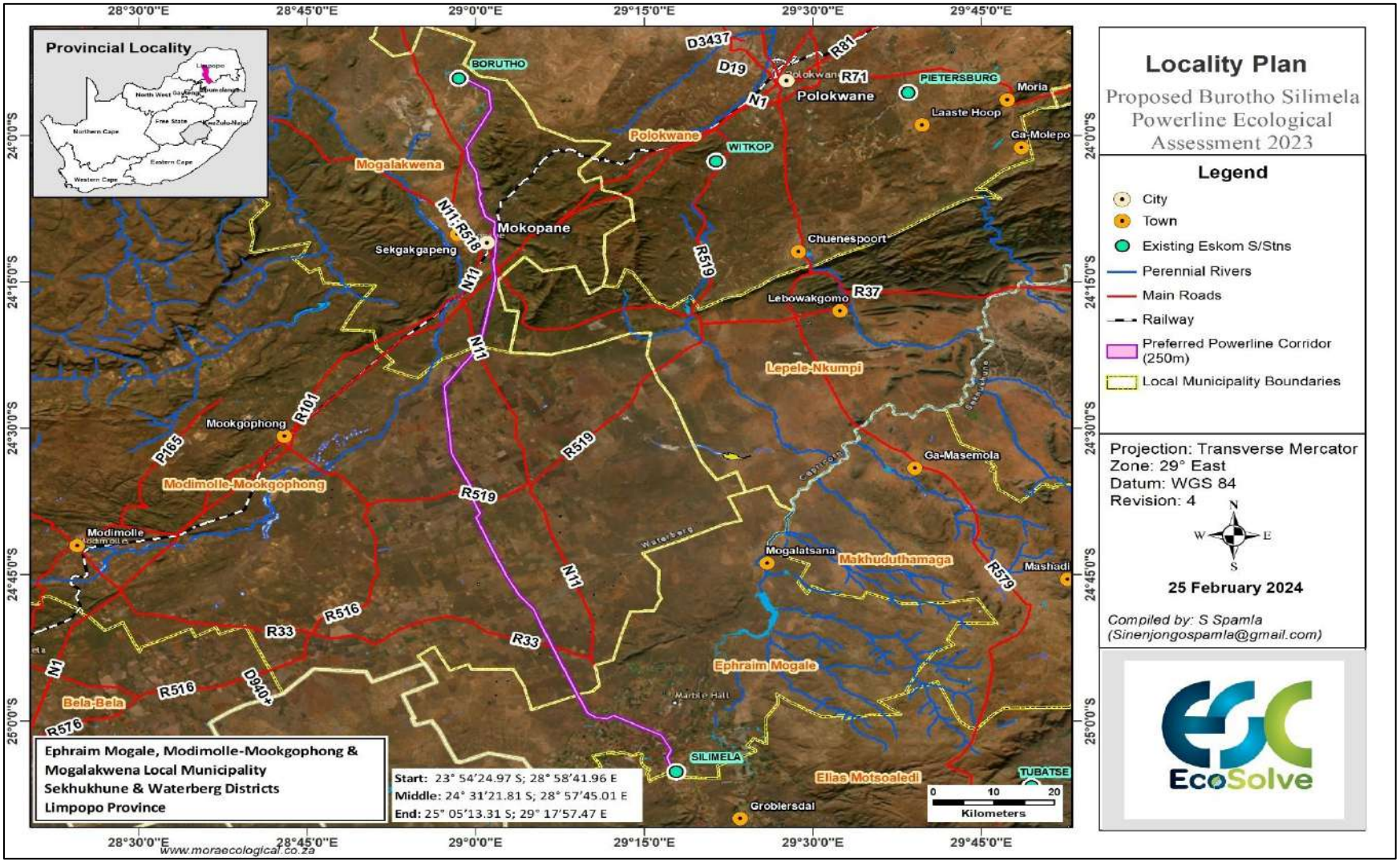


Figure 1: Project area location map of the proposed powerline.

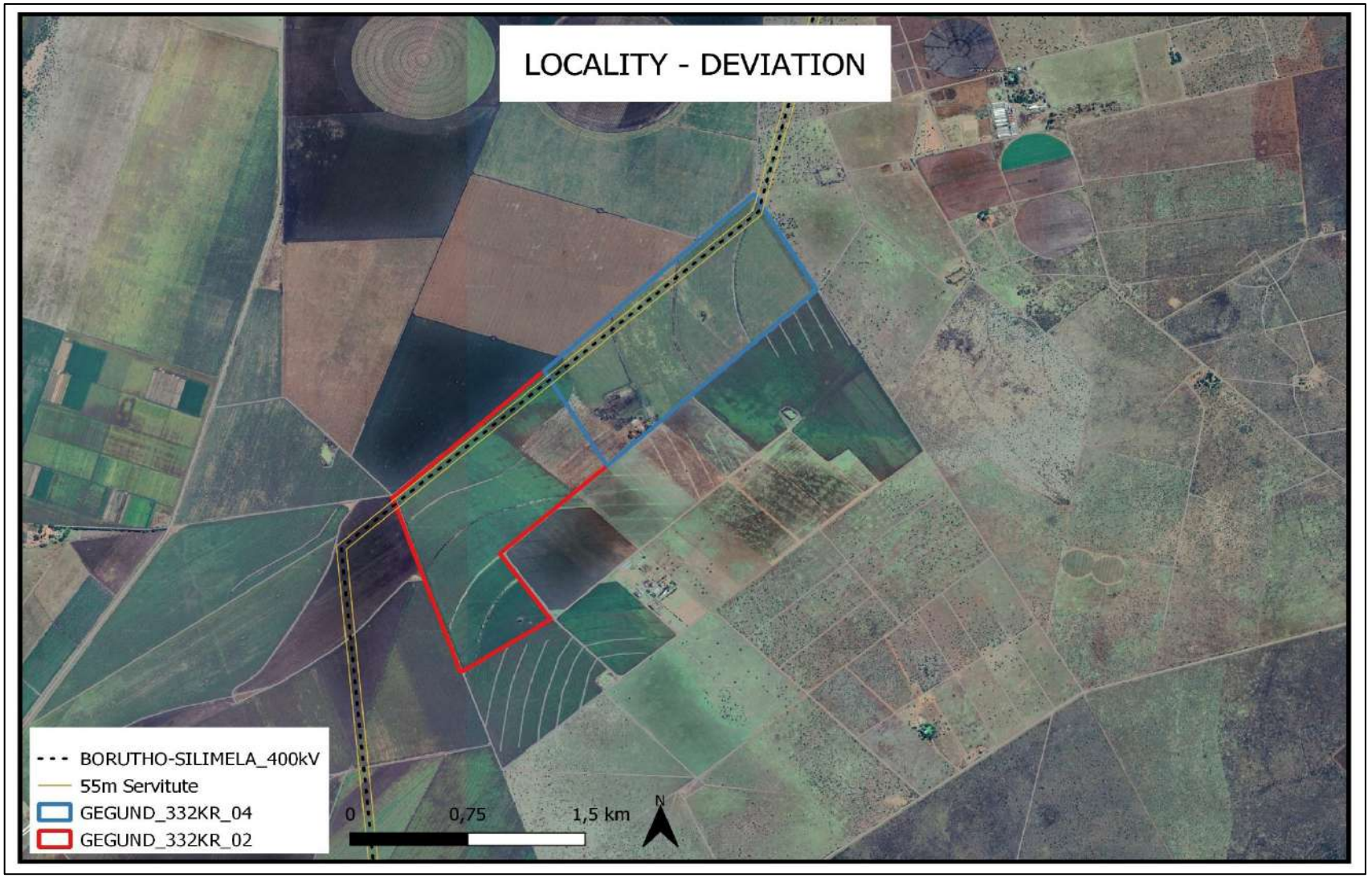


Figure 2: Project area location map (±5.2 km deviation).

KEY LEGISLATIVE REQUIREMENTS

International law and conventions

The importance of sustainable development and the protection of environmental resources have globally become a driving factor in the construction of new legislation governing industrial practices and their impact on the environment. South Africa has signed and ratified a number of global treaties, protocols and conventions, agreeing to implement the policies, which endorse sustainable development and promote a positive environmental legacy for future generations. A considerable international convention to which South Africa is in agreement within signatory is namely the Convention on Biological Diversity (CBD). The CBD is notably the key international convention for sustainable development. The CBD has three main objectives which lead and encourage a sustainable future. These are:

- The conservation of biological diversity;
- The sustainable use of its components; and
- The fair and equitable sharing of the benefits from the use of genetic resources.

The convention covers all possible domains that are directly or indirectly related to biodiversity and its role in development, ranging from science, politics and education to agriculture, business and culture.

South African Constitution

The foundation of South Africans Environmental law is set in the Constitution of the Republic of South Africa (1996), specifically “Chapter 2- The Bill of Rights: section 24”. This has allowed for the rapid development of environmentally based legislations which guard, enforce and guide all parties to maintain the human rights granted in the Constitution. These rights include:

- The right to an environment that is not harmful to their health or well-being; and
- To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

National Environmental Management Act (NEMA)

The National Environmental Management Act (NEMA), Act 107 of 1998 is the fundamental environmental legislation which aims to strengthen the rights granted in the South African Constitution. The NEMA Act is the foundation of environmental law in South Africa and has set the framework for additional legislation to build on. The Act establishes principles for decision-making on environmental matters, as well as providing a motive for institutions that promote cooperative governance, and can coordinate environmental action plans. Section 2(4) specifies that sustainable development requires the consideration of all relevant factors. Regarding biodiversity and South Africa’s ecological integrity, development should not result in the

disturbance of ecosystems and loss of biological diversity, if not possible, these effects must be minimized and remedied. A low-risk, cautious approach should always be applied, considering the limits of current knowledge concerning consequences and actions. Always anticipate possible negative impacts on the environment and people's environmental rights, Identify impacts should be prevented and where they cannot be altogether prevented, are minimised and mitigated. Outlined NEMA principles with regard to biodiversity are to:

- Prevent pollution and ecological degradation
- Promote conservation; and
- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

National Environmental Management of Biodiversity Act (NEMBA)

The National Environmental Management of Biodiversity Act (NEMBA) Act 10 of 2004 was designed to provide a management and conservation outline for biological diversity, as drafted under the NEMA. NEMBA focuses on the management and conservation of biodiversity, with its relevant components, which includes the use of indigenous biological resources in a sustainable manner, the fair and equitable sharing of benefits arising from bio-prospecting, cooperative governance in biodiversity management and conservation within the structures of NEMA. The Act, in protecting biodiversity, deals with the protection of threatened ecosystems and species, the control of alien invasive species, genetically modified organisms and regulates bio-prospecting. As with NEMA, NEMBA incorporates and gives effect to international agreements relating to biodiversity. The Act gives the Minister of Environmental Affairs, Forestry, and Fisheries the power to categorise any process or activity in a listed ecosystem, as a threatening process, thereafter, be regarded as an activity contemplated in Section 24(2) (b) of NEMA which states that: Specified activities may not be commenced without prior authorisation from the Minister or MEC and specify such activities. NEMBA is the most prominent statute containing provisions directly aimed at the conservation of Threatened or Protected Species Regulations, February 2007 (TOPS Regulations). The NEMBA Regulations on Threatened or Protected Species (TOPS, 2007) lists all of the species (including avian) that are threatened with extinction and therefore, nationally protected under an approach to sustainable use and development. Periodically, Red Data books are published, and the data used to update these lists of protected species.

Additionally, NEMBA regulates all invasive organisms in South Africa, including a wide range of fauna and flora. Chapter 5 of the Act relates to species and organisms posing a potential threat to biodiversity. The purpose of Chapter 5 is:

- To prevent the unauthorized introduction and spread of alien species and invasive species to ecosystems and habitats where they do not naturally occur;

- To manage and control alien species and invasive species to prevent or minimize harm to the environment and biodiversity in particular;
- To eradicate alien species and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats;

According to Section 65 of the Act, "Restricted activities involving alien species":

- A person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7.

Restricted activities include the following:

- Importing into the Republic, including introducing from the sea, any specimen of a listed invasive species.
- Having in possession or exercising physical control over any specimen of a listed invasive species.
- Growing, breeding, or in any other way propagating any specimen of a listed invasive species, or causing it to multiply.
- Conveying, moving, or otherwise translocating any specimen of a listed invasive species.
- Selling or otherwise trading in, buying, receiving, giving, donating, or accepting as a gift, or in any other way acquiring or disposing of any specimen of a listed invasive species.
- Spreading or allowing the spread of any specimen of a listed invasive species.
- Releasing any specimen of a listed invasive species.

National Environmental Management: Protected Areas Act (Act 57 of 2003) (NEMPAA)

NEMPAA provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. The Act also supports the establishment of a national register of all national; provincial, and local protected areas for the management of those areas in accordance with national norms and standards, for intergovernmental cooperation and public consultation in matters concerning protected areas, for continued existence, governance and functions of South African National Parks, and for matters in relation to protected areas.

Section 50(5) of NEMPAA states that "no development, construction or farming may be permitted in a nature reserve or world heritage site without the prior written approval of the management authority."

Conservation of Agricultural Resources Act (Act No. 43 of 1983)

In terms of the amendments to the regulations under this Act, landowners are legally responsible for the control of invasive alien plants on their properties. The schedules provide a list of declared weeds and invaders, which have been divided into three categories, as follows:

- Category 1 plants are prohibited and must be controlled.
- Category 2 plants (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.

- Category 3 plants (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

Specialist Protocol

This report has been compiled in accordance with the *Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial, Plant and Animal Species,* GN 1150 (October 2020). According to the protocols, a site sensitivity verification (SSV) must be undertaken to verify the likelihood of the presence of the SCC. The site sensitivity verification must be undertaken through the use of a desktop study, a site inspection and making use of any other available information of relevance.

When a site is identified by the Department of Forestry, Fisheries and the Environment (DFFE) National Web-based Environmental Screening Tool as being of 'Medium' sensitivity for the theme, either a Compliance Statement or Specialist Impact Assessment Report must be compiled, depending on the findings of the outcome of a site sensitivity verification. Where the site sensitivity verification found no SCC on site and/or confirmed their occurrence to be unlikely, a Compliance Statement must be compiled. Based on the findings, the site was confirmed to be of Medium Sensitivity for terrestrial, plants and animal themes.

TERMS OF REFERENCE

Considering the requirements of national legislation and the proposed project, the purpose of this report is to make provision of substantial information in advising the outcome of the application concerning the ecological viability of the proposed project. The objectives of this report are, therefore, to:

- Describe the baseline receiving environment;
- Identify and describe terrestrial plants and animal species sensitivities within the area and how these sensitive receptors may be impacted upon;
- Identify priority ecological, botanical, and faunal features within the proposed areas;
- Evaluate the extent of site-related impacts;
- Conduct a risk assessment for the proposed project; and
- Provide the prescription of mitigation measures and recommendations for identified risks.

ASSUMPTIONS, LIMITATIONS, UNCERTAINTIES, AND GAP ANALYSIS

The following limitations should be noted for the assessment:

- We relied entirely on NTC Group, as the EAP, to supply correct information on the site locality and extent, as well as project details. We assume that these are correct;
- The findings, results, observations, conclusions, and recommendations provided in this report are based on the author's best scientific and professional knowledge as well as available information regarding the potential impacts of powerline,e developments on the terrestrial environment;

- The assessment of impacts was based on the current state of the primary receiving environment;
- Night surveys were not performed due to safety and budgetary reasons;
- Despite these limitations, a comprehensive desktop study was conducted, in conjunction with the detailed results from the surveys, and as such there is a high level of confidence in the information provided.

METHODS

Methodology

Before conducting field assessments, a comprehensive literature review of available published and unpublished literature about the current use of the land and the potential environmental sensitivity of the site was conducted. The site visit was initially undertaken in May 2023 with a follow-up survey in November 2023 and final verification in February 2024. The survey was conducted by competent fieldworkers of Ecosolve, i.e., a senior ecologist (Pr. Sci. Nat.) and an assistant (Junior Specialist, Cand. Sci. Nat). Surveys were conducted along the proposed powerline footprint area and the survey time daily was from 06h00 am until 18h00 pm.

Terrestrial assessment

Geographic Information Systems (GIS) Mapping

Existing data layers were incorporated into GIS software to establish how the proposed project might interact with any ecologically important entities. The guideline provides a spatial overview of threatened ecosystems and guidance on mitigating biodiversity impacts from the different phases of the proposed activity.

Botanical assessment

Vegetation units, flora species composition, plant sensitivity, and habitat types

The main objective of the flora assessment was an ecological assessment of habitat types as well as the identification of any Red Data species within the area footprint. The fieldwork methodology included the following techniques;

- A visual inspection of the study area was done before surveys were conducted.
- During the process different, homogenous vegetation units were identified and subsequently surveyed on foot and by vehicle to determine the floristic composition of each unit.
- A plotless sampling method was used to record data.
- Species identification was done following reputable checklists and field guides.
- Identification of floral red-data species.
- Where necessary, plant material was collected and/or photographs taken of specimens for

identification purposes.

The desktop study entailed the use of the Vegetation of South Africa, Lesotho, and Swaziland (Mucina & Rutherford, 2006).

Faunal assessment (Mammals, Reptiles and Amphibians)

The faunal assessment was done mainly on a desktop level, supported by on-site observations. No faunal trapping or any other quantitative field species data capturing was, however, conducted due to time and budgetary constraints. A cross-reference with available habitats of the study area was also conducted to establish the faunal potential. In assessing species occurrence, their approximate distribution and habitat requirements were first considered. Therefore, only animal groups for which distribution data are available have been considered in this assessment.

The desktop study entailed the use of the Animal Demographic Units (ADU) Virtual Museum tool. The ADU is a research unit of the University of Cape Town in the Biological Sciences Department. The ADU was initiated with the mission to understand animal populations, especially population dynamics, and therefore provide inputs to their conservation. The ADU Virtual Museum is designed to allow Citizen Science inputs for effectively achieving mass participation projects, long-term ecological monitoring, innovative statistical modeling and population-level interpretation of results. Currently, it has achieved approximately 16 million dated and georeferenced records of fauna species.

The ADU was used to identify the presence of the following animal groups:

- Mammals
- Reptiles
- Amphibians

A separate avifauna report gives the full sensitivity of avifauna species for the proposed development site.

Impacts assessment

The methodology for assessing the impact ratings is included in Appendix A: Method of Environmental Assessment at the end of this report. Potential impacts were evaluated against the data captured during the fieldwork to identify relevance to the project area, specifically the proposed powerline development footprint. Impacts were assessed in terms of the construction, operational, decommissioning, rehabilitation, and closure phases. The operational phase refers to that phase of the project where the prospecting is being conducted and once complete, the decommissioning phase will begin.

It should be noted that the Impacts described are not exhaustive, and more impacts may be identified at a later stage as more project-specific information becomes available. Mitigation measures were only applied to impacts deemed relevant based on the impact analysis. The rating rankings for assessing impact significance are shown in Table 1.

Table 1: Impact rating scoring used.

Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered“fatal flaw”.
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

RISK ASSESSMENT & RECOMMENDATIONS

The aim of conducting a risk assessment is to identify the impacts that the current activity, as well as that of the operational phase of which the proposed project will have on the receiving terrestrial environment. If avoidance is not possible, recommendations and practical mitigation measures are mandatory. Only Low-Risk Activities located within the regulated area of the receiving environment will qualify for the proposed project. Considering the proposed project, buffer zones were suggested and mitigation techniques will be advised to ensure that threats are kept to a minimum.

RECEIVING ENVIRONMENT

Critical Biodiversity Areas and Ecological Support Areas

Figure 3 below is a spatial representation of the biodiversity sector plan of the Limpopo Province, relative to the proposed powerline footprint. Critical Biodiversity Areas (CBAs) are terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning., Ecological Support Areas (ESAs) are supporting areas that are intended for safeguarding and/or preventing the degradation of CBAs. Figure 3 shows a large proportion of the proposed development area is categorized into delineated biodiversity areas CBA 1, CBA 2, ESA 1, and ESA 2. Spatial biodiversity results, therefore, indicate that the receiving environment is of great biodiversity significance. Construction activities

should be limited to the lesser sensitive regions of the receiving environment. A closer look at the critical biodiversity areas, show that majority of the sections have undergone transformation.

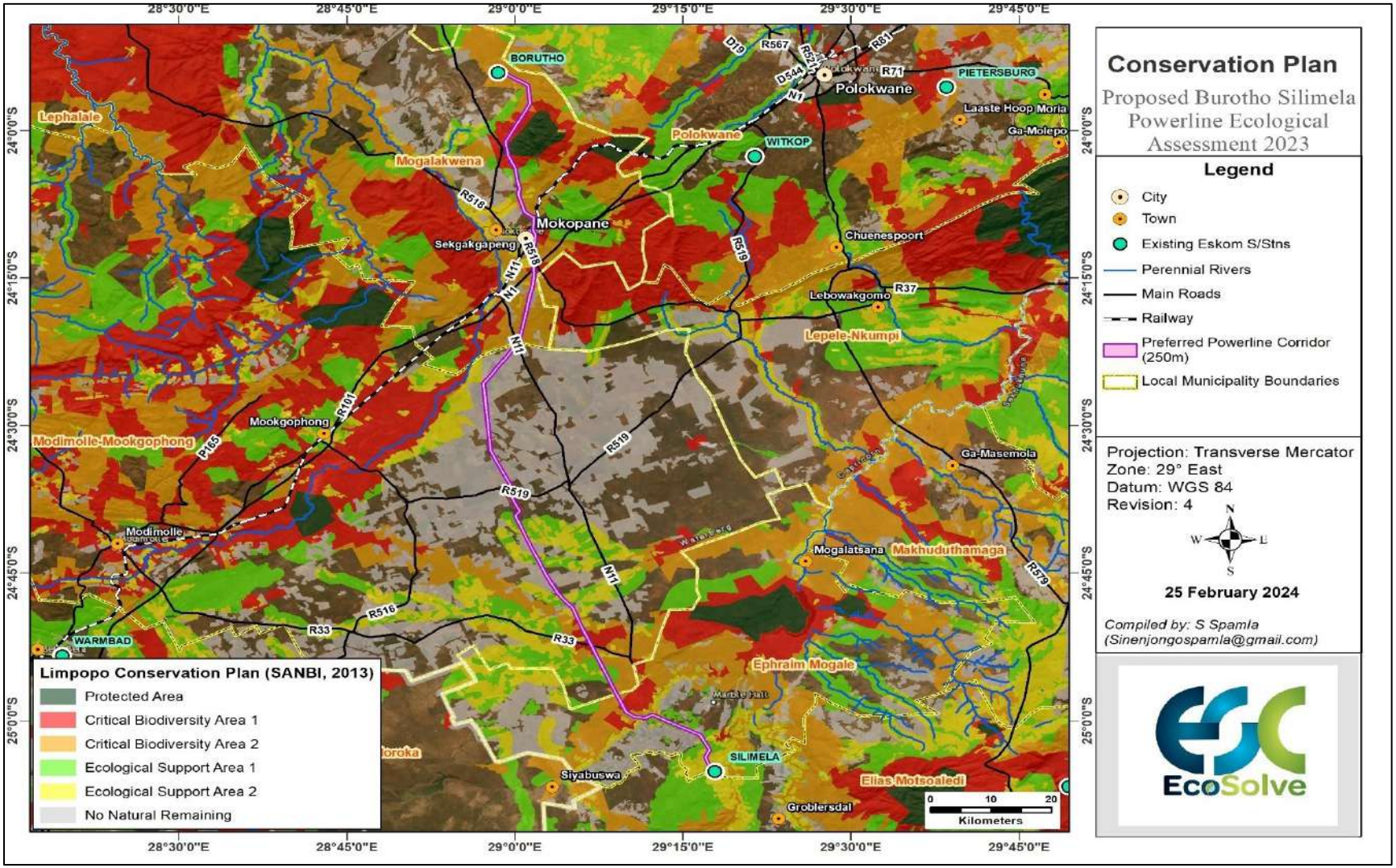


Figure 3: Conservation plan of the receiving environment.

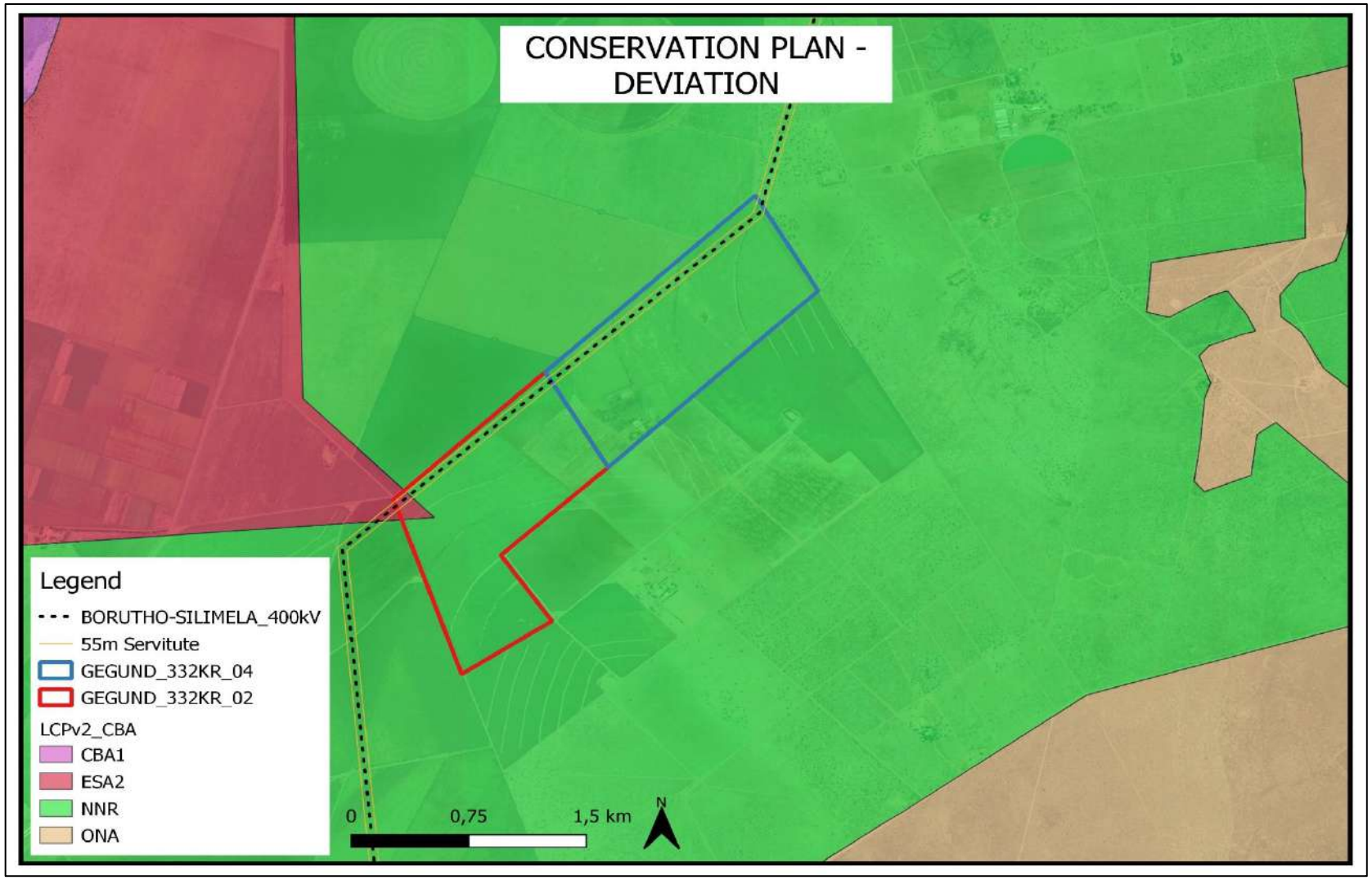
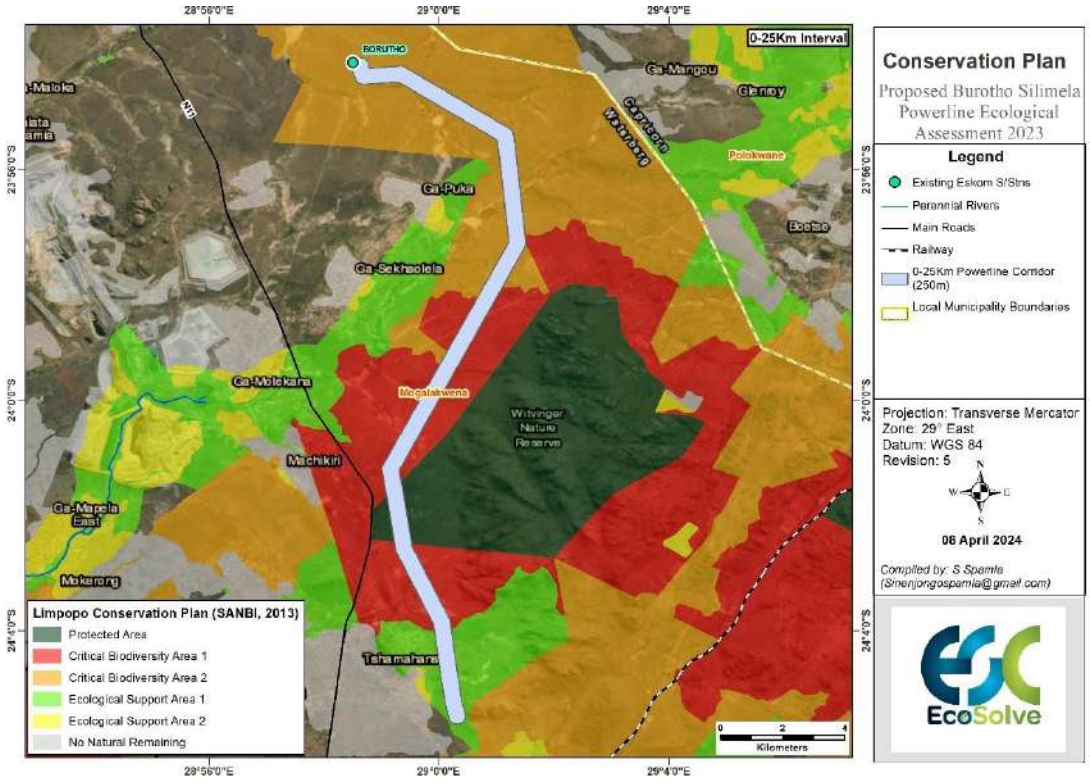
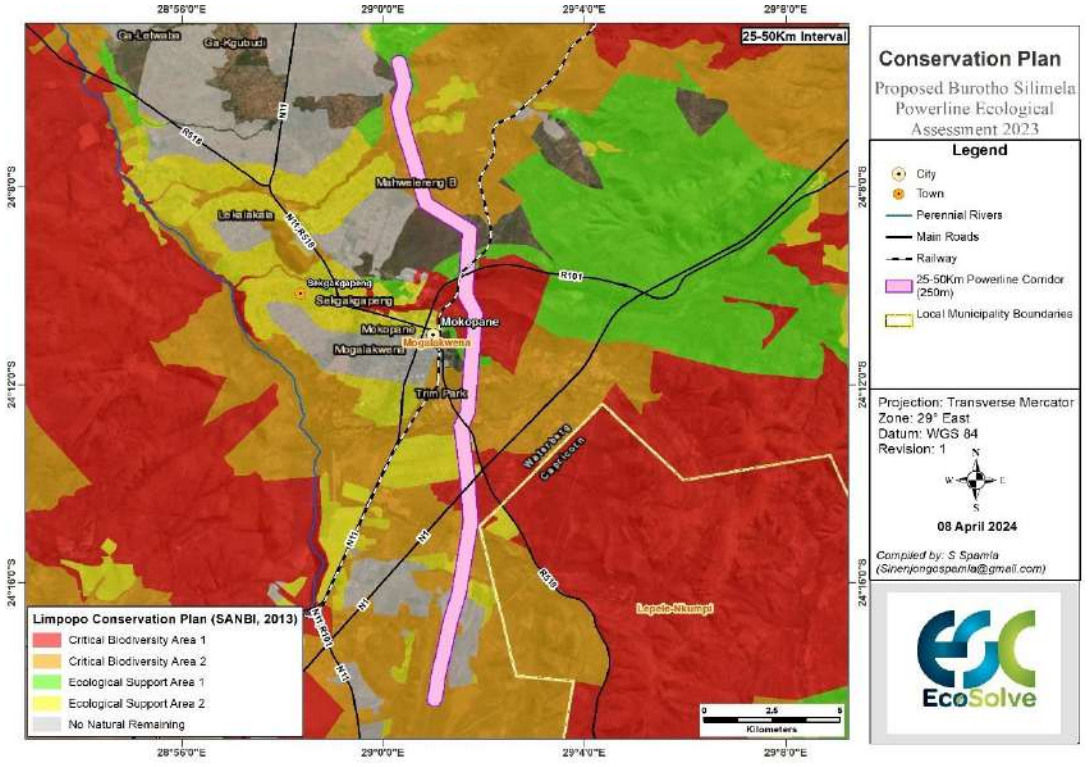
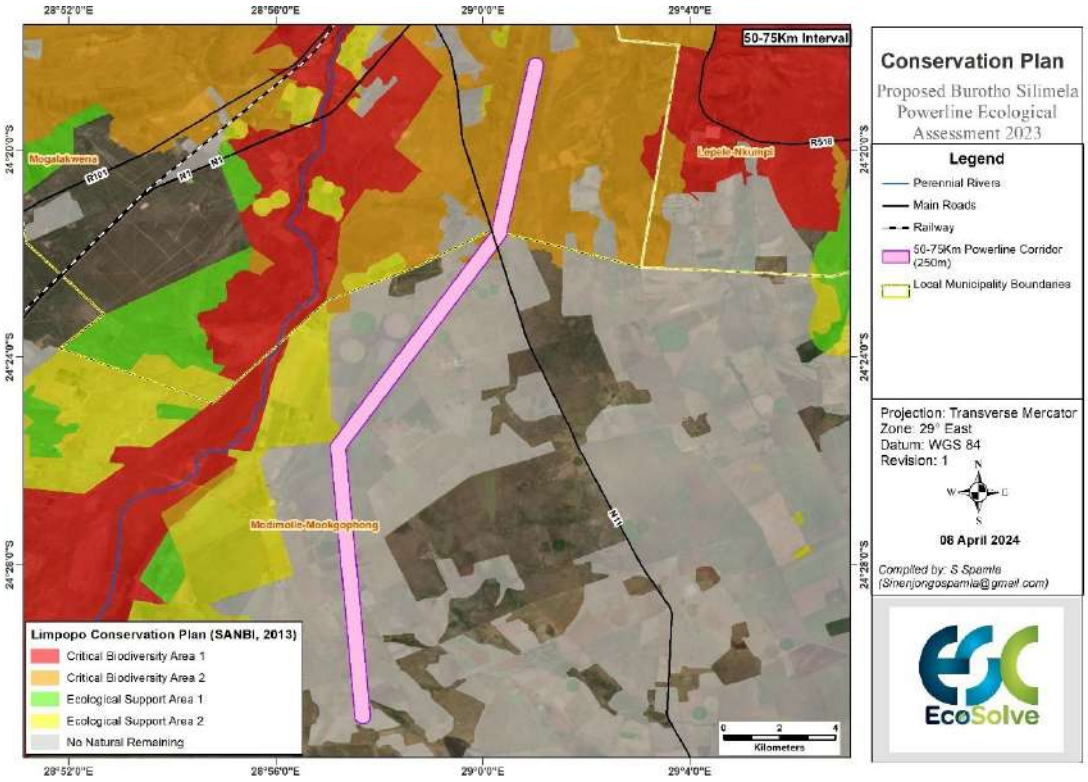
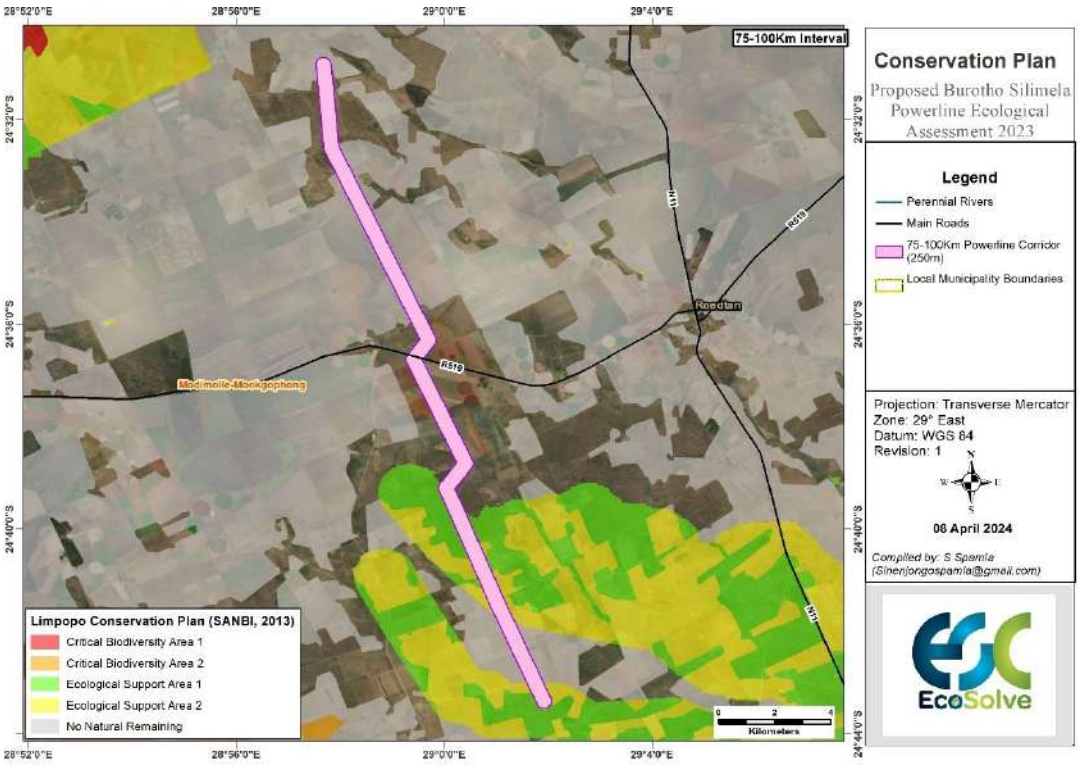


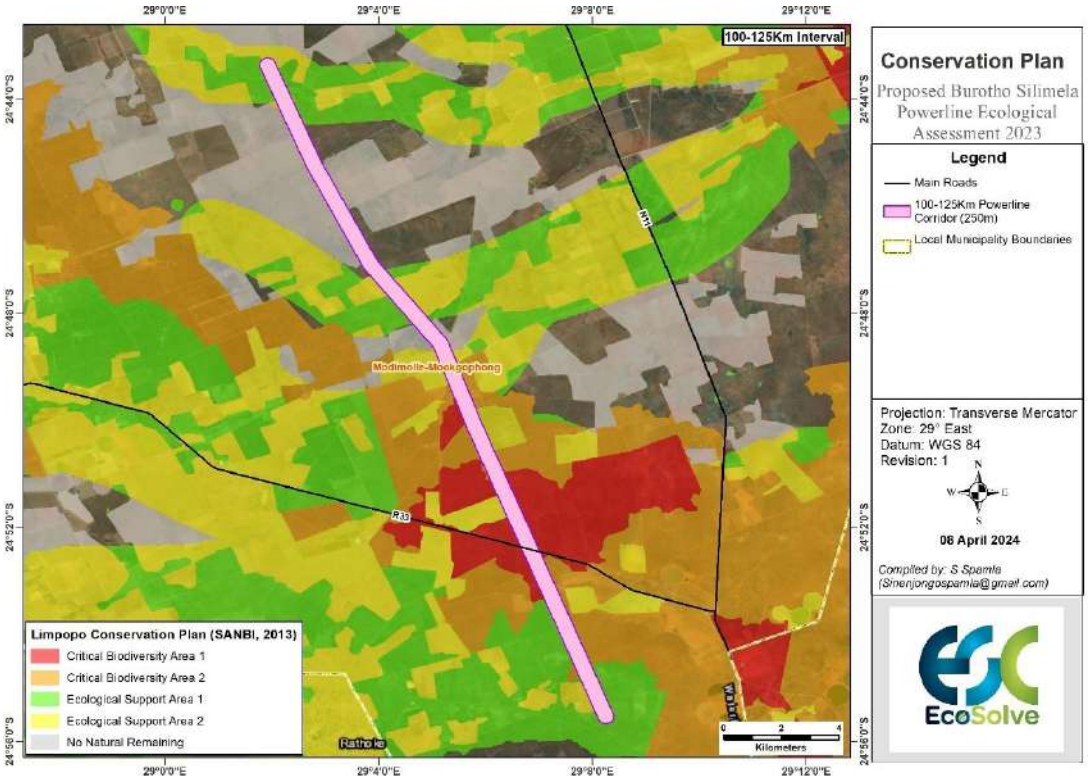
Figure 4: Biodiversity sector plan along the proposed powerline (±5.2 km deviation).

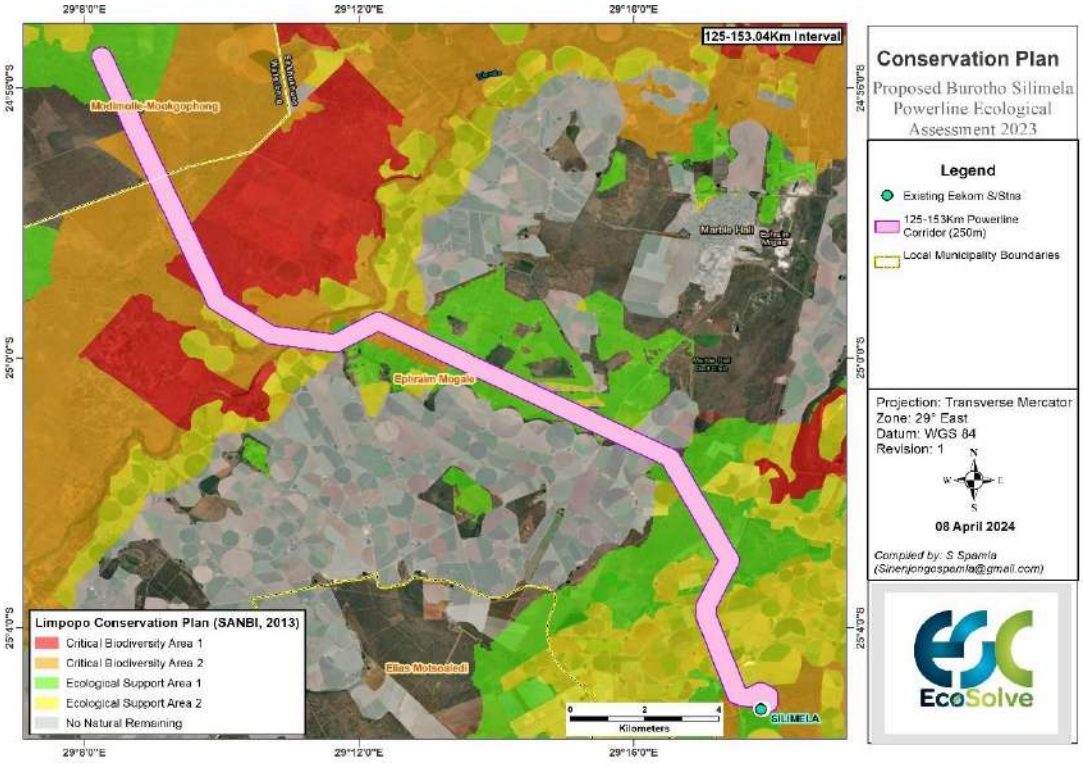

0-25Km Interval
BORUTHO
Ga-Mangou
Glenroy
Polokwane
Ga-Puka
Boetse
Ga-Sekhaolela
Ga-Molekana
Mogalakwena
Machikiri
Ga-Mapela East
Makerong
Tshamahansi
Limpopo Conservation Plan (SANBI, 2013)
Protected Area
Critical Biodiversity Area 1
Critical Biodiversity Area 2
Ecological Support Area 1
Ecological Support Area 2
No Natural Remaining
Kilometers
Conservation Plan
Proposed Burotho Silimela Powerline Ecological Assessment 2023
Legend
Existing Eskom S/Stns
Perennial Rivers
Main Roads
Railway
0-25Km Powerline Corridor (250m)
Local Municipality Boundaries
Projection: Transverse Mercator
Zone: 29° East
Datum: WGS 84
Revision: 5
08 April 2024
Compiled by: S Spamla
(Sinenjongospamla@gmail.com)
EcoSolve


25-50Km Interval
Ga-Lehwaka
Ga-Kgubudi
Mahwelereng B
Lekatakata
Sekgakgapeng
Selgakgapeng
Mokopane
Mogalakwena
Trim Park
Lapolo-Nkumpi
Limpopo Conservation Plan (SANBI, 2013)
Critical Biodiversity Area 1
Critical Biodiversity Area 2
Ecological Support Area 1
Ecological Support Area 2
No Natural Remaining
Kilometers
Conservation Plan
Proposed Burotho Silimela Powerline Ecological Assessment 2023
Legend
City
Town
Perennial Rivers
Main Roads
Railway
25-50Km Powerline Corridor (250m)
Local Municipality Boundaries
Projection: Transverse Mercator
Zone: 29° East
Datum: WGS 84
Revision: 1
08 April 2024
Compiled by: S Spamla
(Sinenjongospamla@gmail.com)
EcoSolve


50-75Km Interval
Conservation Plan
Proposed Burotho Silimela Powerline Ecological Assessment 2023
Legend
Perennial Rivers
Main Roads
Railway
50-75Km Powerline Corridor (250m)
Local Municipality Boundaries
Projection: Transverse Mercator
Zone: 29° East
Datum: WGS 84
Revision: 1
08 April 2024
Compiled by: S Spamla
(Sinenjongospamla@gmail.com)
Limpopo Conservation Plan (SANBI, 2013)
Critical Biodiversity Area 1
Critical Biodiversity Area 2
Ecological Support Area 1
Ecological Support Area 2
No Natural Remaining
Mogalakwena
Lepele-Nkumpi
Modimolle-Mookgophong
R510
R518
N1
Kilometers
EcoSolve


75-100Km Interval
Conservation Plan
Proposed Burotho Silimela Powerline Ecological Assessment 2023
Legend
Perennial Rivers
Main Roads
75-100Km Powerline Corridor (250m)
Local Municipality Boundaries
Projection: Transverse Mercator
Zone: 29° East
Datum: WGS 84
Revision: 1
08 April 2024
Compiled by: S Spamla
(Sinenjongospamla@gmail.com)
Limpopo Conservation Plan (SANBI, 2013)
Critical Biodiversity Area 1
Critical Biodiversity Area 2
Ecological Support Area 1
Ecological Support Area 2
No Natural Remaining
Roedtan
Modimolle-Mookgophong
R518
N1
Kilometers
EcoSolve


100-125Km Interval
Conservation Plan
Proposed Burotho Silimela Powerline Ecological Assessment 2023
Legend
Main Roads
100-125Km Powerline Corridor (250m)
Local Municipality Boundaries
Projection: Transverse Mercator
Zone: 29° East
Datum: WGS 84
Revision: 1
08 April 2024
Compiled by: S Spamla
(Sinenjongospamla@gmail.com)
Limpopo Conservation Plan (SANBI, 2013)
Critical Biodiversity Area 1
Critical Biodiversity Area 2
Ecological Support Area 1
Ecological Support Area 2
No Natural Remaining
Modimolle-Mookgophong
Ratholo
Kilometers
EcoSolve


125-153.04Km Interval
Conservation Plan
Proposed Burotho Silimela Powerline Ecological Assessment 2023
Legend
Existing Eskom S/Stns
125-153Km Powerline Corridor (250m)
Local Municipality Boundaries
Projection: Transverse Mercator
Zone: 29° East
Datum: WGS 84
Revision: 1
08 April 2024
Compiled by: S Spamla
(Sinenjongospamla@gmail.com)
Limpopo Conservation Plan (SANBI, 2013)
Critical Biodiversity Area 1
Critical Biodiversity Area 2
Ecological Support Area 1
Ecological Support Area 2
No Natural Remaining
Modimolle-Mookgophong
Marble Hall
Ephraim Mogale
Elias Motsoaledi
SILIMELA
Kilometers
EcoSolve

Protected and Conservation Areas

The definition of protected areas used in these documents follows the definition of a protected area as defined in the National Environmental Management: Protected Areas Act (Act 57 of 2003). Chapter 2 of the National Environmental Management: Protected Areas Act, 2003 sets out the "System of Protected Areas", which consists of the following kinds of protected areas:

- Special nature reserves;
- National parks;
- Nature reserves;
- Protected environments (1-4 declared in terms of the National Environmental Management: Protected Areas Act, 2003);
- World heritage sites declared in terms of the World Heritage Convention Act;
- Marine protected areas declared in terms of the Marine Living Resources Act;
- Specially protected forest areas, forest nature reserves, and forest wilderness areas declared in terms of the National Forests Act, 1998 (Act No. 84 of 1998); and
- Mountain catchment areas declared in terms of the Mountain Catchment Areas Act, 1970 (Act No. 63 of 1970).

The following protected and conservation areas are found along the proposed powerline:

1. Witvinger Nature Reserve
2. Doelen Private Nature Reserve
3. Palmer Private Nature Reserve
4. Somerset Private Nature Reserve
5. Potgietersus Nature Resrve

Vegetation

The proposed development footprint falls on the Savanna Biome. The Savanna Biome is the largest, comprising 32.5% of the land in South Africa and Eswatini combined. The Savanna Biome is dominated by a grassy and herbaceous layer with a woody upper layer of low to tall trees. Within the Savanna Biome, the proposed development falls on the Central Bushveld Savanna Bioregion (Figure 5). Within the Central Bushveld Savanna Bioregion, the authorized corridor runs dominantly on the Springbokvlakte Thornveld (SVcb 15) vegetation type. The Springbokvlakte Thornveld (SVcb 15) vegetation type is dominated by Vachellia species and a shrubby grassland layer. Smaller portions of the corridor also run through other vegetation types, namely, the Makhado Sweet Bushveld and Springbokvlakte Thornveld (Figure 5).

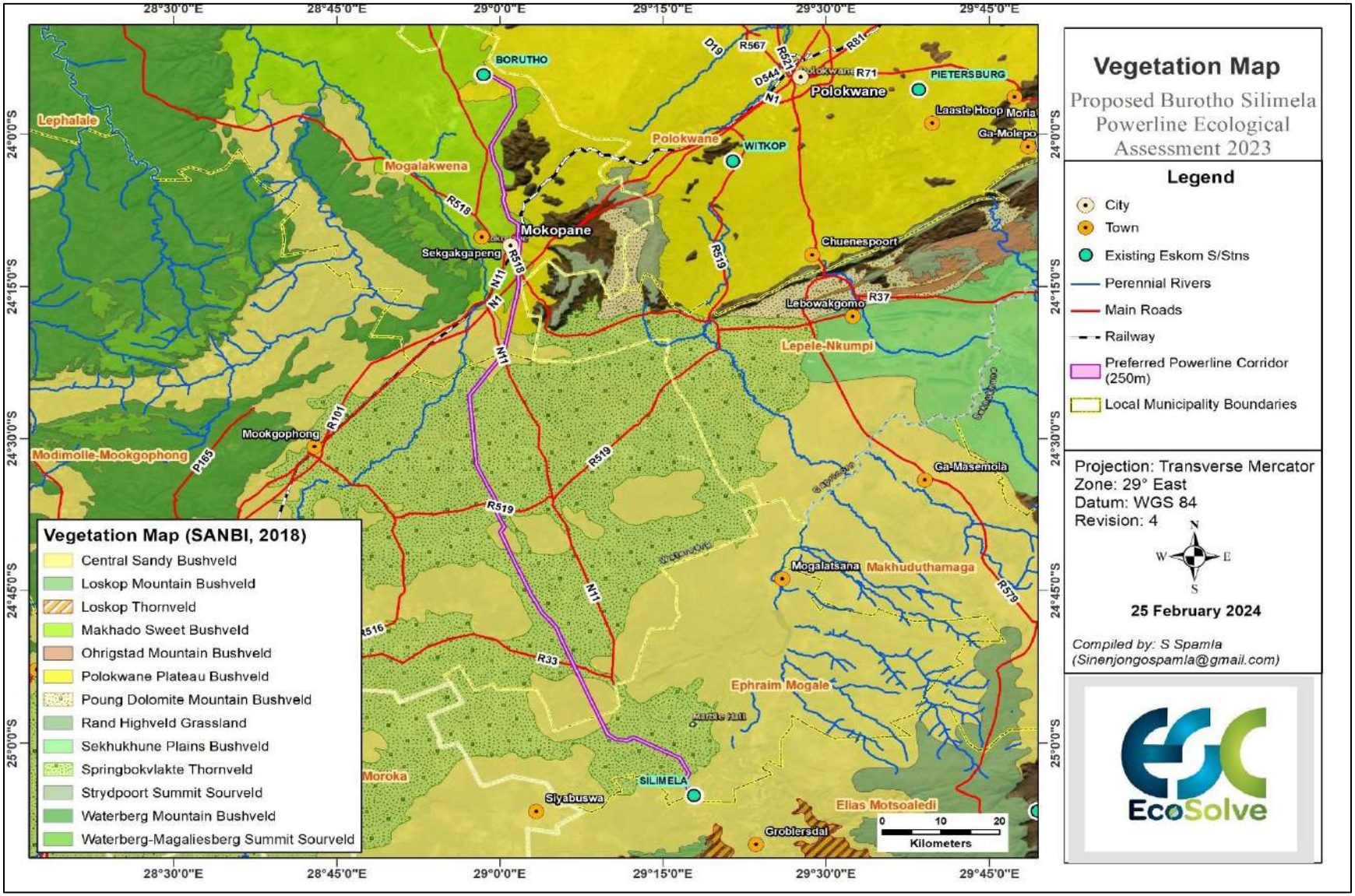
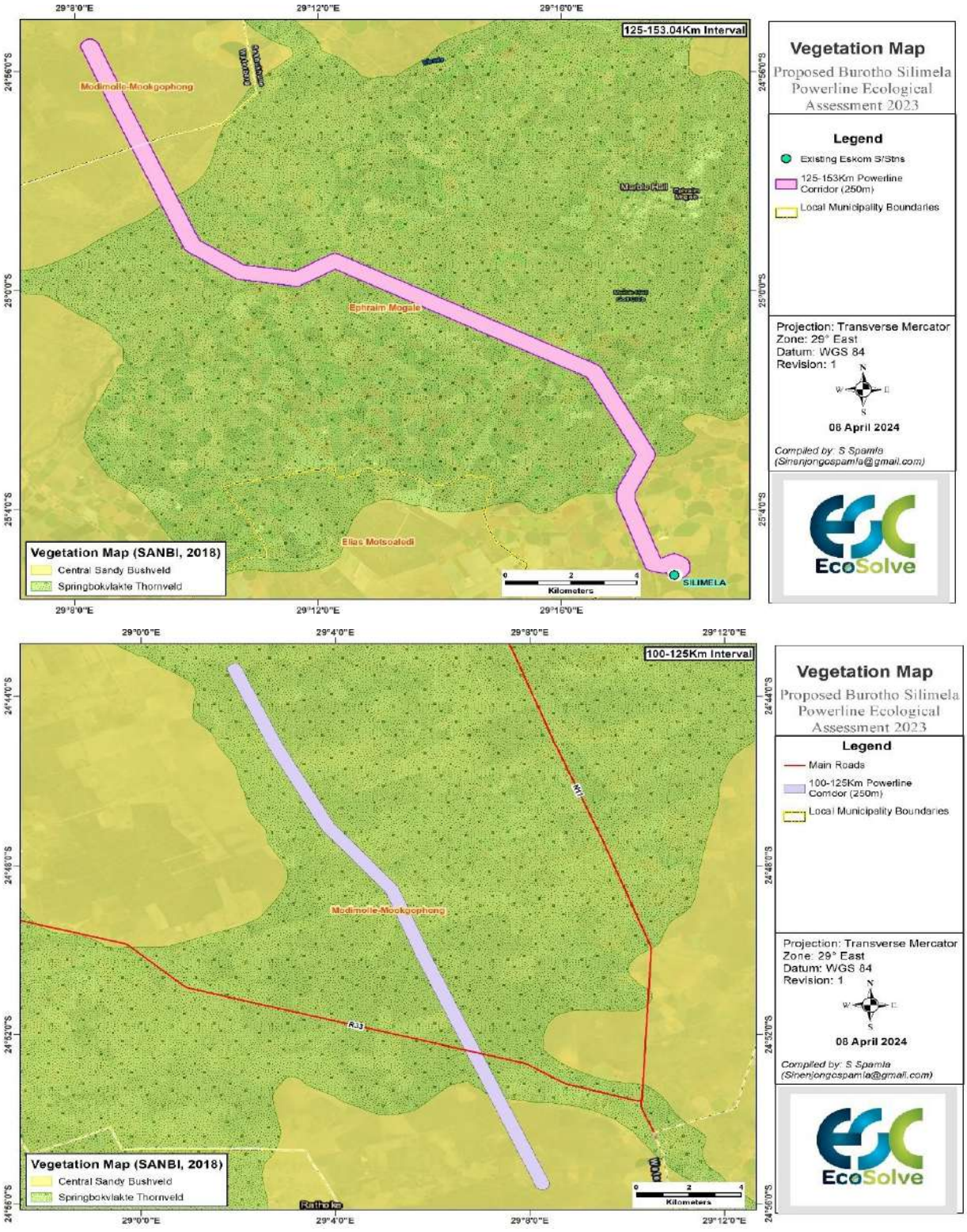
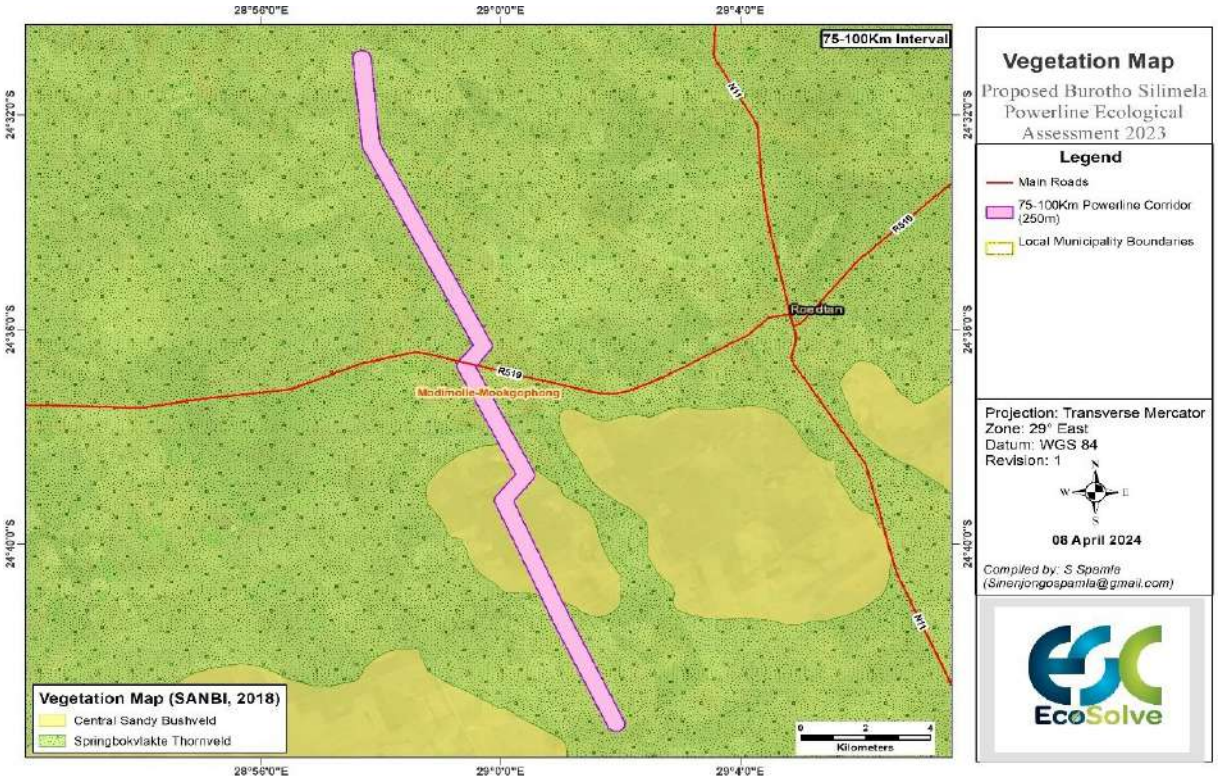
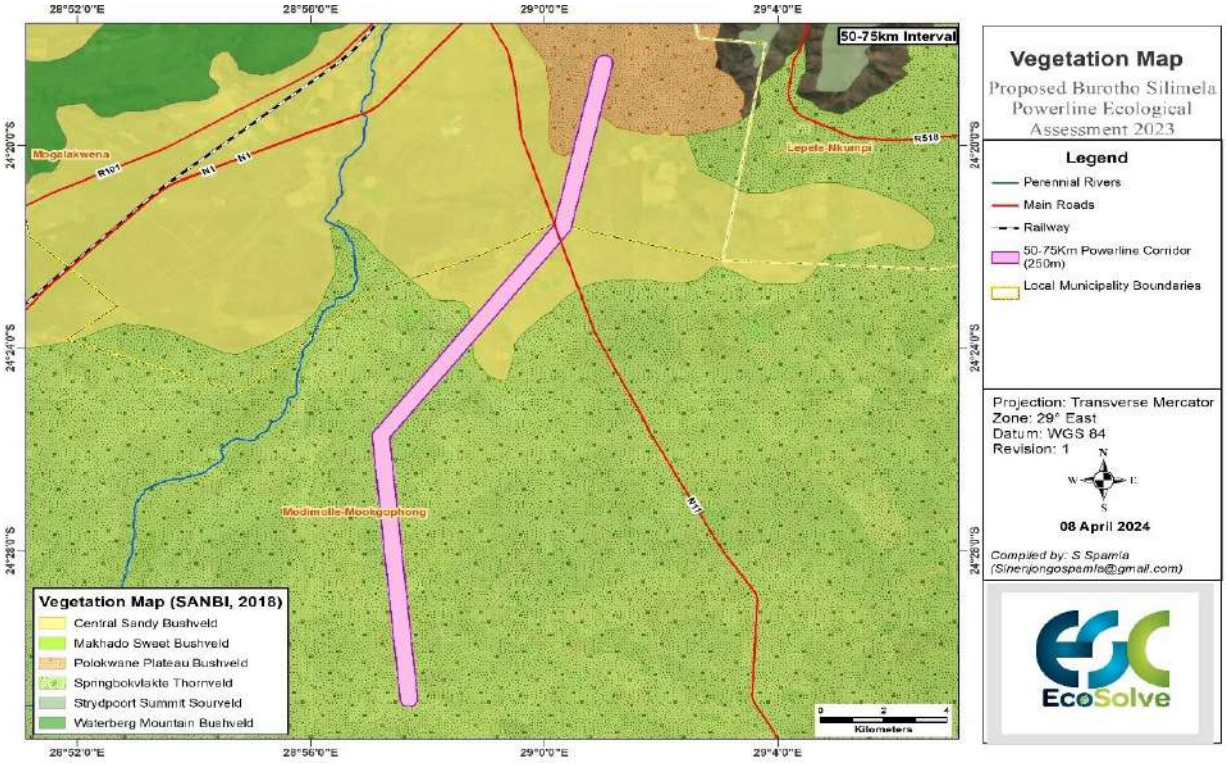
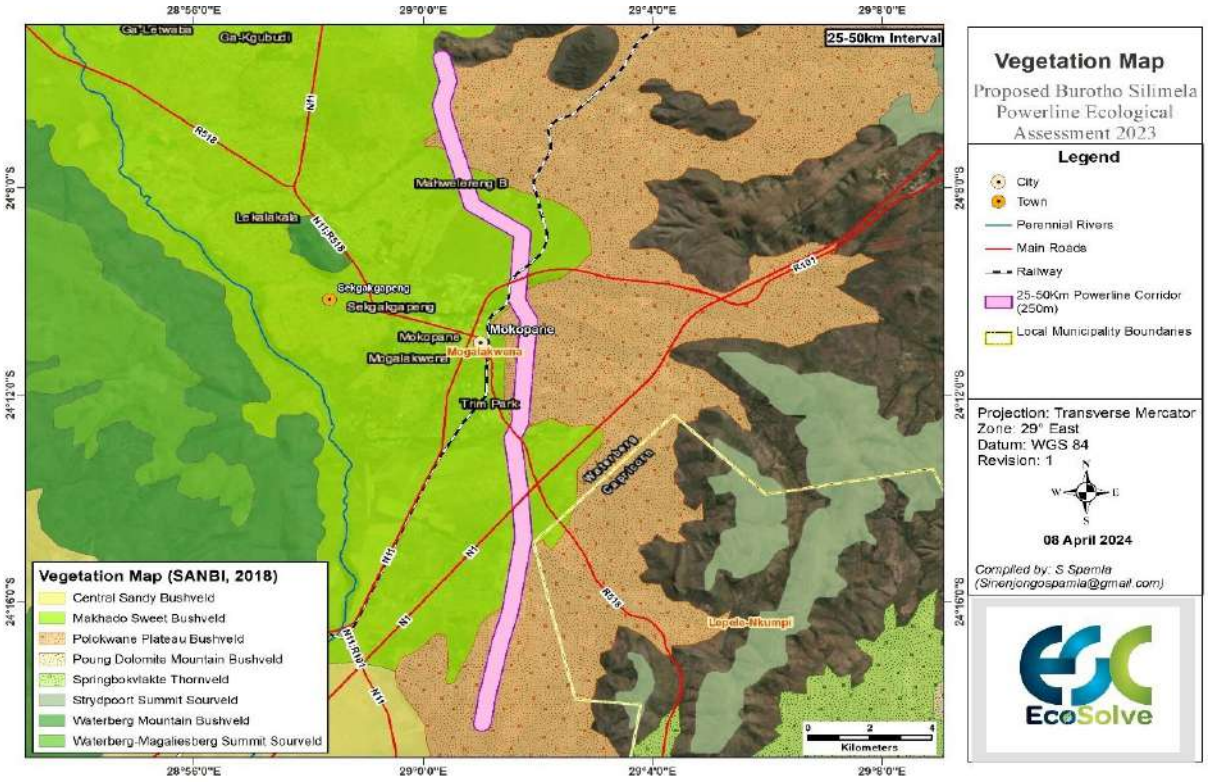


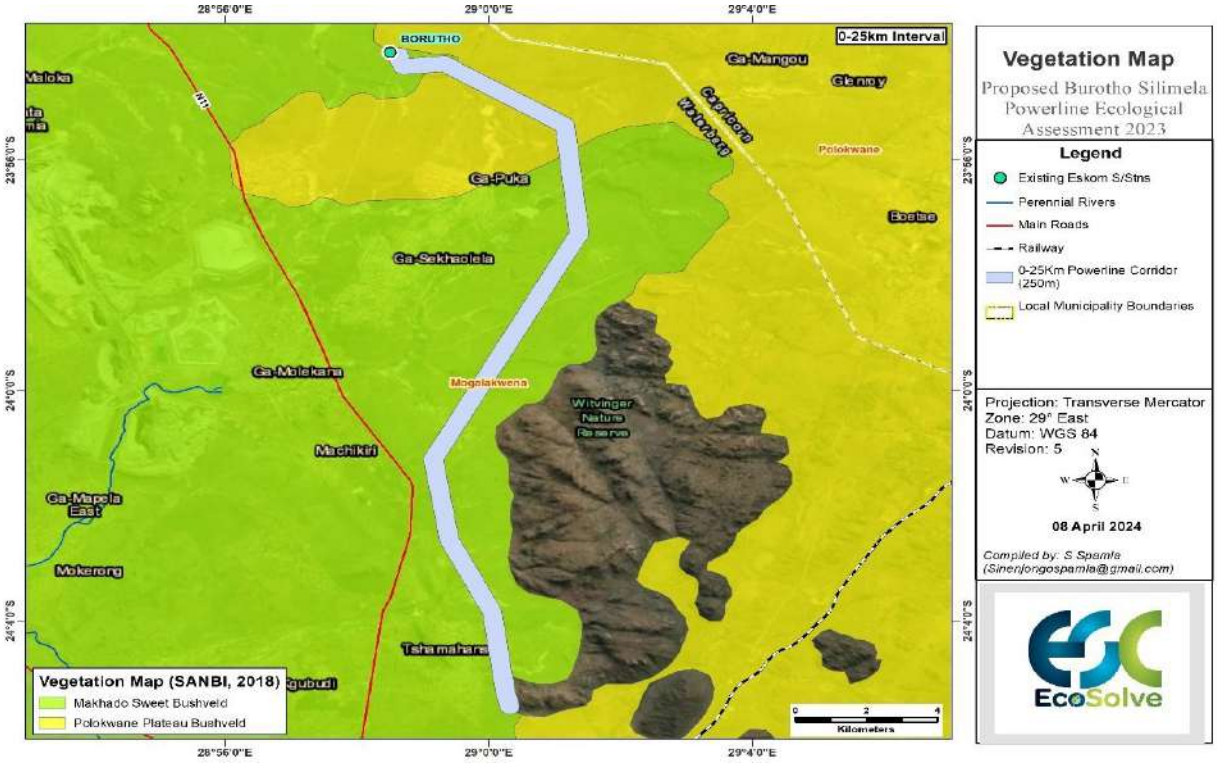
Figure 5: Vegetation map of receiving environment.


125-153.04Km Interval
Modimolle-Mookgophong
Ephraim Mogale
Elias Motsoaledi
SILIMELA
Vegetation Map (SANBI, 2018)
Central Sandy Bushveld
Springbokvlakte Thornveld
Kilometers
Vegetation Map
Proposed Burotho Silimela Powerline Ecological Assessment 2023
Legend
Existing Eskom S/Stns
125-153Km Powerline Corridor (250m)
Local Municipality Boundaries
Projection: Transverse Mercator
Zone: 29° East
Datum: WGS 84
Revision: 1
08 April 2024
Compiled by: S Spamla
(Sinenjongospamla@gmail.com)
EcoSolve
100-125Km Interval
Modimolle-Mookgophong
R33
Ratholo
Vegetation Map (SANBI, 2018)
Central Sandy Bushveld
Springbokvlakte Thornveld
Kilometers
Vegetation Map
Proposed Burotho Silimela Powerline Ecological Assessment 2023
Legend
Main Roads
100-125Km Powerline Corridor (250m)
Local Municipality Boundaries
Projection: Transverse Mercator
Zone: 29° East
Datum: WGS 84
Revision: 1
08 April 2024
Compiled by: S Spamla
(Sinenjongospamla@gmail.com)
EcoSolve


75-100Km Interval
Vegetation Map
Proposed Burotho Silimela Powerline Ecological Assessment 2023
Legend
Main Roads
75-100Km Powerline Corridor (250m)
Local Municipality Boundaries
Projection: Transverse Mercator
Zone: 29° East
Datum: WGS 84
Revision: 1
08 April 2024
Compiled by: S Spamla
(Sinenjongospamla@gmail.com)
EcoSolve
Vegetation Map (SANBI, 2018)
Central Sandy Bushveld
Springbokvlakte Thornveld
Modimolle-Mookgophong
Roedtan
N11
R519
R510
Kilometers


50-75km Interval
Vegetation Map
Proposed Burotho Silimela Powerline Ecological Assessment 2023
Legend
Perennial Rivers
Main Roads
Railway
50-75Km Powerline Corridor (250m)
Local Municipality Boundaries
Projection: Transverse Mercator
Zone: 29° East
Datum: WGS 84
Revision: 1
08 April 2024
Compiled by: S Spamla
(Sinenjongospamla@gmail.com)
EcoSolve
Vegetation Map (SANBI, 2018)
Central Sandy Bushveld
Makhado Sweet Bushveld
Polokwane Plateau Bushveld
Springbokvlakte Thornveld
Strydpoort Summit Sourveld
Waterberg Mountain Bushveld
Mogalakwena
Lepele-Nkumpi
Modimolle-Mookgophong
N1
N11
R101
R518
Kilometers


25-50km Interval
Vegetation Map
Proposed Burotho Silimela Powerline Ecological Assessment 2023
Legend
City
Town
Perennial Rivers
Main Roads
Railway
25-50Km Powerline Corridor (250m)
Local Municipality Boundaries
Projection: Transverse Mercator
Zone: 29° East
Datum: WGS 84
Revision: 1
08 April 2024
Compiled by: S Spamla
(Sinenjongospamla@gmail.com)
Vegetation Map (SANBI, 2018)
Central Sandy Bushveld
Makhado Sweet Bushveld
Polokwane Plateau Bushveld
Poung Dolomite Mountain Bushveld
Springbokvlakte Thornveld
Strydpoort Summit Sourveld
Waterberg Mountain Bushveld
Waterberg-Magaliesberg Summit Sourveld
Ga-Lekwatla
Ga-Kgubudi
Mahwelereng B
Lekalakala
Sekgakgapeng
Mokopane
Mogalakwena
Trim Park
Lapeile-Nkumpi
Kilometers


0-25km Interval
Vegetation Map
Proposed Burotho Silimela Powerline Ecological Assessment 2023
Legend
Existing Eskom S/Stns
Perennial Rivers
Main Roads
Railway
0-25Km Powerline Corridor (250m)
Local Municipality Boundaries
Projection: Transverse Mercator
Zone: 29° East
Datum: WGS 84
Revision: 5
08 April 2024
Compiled by: S Spamla
(Sinenjongospamla@gmail.com)
Vegetation Map (SANBI, 2018)
Makhado Sweet Bushveld
Polokwane Plateau Bushveld
BORUTHO
Maloka
Ga-Mangou
Glenroy
Polokwane
Ga-Puka
Boetse
Ga-Sekhaolela
Ga-Molekana
Mogalakwena
Witvinger Nature Reserve
Machikiri
Ga-Mapela East
Mokerong
Tshamahansi
Kilometers

Climate

The climate of the area is generally sub-tropical, with almost exclusively summer rainfall and dry winter. The mean annual precipitation of the area is between 400 – 650 mm (Figure 6). The mean annual temperature has a wide range of between 35.2 °C and -2.0 °C.

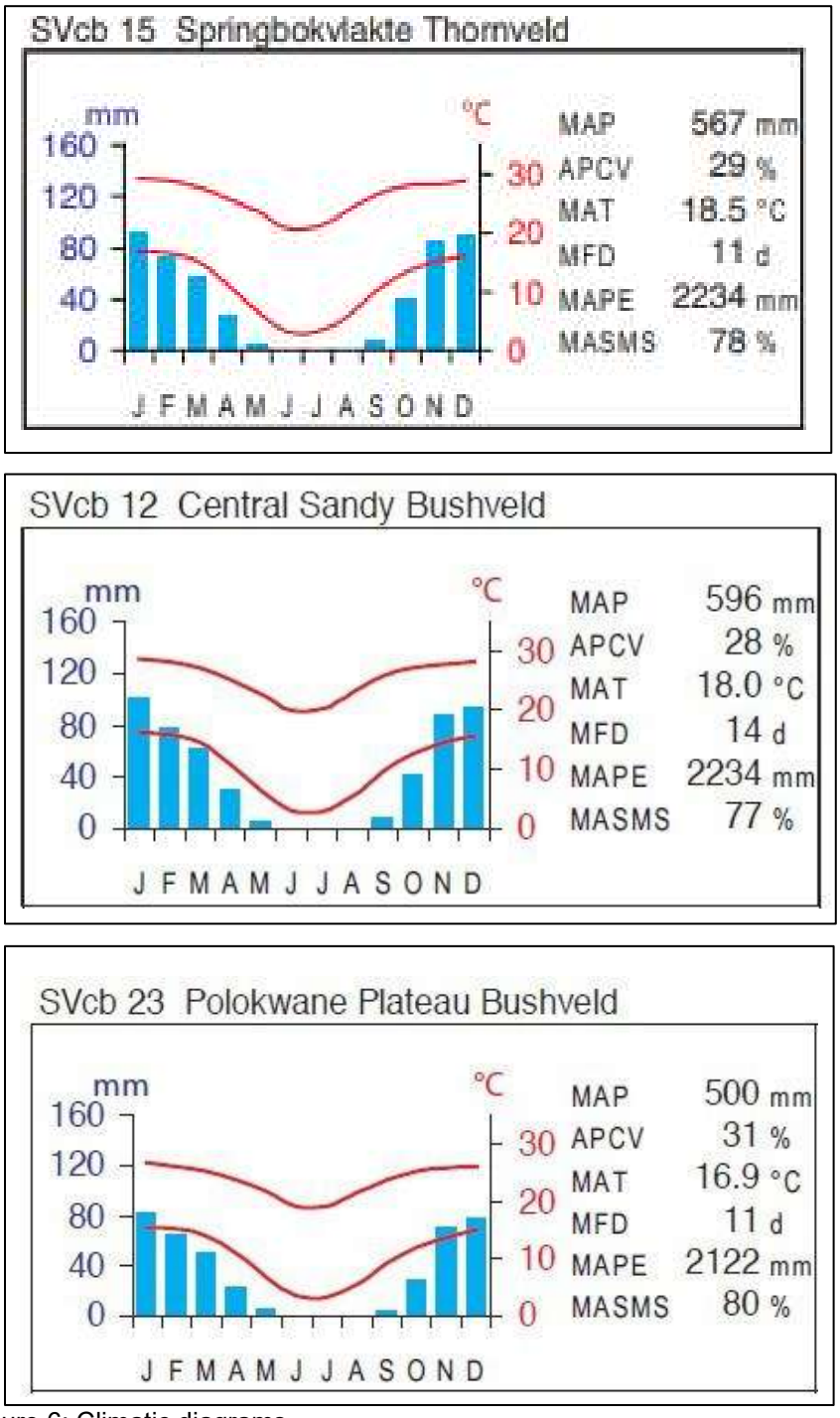


Figure 6: Climatic diagrams.

Land-use

The Savanna Biome is extensively used for livestock and game ranching, including numerous well-known wildlife sanctuaries.

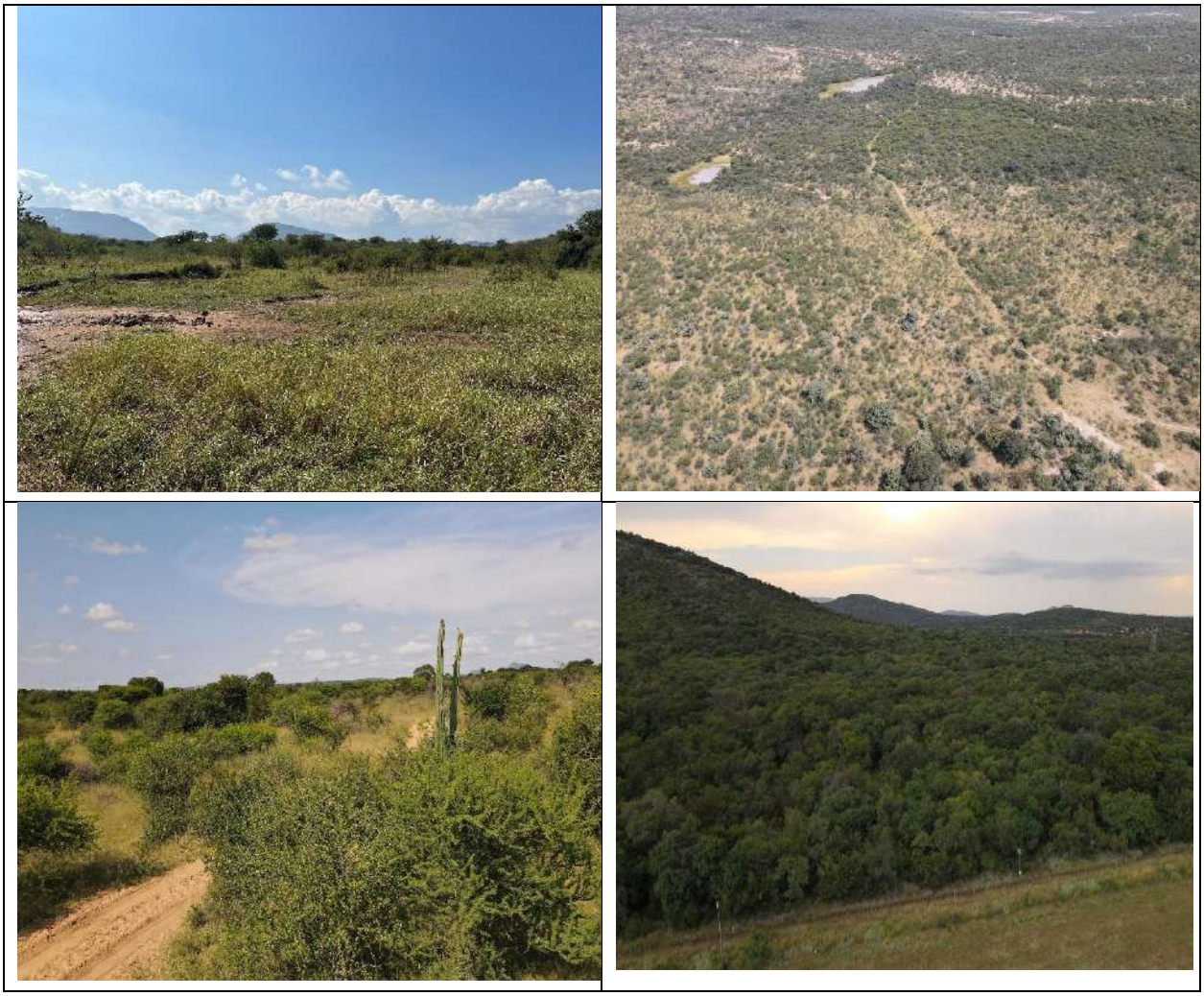
DESKTOP ASSESSMENT

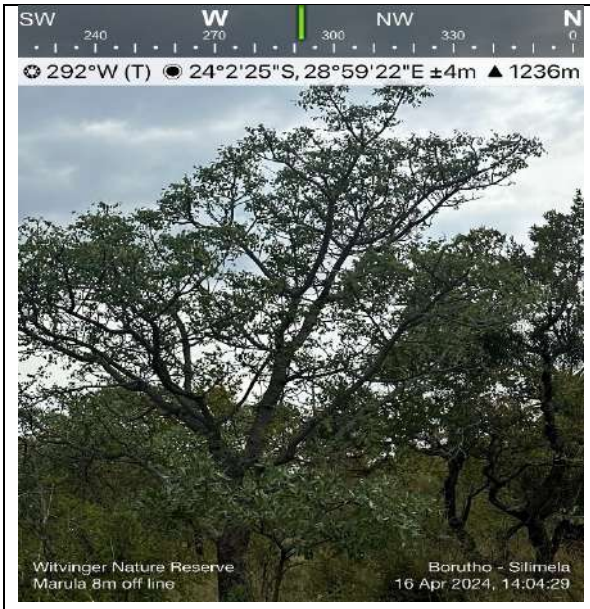
Flora assessment

Mucina and Rutherford (2006) were consulted at the desktop level to understand the habitat types and flora species composition, especially quantifying the presence of Red Data or species of conservation importance within the proposed powerline area.

Descriptions of vegetation types

A. Borutho Substation and southern part of the powerline (Mokopane).





Makhado Sweet Bushveld

This vegetation stretches from Borutho Substation and runs along the national route 11 (N11) towards Tshamahansi village. Polokwane Plateau Bushveld intercepts immediately after the substation until Ga Puka village. Some section of the powerline cuts through the corner of Witvinger Nature Reserve and also Potgietersrus Nature Reserve. In these two areas there were several Marula trees observed. The powerline runs through natural and disturbed areas (Potgietersrus Nature Reserve), especially near villages where there is illegal sand minings.

Plant species present in this vegetation type include:

Trees

	Observsed? (Y/N		Observsed? (Y/N		Observsed ? (Y/N
Acacia erubescens (d)	Y	*Commiphora pyracanthoides*	Y	*Pechuel-Loeschea leubnitziae*	N
A. gerrardii (d)	N	*Dichrostachys cinerea*	Y	*Rhigozum obovatum*	N
A. mellifera subsp. detinens (d)	Y	*Grewia flava*	Y	*Terminalia sericea*	Y
A. rehmanniana (d)	Y	*Hibiscus calyphyllus*	N	*Sclerocarya birrea* subsp. *Caffra* (protected)	Y
A. tortilis subsp. heteracantha	Y	*Hirpicium bechuanense*	N	*Aloe marlothii*	Y

Barleria lancifolia	N	*Indigofera poliotes*	N	*Euphorbia ingens*	Y
Boscia albitrunca (d)	N	*Lycium shawii*	Y		
Combretum apiculatum (d)	Y	*Melhania rehmannii*	Y		
C. zeyheri	Y				

Grasses and Herbs

	Observsed? (Y/N)		Observsed? (Y/N)
Anthephora pubescens (d)	N	*Schmidtia pappophoroides*	N
Aristida stipitata subsp. graciliflora (d)	Y	*Urochloa mosambicensis*	Y
Cenchrus ciliaris (d)	Y	*Corbichonia decumbens*	N
Brachiaria nigropedata	Y	*Hibiscus calyphyllus*	N
Eragrostis trichophora	Y	*Harpagophytum procumbens subsp. transvaalense*	N
Panicum coloratum	N	*Heliotropium steudneri*	N
P. maximum	Y	*Hemizygia elliottii*	N
Osteospermum muricatum	Y	*Tephrosia purpurea subsp.* *leptostachya*	N
		Hermbstaedtia odorata	N
		Leucas sexdentata	N

Polokwane Plateau Bushveld

Trees

	Observed? Y/N		Observed? Y/N		Observed? Y/N
Acacia caffra (d)	Y	*Aloe marlothii subsp. marlothii*	Y	*Tephrosia rhodesica*	N
A. permixta (d)	N	*Gymnosporia senegalensis*	Y	*Triumfetta pilosa var. tomentosa*	N
A. karroo	Y	*Combretum hereroense*	Y	*Anthospermum rigidum subsp. rigidum*	N

A. tortilis subsp. heteracantha	Y	*Diospyros lycioides subsp. sericea*	Y	*Gymnosporia glaucophylla*	N
A. hebeclada subsp. hebeclada	N	*Euclea crispa subsp. crispa*	Y	*Hirpicium bechuanense*	N
Combretum molle	Y	*Heteromorpha arborescens var. abyssinica*	N	*Lantana rugosa*	N
Ormocarpum kirkii	N	*Lippia javanica*	Y	*Senecio burchellii*	N
Ziziphus mucronata	Y	*Rhus pyroides var. pyroides*	Y	*Sida rhombifolia*	N
Solanum panduriforme	N	*Aloe cryptopoda*	N	*Asparagus africanus*	Y
Momordica balsamina	N	*Rubia petiolaris*	N		

Grasses and Herbs

Aristida diffusa (d)	*Digitaria diagonalis*	*Sporobolus africanus*
Aristida congesta	*Diheteropogon amplectens*	
Brachiaria nigropedata (d)	*Elionurus muticus*	*Leucas sexdentata*
Digitaria eriantha subsp. eriantha (d)	*Eragrostis gummiflua*	*Felicia mossamedensis*
Brachiaria nigropedata	*E. racemosa*	*Hermbstaedtia odorata*
Eragrostis curvula(d)	*E. superba*	*Pollichia campestris*
Themeda triandra (d)	*Eustachys paspaloides*	*Eulophia petersii*
Cymbopogon caesius	*Panicum maximum*	*Hypoxis hemerocallidea*
Cynodon dactylon	*Pogonarthria squarrosa*	*Aloe greatheadii var. greatheadii*
Mosdenia leptostachys	*Oxygonum dregeanum subsp. canescens*	*Ledebouria crispa*

B. Southern part of N1 towards Roedtan to Silimela Substation

These sections are dominated by Springbokvlakte Thronveld, with Central Sandy Bushveld vegetation intercepting after N1, outside Roedtan and at Silimela Substation. In this area the powerline traverse areas dominated by commercial crop farming.

Springbokvlakte Thornveld

Trees and shrubs

	Observed? Y/N		Observed? Y/N		Observed? Y/N
Acacia karroo (d)	*Y*	*Grewia flava*		*Diospyros lycioides subsp. lycioides*	Y
A. luederitzii var. retinens (d),	*N*	*Tarchonanthus camphoratus*	*N*	*Dichrostachys cinerea*	*Y*
A. mellifera subsp. detinens (d)	*Y*	*Acacia tenuispina*	*N*	*Kleinia longiflora*	*N*
A. nilotica (d)	*Y*	*Ptycholobium plicatum*	*N*	*Rhynchosia minima*	*N*

A. tortilis subsp. heteracantha	*N*	*Momordica balsamina*	*N*	*Rhus engleri (d)*	*Y*
Ziziphus mucronata (d)	*Y*	*Boscia foetida subsp. rehmanniana*	*N*		
		Euclea undulata (d)	*Y*		

Grasses and Herbs

	Observed? Y/N		Observed? Y/N		Observed? Y/N
Aristida bipartita (d)	*Y*	*Aspilia mossambicensis*	*N*	*indigastrum parviflorum*	*N*
Dichanthium annulatum var. papillosum (d),	*Y*	*Diheteropogon amplectens*	*N*	*Nidorella hottentotica*	*Y*
Ischaemum afrum (d)	*N*	*Mosdenia leptostachys*	*N*	*Orthosiphon suffrutescens*	*N*
Setaria incrassata (d)	*Y*	*Eragrostis gummiflua*	*N*	*Mosdenia leptostachys*	*N*
Brachiaria eruciformis	*N*	*E. racemosa*	*Y*	*Senecio apiifolius*	*N*

Alien invasive plants

Invasive alien species have been identified as the second greatest driver of habitat destruction by outcompeting native biodiversity. Biological invasions have deleterious impacts on water quality, microclimate, soil nutrients, agricultural economies, and fire regime, listing them among the most prominent influencers of ecological change. Within the jurisdiction of the proposed project area, previously observed invasive alien plants at high infestations in the Springbokvlakte Thornveld (SVcb 15) vegetation types include *Cereus jamacaru*, *Eucalyptus* species, *Lantana camara*, *Melia azedarach*, *Opuntia ficus-indica* and *Sesbania punicea* (Mucina and Rutherford, 2006).

Fauna assessment

Based on historical data of the Animal Demographic Units (ADU) Virtual Museum, the following fauna species occur on site:

Table 2: List of mammal, reptile and amphibian species from ADU Virtual Museum records using the 2529AA, 2529AB, 2428DB, 2429CA, 2428BD, 2429AC, 2428BB, 2429AA and 2328DD Quarter Degree Squares.

Mammals	Amphibians	Reptiles
Arctocephalus pusillus pusillus	*Schismaderma carens*	*Nucras holubi*
Mirounga leonina	*Sclerophrys gutturalis*	*Panaspis wahlbergii*
Genetta tigrina	*Amietia delalandii*	*Varanus niloticus*
Caracal caracal	*Phrynomantis bifasciatus*	*Hemidactylus mabouia*
Cercopithecus albogularis erythrarchus	*Tomopterna cryptotis*	*Trachylepis varia sensu lato*
Elephantulus myurus	*Cacosternum boettgeri*	*Chondrodactylus turneri*
Procavia capensis capensis	*Sclerophrys garmani*	*Lygodactylus capensis*
Taphozous (Taphozous) mauritianus	*Xenopus laevis*	*Acanthocercus atricollis*
Dendromus melanotis	*Ptychadena mossambica*	*Lygodactylus capensis*
Georychus capensis	*Tomopterna cryptotis*	*Trachylepis punctatissima*
Herpestes pulverulentus	*Cacosternum boettgeri*	*Acanthocercus atricollis*
Malacothrix typica	*Pyxicephalus adspersus*	
Chlorocebus pygerythrus pygerythrus	*Pyxicephalus edulis*	
Oryx gazella	*Tomopterna cryptotis*	
Xerus inauris	*Pyxicephalus adspersus*	
Procavia capensis capensis	*Poyntonophrynus fenoulheti*	
Lepus saxatilis	*Ptychadena anchietae*	
Pronolagus rupestris	*Chiromantis xerampelina*	
Raphicerus campestris	*Kassina senegalensis*	
Rhabdomys pumilio		
Elephantulus edwardii		
Equus zebra zebra		
Otocyon megalotis		
Raphicerus campestris		
Lepus capensis		
Raphicerus campestris		
Cynictis penicillata		
Cephalophus natalensis		

NB: None of the Mammalia, Reptile or Amphibian species are Red Data or of conservation concern.

Sensitivity of receiving environment

The DFFE screening tool was consulted using the feasibility region shown in figure 6, which covers the geographical extent of the proposed project area. Based on the selected classification, and the environmental sensitivities of the proposed development footprint, Table 3 is a summary of the development

site environmental sensitivities. The terrestrial biodiversity (Figure 7) was classified as having a Very High Environmental Sensitivity and the animal theme (Figure 8) as having a High Environmental Sensitivity. The Plant species category (Figure 9) is of Medium Sensitivity. To explain the sensitivity rankings, Table 4 gives a detailed description of the site sensitivity ratings used in the screening tool.

Table 3: Summary of DFFE screening tool outputs

Theme	Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
Animal Species		X		
Plant Species			X	
Terrestrial Biodiversity	X			

Table 4: Site sensitivity ratings to species data in the screening tool

Sensitivity Rating	Description of Sensitivity Rating
Very high	Habitat for species that are endemic to South Africa, where all the known occurrences of that species are within an area of 10 km^2 is considered critical habitat, as all remaining habitat is irreplaceable. Typically, these include species that qualify under the CR, EN, or VU criteria of the IUCN or species listed as Critically/Extremely Rare under South Africa's National Red List Criteria. For each species reliant on a critical habitat, all remaining suitable habitat has been manually mapped at a fine scale.
High	Recent occurrence records for all threatened (CR, EN, VU) and/or Rare endemic species are included in the high sensitivity level. Spatial polygons of suitable habitat have been produced for each species by intersecting recently collected occurrence records (those collected since the year 2002) that have a spatial confidence level of less than 250 m with segments of remaining natural habitat.
Medium	Medium Model-derived suitable habitat areas for threatened and/or rare species are included in the medium sensitivity level. Two types of spatial models have been included. The first is a simple rule-based habitat suitability model where habitat attributes such as vegetation type and altitude are selected for all areas where a species has been recorded to occur. The second is a species distribution model which uses species occurrence records combined with multiple environmental variables to quantify and predict areas of suitable habitat. The models provide a probability-based distribution indicating a continuous range of habitat suitability across areas that have not been previously surveyed. A probability threshold of 75% for suitable habitat has been used to convert the modelled probability surface and reduce it into a single spatial area which defines areas that fall within the medium sensitivity level.
Low	Low Areas where no species of conservation concern (SCC) are known or expected to occur.

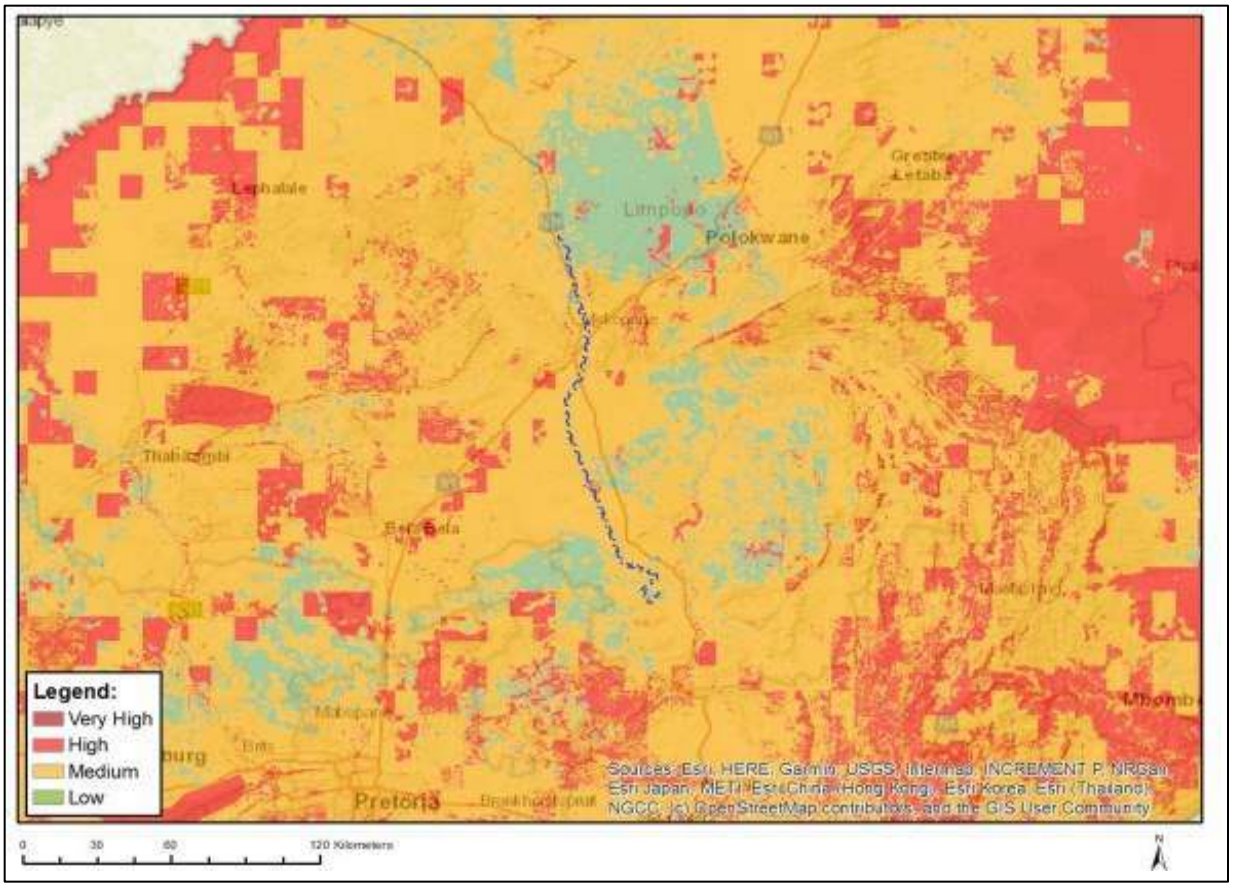


Figure 7: Animal species sensitivity.

Group-Species	Sensitivity
Aves-*Aquila rapax*	High
Aves-*Sagittarius serpentarius*	High
Aves-*Mycteria ibis*	High
Reptilia-*Kinixys lobatsiana*	High
Aves-*Aquila rapax*	Medium
Aves-*Podica senegalensis*	Medium
Aves-*Hydroprogne caspia*	Medium
Aves-*Aquila verreauxii*	Medium
Mammalia-*Crocidura maquassiensis*	Medium
Mammalia-*Dasymys robertsii*	Medium
Mammalia-*Lycaon pictus*	Medium
Mammalia-*Neamblysomus julianae*	Medium
Reptilia-*Kinixys lobatsiana*	Medium

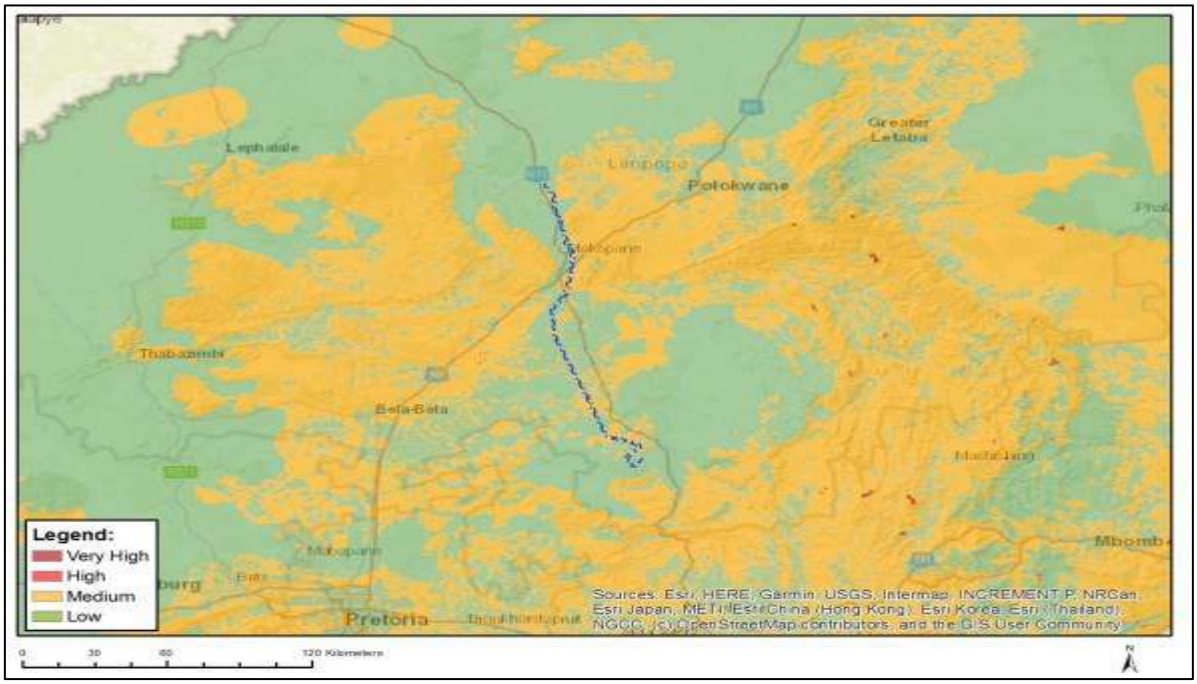


Figure 8: Plant species sensitivity.

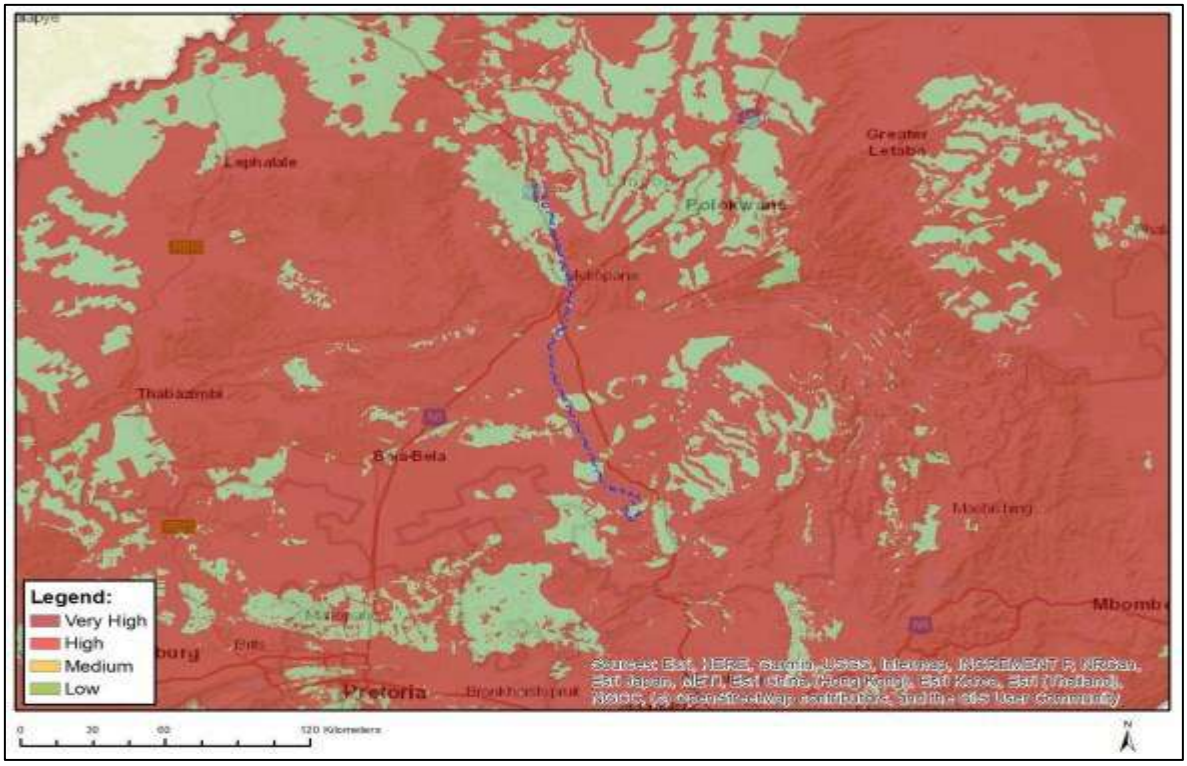


Figure 9: Terrestrial biodiversity sensitivity

Sensitivity	Feature(s)
Very High	CBA 1
Very High	CBA 2

Very High	ESA 1
Very High	ESA 2
Very High	National Protected Area Expansion Strategy (NPAES)
Very High	Witvinger Nature Reserve
Very High	Doelen Private Nature Reserve
Very High	Palmer Private Nature Reserve
Very High	Somerset Private Nature Reserve
Very High	Fossil Hominid Sites of SA
Very High	VU_Springbokvlakte Thornveld

The proposed powerline traverses mainly the western parts of the following conservation areas: Witvinger Nature Reserve, Potgietersus Nature Reserve and Palmer Private Nature Reserve (Figure 10).

From the visual observation of the site conditions and locations, the powerline development can be accommodated within these areas. This will require strict adherence to mitigations provided in order to prevent severe environmental degradation.

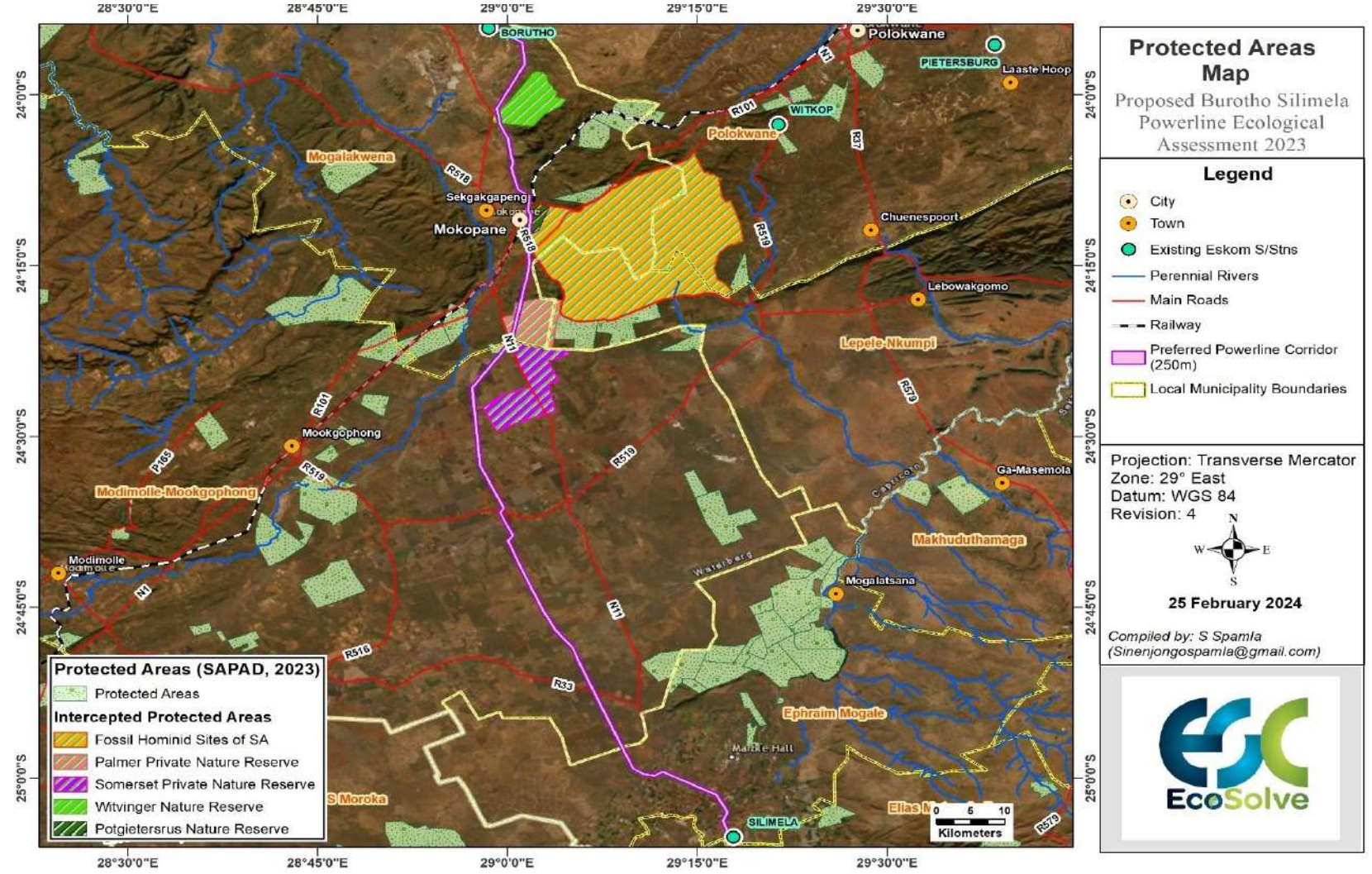


Figure 10: Formal and informal protected areas map.

FIELD SURVEY RESULTS

Terrestrial assessment

Two broad vegetation units were identified during surveys. Both based on floristic differences of different topographical positions and natural habitat types.

- Vegetation Unit 1: Natural grassland vegetation
- Vegetation Unit 2: Transformed area

It should be noted that no protected trees were observed during the fieldworks. Sampling in nature does not cover 100% of the studied area, and as a result, this does not rule out the possibility of protected trees occurring within the corridor.

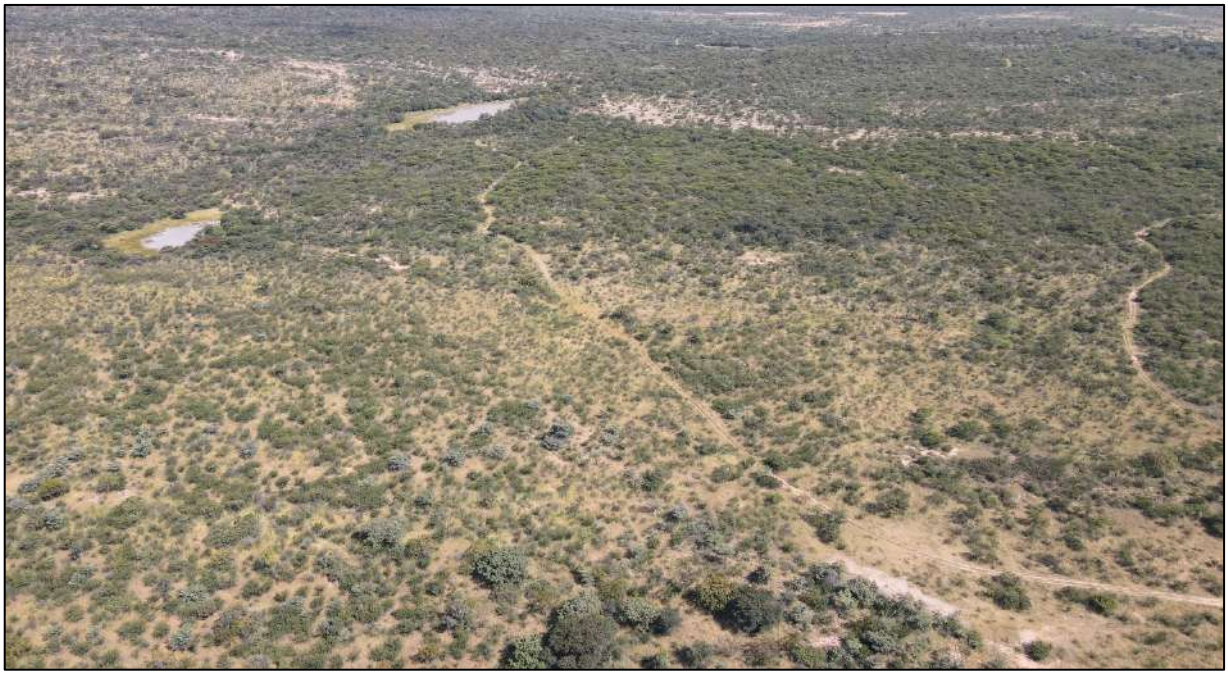


Figure 11: Vegetation unit 1 (natural Savanna) in proposed development area within Witvinger Nature Reserve.

Vegetation Unit 1 (Figure 11) has a natural character although some portions have been slightly degraded due to fragmentation and the edge effects of other neighbouring transformed habitats. Additionally, natural environments and field margins are very important in harbouring native animal diversity. Therefore, such vegetation should be protected from disturbance. Vegetation Unit 2 (Figure 12) has low sensitivity due to its totally transformed nature since it is subjected to high levels of transformation.

It was observed during the site inspection that some section of the powerline cuts through the corner of Witvinger Nature Reserve and also Potgietersrus Nature Reserve. In these two areas there were several Marula trees observed. The powerline runs through natural and disturbed areas (Potgietersrus Nature Reserve), especially near villages where there is illegal sand minings.

Figure 12: Vegetation Unit 2 (transformed area due to sand mining) along some sections of the proposed powerline in Mokopane areas.

Invasive Alien Plants

Category 1/1b under CARA and NEMBA invasive alien plant species were recorded on site. Below are photographic examples of invasive alien plants observed during surveys. The observed species are highly competitive species that grow and reproduce quickly. Additionally, these plant species, for example *Tecoma stans*, have highly effective seed dispersal methods and a few enemies. Therefore, it should be well ensured that invasive alien plants are controlled prior to reaching the construction phase of the development. This will assist in reducing the propagation of these problematic species across the footprint area.

Figure 13: The undisturbed vegetation area with an invasive alien plant, *Melia azedarach* in Marble Hall areas.

Below are the two recorded species, requiring control.

1. *Melia azedarach*
2. *Lantana camara*

A combination of mechanical and chemical control methods with be required. Chemical controls should be implemented before the end of the summer season.

Fauna assessment

No fauna species were observed on site during assessments. The High Sensitivity outcome of the DFFE screening tool is triggered by the nature reserves along the powerline route. These nature reserves are likely providing refugia for several faunal species including those of conservation concern.

HABITAT ASSESSMENT & ECOLOGICAL IMPORTANCE

Areas where there is vegetation along watercourses and valleys are highly sensitive. Bare ground areas have low sensitivity, and the open grasslands have a low-medium sensitivity. The impact assessment, to follow in this report, is in consideration that all constructions are to occur on the low-medium and low sensitivity areas.

IMPACT ASSESSMENT RATINGS & REQUIRED MITIGATIONS

The impacts assessment ratings will be mostly Negative medium impact to Negative low impact from a specialist perspective. However, considering the aforementioned conservation status of the footprint bioregion and the recommended mitigations are not implemented, the project will drastically have an overall Negative high impact which should be avoided by the applicant.

Table 5: Impacts assessment matrix

Construction Phase	Borutho - Silimela	
	Rating Before Mitigation	Rating After Mitigation
1. POTENTIAL IMPACT: Loss of priority flora and fauna species from important habitats		
MITIGATIONS **Essential mitigation measures for construction phase:** • Minimise the development footprint and reserve indigenous vegetation wherever possible. • Avoid undertaking project activities during the breeding season (summer). The project should be in shortest timeframe and control pollution. • Undertake final walkdown where powerline traverse protected areas. • All areas of increased ecological sensitivity should be marked as such and be off limits to all unauthorised construction vehicles.		
Magnitude:	2	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	2	2
Cumulative Effect:	2	1
Probability:	2	1
Total SP:	28	20
Significance rating:	Negative low impact	Negative low impact
2. POTENTIAL IMPACT: Loss of resident flora and fauna through increased disturbance resulting in alien invasion		
MITIGATIONS **Essential mitigation measures for construction phase:** • Minimise the development footprint and reserve indigenous vegetation wherever possible.		

• Avoid undertaking project activities during the breeding season (summer). The project should be in shortest timeframe and control pollution. • Undertake final walkdown where powerline traverse protected areas. • All areas of increased ecological sensitivity should be marked as such and be off limits to all unauthorised construction vehicles. • Invasive plant material should be disposed by incineration, or alternatively, composting to break down seeds. If seedbank persists, invasive alien plant management and eradication measures should be implemented.		
Magnitude:	2	2
Duration:	1	1
Geographical Extent:	1	1
Loss of Resources:	2	2
Reversibility:	2	1
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	22	16
Significance rating:	Negative low impact	Negative low impact
3. POTENTIAL IMPACT: Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important habitats		
MITIGATIONS **Essential mitigation measures for construction phase:** • Use designated roads to access the site. • Minimise the project footprint and reserve indigenous vegetation wherever possible. • Avoid undertaking project activities during the breeding season (summer). • The project should be in shortest timeframe and control noise pollution. Rehabilitate area with indigenous flora.		
Magnitude:	1	1
Duration:	3	2
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	4	2
Total SP:	17	11
Significance rating:	Negative low impact	Negative low impact
Operation Phase	**Borutho - Silimela**	
	Rating Before Mitigation	**Rating After Mitigation**
4. POTENTIAL IMPACT: Continuous deterioration of aquatic ecosystems		
MITIGATIONS **Essential mitigation measures for construction phase:**		

• Any construction-related waste must not be placed in the vicinity of the riparian areas; • Limit the footprint area of the construction activity to what is absolutely essential in order to minimize environmental damage; and • Upon completion of the construction phase the disturbed area should be rehabilitated through reprofiling and revegetation.		
Magnitude:	2	2
Duration:	3	2
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	3
Total SP:	34	26
Significance rating:	Negative medium impact	Negative low impact
Decommissioning Phase	**Borutho - Silimela**	
	Rating Before Mitigation	**Rating After Mitigation**
5. POTENTIAL IMPACT: Long-term or permanent degradation and modification of the receiving environment due to uncontrolled construction activities and poor rehabilitation		
MITIGATIONS **Essential mitigation measures for construction phase:** • Any construction-related waste must not be placed in the vicinity of the riparian areas; • Limit the footprint area of the construction activity to what is absolutely essential in order to minimize environmental damage; and • Upon completion of the construction phase, the disturbed area should be rehabilitated through reprofiling and revegetation.		
Magnitude:	2	2
Duration:	3	2
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	3
Total SP:	34	26
Significance rating:	Negative medium impact	Positive low impact
Post Decommissioning Phase	**Borutho - Silimela**	
	Rating Before Mitigation	**Rating After Mitigation**
6. POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT: Cumulative displacement of resident species		
MITIGATIONS **Essential mitigation measures for construction phase:**		

- No trapping or hunting of fauna is to take place. Access control must be implemented to ensure that no illegal trapping or poaching takes place; and
- Limit the footprint area of the construction activity to what is absolutely essential in order to minimize environmental damage.
- All areas of increased ecological sensitivity should be marked as such and be off limits to all unauthorised construction vehicles.

Recommended mitigation measures for construction phase:

- All areas of increased ecological sensitivity should be marked as such and be off limits to all unauthorised construction vehicles.

Essential mitigation measures for operational phase:

- No trapping or hunting of fauna is to take place; and
- Ensure that migratory connectivity is maintained where appropriate, especially in the sensitive faunal habitat unit areas.

Magnitude:	2	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	2	2
Cumulative Effect:	2	1
Probability:	2	1
Total SP:	24	16
Significance rating:	Negative low impact	Positive low impact

Cumulative impact of natural habitat loss, disturbance and fragmentation.

Portions of the study area and the surrounding landscape are modified and fragmented as a consequence of various anthropogenic land uses, most notably agriculture. These anthropogenic activities, amongst others, have caused and continue to cause, ongoing habitat loss, disturbance and fragmentation, and this is placing additional pressure on the functioning and integrity of remaining natural and semi-natural habitat patches in the landscape. The proposed powerline and associated infrastructure form part of a larger Transmission Development Plan 2022 to 2031. Collectively, these planned development components will cause direct habitat loss, disturbance and fragmentation through vegetation clearing that is much greater in extent than that of a single constituent project. Considering that a large proportion of affected land is designated as CBAs or a protected area, this will have a negative cumulative impact on terrestrial biodiversity.

Prior to any form of mitigation, the cumulative impact on terrestrial biodiversity associated with direct habitat loss, disturbance and fragmentation are rated ‘High’. The project contributes to cumulative impacts can be minimised by strictly implementing the required mitigation measures, and addressing any significant residual impacts via additional conservation actions. The cumulative impact on terrestrial biodiversity associated with direct habitat loss, disturbance and fragmentation, can be thus reduced to ‘Low’ significance

NO-GO AREAS, BUFFERS AND ALTERNATIVES

No-go areas or buffers are applicable for this study. The areas are mainly within Protected Areas such as Witvinger Nature Reserve and Potgietersrus Nature Reserve.

It is important to highlight that the current corridor intersect with protected areas, which necessitates the submission of Section 50(5) of the National Environmental Management: Protected Areas Act (Act 57 of 2003), applications as part of the licensing process.

NEM:PAA stipulates that "*No development, construction or farming may be permitted in a national park, nature reserve or world heritage site without the prior written approval of the management authority.*It should be noted that with the powerline being a linear development, its footprint and habitat transformation within these areas will be minimal.

CONCLUSION AND RECOMMENDATIONS

Impacts of powerlines on biodiversity can be managed due to the fact that they are linear developments. The proposed powerline will be located on heavily disturbed areas (croplands), natural vegetated areas and developed areas (residential). This proposed powerline will traverse Critical Biodiversity Areas and Ecological Support Areas. This means that the maintenance of the intact primary vegetation associated with the project footprint is of critical importance to meeting the national and regional conservation target for the vegetation type. In terms of safeguarding and protecting species of conservation concern, an Ecological Walkthrough should be conducted prior to site clearance to verify sensitive habitats within and near protected areas. Should any protected tree species be encountered, relevant tree permits must be obtained through the Department of Environment, Fisheries and Forestry. Although the proposed powerline traverse some of the protected areas that also have protected trees such as Marula, visual observations revealed that the powerline can be accommodated within these protected areas. However, strict adherence to recommendations will be required in order to reduce the anticipated impacts. Relevant tree permits should be obtained where total avoidance of disturbing protected trees is not possible.

<u>Important recommendations for the conservation of the current vegetation structure</u>

- The proponent must be committed to a conservation approach of practice and the actual footprint of disturbance must be kept to a minimum.
- As much of the natural environment must be conserved, there should be minimal vegetation clearing.
- Relocation of important species, identification and demarcation of specimens and sub habitats not to be disturbed will have to be done beforehand by a specialist.
- Important species (flora) that will be threatened by the development must be relocated to safer

habitats by suitable specialists.

- Preventative erosion control measures to be put in place.
- Conduct alien invasive species monitoring on an annual basis.

Important recommendations for conservation of fauna species

- The proponent must be committed to a conservation approach of practice and the actual footprint of disturbance must be kept to a minimum.
- Relocation of important species, identification and demarcation of specimens and sub habitats not to be disturbed will have to be done beforehand by a specialist.
- Important species (fauna) that will be threatened by the development must be relocated to safer habitats by suitable specialists.
- Preventative erosion control measures to be put in place.

Specific conditions recommended for the EA from a biodiversity perspective

- Implement mitigation controls during the construction phase as specified in the mitigation requirements. Monitor and report on their effectiveness.
- Implement mitigation controls during the operational phase as specified in the mitigation. Monitor and report on their effectiveness.
- Monitoring of implementation of mitigation controls, along with reporting, should be undertaken at least quarterly throughout the construction phase, and bi-annually during the operational phase. Monitoring, at the minimum, should consist of a quarterly monitoring of the development area;
- As much of the natural habitat as possible should be preserved during construction and operation to lessen the operational impacts and to reduce the irreversibility of impacts.
- Effective restoration of the natural habitats that were intact before the development should be implemented and reported on after decommissioning.

REFERENCES

Acocks, J.P.H. 1988. *Veld types of South Africa.* 3rd ed. Memoirs of the Botanical Survey of South Africa 57: 1–146.

Barnes, K.N. 2000. *The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland.* Birdlife South Africa, Johannesburg.

Brownlie, S.; Walmsley, B. and Tarr, P. 2009. Guidance Document on Biodiversity, Impact Assessment and Decision-Making in Southern Africa. CBBIAIAIA Guidance Series. Capacity Building in Biodiversity and Impact Assessment (CBBIA) Project, International Association for Impact Assessment, North Dakota (USA).

Cherry, J. A. 2011. Ecology of Wetland Ecosystems: Water, Substrate, and Life. *Nature Education Knowledge* 3(10):16

Desmet, P.G. and Schaller, R. 2015. North West Biodiversity Sector Plan Technical Report. North West Department of Rural, Environment and
Agricultural Development, Mahikeng (Mafikeng). November 2015

Department of Water Affairs and Forestry (DWAF). 1999. Resource Directed Measures for Protection of Water Resources; Volume 4: Wetland Ecosystems; Version 1.0. Department of Water Affairs and Forestry, Pretoria. Pp. W4/1-W4/6.

DWAF (Department of Water Affairs and Forestry). 2005. A practical field procedure for identification and delineation of wetland and riparian areas. DWAF, Pretoria.

Department of Water Affairs and Forestry (DWAF). 2007. Manual for the assessment of a Wetland Index of Habitat Integrity for South African floodplain and channelled valley bottom wetland types. RQS Report No.N/0000/00/WEI/0407. Resource Quality Services, Department of Water Affairs and Forestry, Pretoria.

DWAF. 2008. Updated Manual for the Identification and Delineation of Wetlands and Riparian Areas, prepared by M. Rountree, A. L. Batchelor, J. MacKenzie and D. Hoare. Report no. XXXXXXXXX. Stream Flow Reduction Activities, Department of Water Affairs and Forestry, Pretoria, South Africa

Edwards, R., Macfarlane, D., Robinson, K., Israel, A., de Groen, M., and Dunsomore, S. 2018. Wetland Management Guidelines: Building Capacity and Supporting Effective Management of Wetlands within South African Municipalities

Eco-Pulse. 2018. ICLEI Wetland Management Guidelines: Building Capacity and Supporting effective management of wetlands within South Africa municipalities. *Preliminary Version.*

FitzPatrick Institute of African Ornithology. 2023. FrogMAP Virtual Museum. Accessed at https://vmus.adu.org.za/?vm=FrogMAP on 2023-04-30

Friedmann, Y. and Daly, B. 2004. Red data book of the mammals of South Africa: a conservation assessment, CBSG Southern Africa, Endangered Wildlife Trust, Johannesburg

Harris, J.M., Livingstone, T., Lombard, A.T., Lagabrielle, E., Haupt, P., Sink, K., Schleyer, M., Mann,

Kotze, D.C., Marneweck, G.C., Batchelor, A.L., Lindley, D.S. & Collins, N.B. 2007. WetEcoServices: A technique for rapidly assessing ecosystem services supplied by wetlands, WRC Report No. TT 339/09, Water Research Commission, Pretoria.

KOTZE, D.C., ELLERY., W.N., MACFARLANE, D,M., and JEWITT, G.P.W. 2012. A rapid assessment method for coupling anthropogenic stressors and wetland ecological condition. Ecological Indicators 13, 284-293.

Low, A.B. & Rebelo, A.G. (Eds.) 1996. Vegetation of South Africa, Lesotho and Swaziland. Pretoria: Department of Environmental Affairs and Tourism.

Macfarlane, D., Kotze, D., Ellery, W., Walters, D., Koopman, V., Goodman, P and Goge, C. 2007. WET-Health: A technique for rapidly assessing wetland health. WRC Report No. TT 340/08. Water Research Commission,Pretoria.

Macfarlane, D.M., Lagese, J.V., Ollis, D., Du Toit, D., and Pollard, S. 2021. National Wetland Management Framework for South Africa. Report prepared for the Departments of Environment, Fisheries and Forestry, Water and Sanitation and Agriculture, Land Reform and Rural Development. Report No. EP510-05. November 2021.

Mucina, L. & Rutherford, M.C. eds. 2006. *The vegetation of South Africa, Lesotho and Swaziland*. Strelitzia 19. Pretoria: South African National Biodiversity Institute. 807 p.

Nel, J.L., Driver A., Strydom, W.F., Maherry, A., Petersen, C., Hill, L., Roux, D.J., Nienaber, S., van Deventer, H., Swartz, E. and Smith-Adao, A.B. (2011). ATLAS of FRESHWATER ECOSYSTEM PRIORITY AREAS in South Africa: Maps to support the sustainable development of water resources. Report to the WRC. No. TT 500/11.

Ollis, D.J., Snaddon, C.D., Job, N.M. & Mbona, N. 2013. Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems. SANBI Biodiversity Series 22. South African National Biodiversity Institute, Pretoria.

Ollis, D.J and Malan, H.L. 2014. Volume 1: Review of available methods for the assessment of the ecological condition of wetlands in South Africa (Water Research Commision) Report No. TT 608/14).

Pospescu, V.D., Rozylowicz, L., Niculae, I.M., Cucu, A.L. and Hartel, T. 2014. Species, Habitats, Society: An Evaluation of Research Supporting E.U.'s Natura 2000 Network. PLoS ONE 9(11): e113648. doi:10.1371/journal.pone.0113648

SANBI. 2013. Grasslands Ecosystem Guidelines: landscape interpretation for planners and managers. Compiled by Cadman, M., de Villiers, C., Lechmere-Oertel, R. and D. McCulloch. South African National Biodiversity Institute, Pretoria. 139 pages.

SANBI. 2014. Grazing and Burning Guidelines: Managing Grasslands for Biodiversity and Livestock Production. Compiled by Lechmere-Oertel, R.G. South African National Biodiversity Institute, Pretoria. 42 pages

SANBI. 2016. Botanical Database of Southern Africa (BODATSA) [Accessed: 20 April 2023].

SANBI. 2020. Statistics: Red List of South African Plants version 2020.

Schoeman, F., Newby, T.S., Thompson, M.W. and Van den Berg, E.C. 2013. South African National Land-cover Change Map. *South African Journal of Geomatics* 2:94-105.

Taylor, M.R., Peacock, F. & Wanless, R.M. 2015 (eds.). *The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland*. Johannesburg: Birdlife South Africa.

van Oudtshoorn, F. 2012. *Guide To Grasses Of Southern Africa.* Pretoria, Briza Publications

Walters, D., Kotze, D.C., Rebelo, A., Pretorius, L., Job, N., Lagesse, J.V., Riddell, E., and Cowden, C. 2021. Validation of a rapid wetland ecosystem services assessment technique using the Delphi method. *Ecological Indicators 125*

Whittington-Jones, C.A. and Peacock, F. 2015. African Grass Owl *Tyto capensis*. In: **Taylor, M.R., Peacock, F. & Wanless, R.M. (eds.)**. *The 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland*. Johannesburg: BirdLife South Africa, pp. 240-242.

Wright, D.R., Stevens, C.M.D., Marnewick, D., and Mortimer, G. 2018. Privately Protected Areas and Biodiversity Stewardship in South Africa: Challenges and Opportunities for Implementation Agencies. Parks Volume 24.2 November 2018.

APPENDICES

Appendix A: Method of Environmental Assessment

1.1 METHOD OF ENVIRONMENTAL ASSESSMENT

The environmental assessment aims to identify the various possible environmental impacts that could results from the proposed activity. Different impacts need to be evaluated in terms of its significance and in doing so highlight the most critical issues to be addressed.

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e., site, local, national or global whereas intensity is defined by the severity of the impact e.g., the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in the Table below.

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. The total number of points scored for each impact indicates the level of significance of the impact.

1.1.1 Impact Rating System

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the project phases:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact, the following criteria is used:

The rating system

NATURE		
Include a brief description of the impact of the environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.

2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects 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 (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		

1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/ component, and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component, and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible, rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible, and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.

CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects
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. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity. The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".

74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

Appendix B: Photographic representation of receiving environment.

Borutho-Silimela Powerline, Limpopo, South Africa

SPECIALIST DETAILS, CURRICULUM VITAE AND DECLARATION

The surveys and site assessments were undertaken by suitably qualified field specialists of Ecosolve.

Curriculum vitae

EDUCATION:

- MSc Zoology, Nelson Mandela University (Percy FitzPatrick Institute of African Ornithology Centre of Excellence)

Research Project Topic: Foraging behaviour and thermal physiology in Cape Sugarbirds: sex-specific responses to temperature.

- BSc Honours in Zoology, University of Limpopo

Research Project Topic: Morphometrics and plumage variation in the South African Fiscal flycatcher *Sigelus silens* Shaw 1809.

- BSc Botany & Zoology, University of Venda
- Grade 12, Marobathota High School

CERTIFICATES:

- SASS5 Aquatic Biomonitoring, GroundTruth
- Hydropedology and Wetland Functioning, Terra Soil Science & Water Business Academy
- Section 21 (c) & (i) Water Use Authorisation Training, Department of Water and Sanitation
- Basic Project Management, Hudisa Business School

PROFESSIONAL MEMBERSHIP:

- South African Council for Natural Scientific Professions (SACNASP) – Professionally registered as Professional Natural Scientist. **Registration number:** 009509
- British Ecological Society (BES). **Membership number**: 1010709
- Zoological Society of Southern Africa (ZSSA). **Membership number**: 691

WORK EXPERIENCE:

- MORA Ecological Services (Pty) Ltd: April 2018 – Current, I am an Environmental Specialist, and my duties include; (i) Conducting Biodiversity, Aquatic Impact Assessments, Rehabilitation (ii) Compilation of specialist reports.
- Arcus Consulting: May - November 2017, I was a subcontracted avifaunal surveyor for the proposed Highlands Wind Energy Farm, Somerset East, Eastern Cape.
- Centre for African Conservation Ecology (ACE), Nelson Mandela University: 2015 - 2016, I was a field guide/ environmental educator. Responsibilities: taking school learners on trial walks inside the Nelson Mandela University Nature Reserve.
- South African National Biodiversity Institute (SANBI): May – December 2014, I was a Zoological Systematics Technician. Responsibilities: (i) Insect identification and curation, and (ii) compiling the animal checklist of South Africa, (iii) Sourcing wildlife crime reports on endangered animals and plants for Barcode of Wildlife Project, (iv) Monitoring the bird population in the Botanical Garden.

- Department of Zoology, University of Venda: 2009 – 2013, I was a Research Assistant under Dr. T.C Munyai who was conducting a long-term research project which monitored the effects of climate change on biota and processes influencing ecosystem functioning and species diversity patterns.
- Percy FitzPatrick Institute of African Ornithology: March – April 2014, I was a Research Assistant under Dr. Rita Covas' Sociable Weaver Research Project. This is a long-term study which looks at the reproductive success of Sociable weavers at Benfontein Nature Reserve in Kimberley.

Key experience in specialist projects

Year	Project	Location:	Role(s)
2022	Avifaunal Impact Assessment for the proposed 132kV for Musina-Makhado Special Economic Zone North Site	Musina, Limpopo	Avifaunal Specialist/Ornithologist
2022	Avifaunal Impact Assessment for the proposed Khauta PV Solar including 44kV and 132kV Powerline	Welkom, Free State	Avifaunal Specialist/Ornithologist
2022	Avifaunal Impact Assessment for the proposed NAOS PV Solar including 132kV Powerline	Free State	Avifaunal Specialist/Ornithologist
2022	Preconstruction Avifaunal Assessment for the proposed Lichtenburg PV Solar including 132kV Powerline	Lichtenburg, North West	Avifaunal Specialist/Ornithologist
2022	Preconstruction Botanical Assessment for the proposed Lichtenburg PV Solar including 132kV Powerline	Lichtenburg, North West	Ecologist
2022	Biodiversity Assessment, Land Capability and Veld Condition Assessment for PPC Cement SA Slurry	Slurry, North West	Ecologist
2021	Avifaunal Impact Assessment for the proposed Upington-Aries 2x 400kV	Upington, Northern Cape	Avifaunal Specialist/Ornithologist
2021	Habitat Assessment Post Rehabilitation for PPC Cement SA Dwaalboom Factory	Dwaalboom, Limpopo	Ecologist
2021	Habitat Assessment Post Rehabilitation for Gibson Bay Wind Energy Farm	Humansdorp, Eastern Cape	Ecologist
2021	Wetland Rehabilitation for the sewer pipeline construction in Daveyton	Ekurhuleni East College Campus, Daveyton, Gauteng	Wetland Ecologist
2021	12 Months Wetland Rehabilitation Supervision for Ekangala Ext F Waterborne Sanitation Project	City of Tshwane Metropolitan Municipality, Ekangala, Gauteng	Aquatic Ecologist