

PLANTS, ANIMALS & TERRESTRIAL BIODIVERSITY ASSESSMENT
FOR THE PROPOSED INSTALLATION OF SYNCHRONOUS CONDENSERS AT THE KORUSON
SUBSTATION NEAR MIDDELBURG IN THE UMSOBOMVU LOCAL MUNICIPALITY, PIXLEY KA
SEME DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE.



prepared in accordance with the "Protocol for the Specialist Assessment and minimum report content requirements for environmental impacts on Plant Species, Animal Species, and Terrestrial Biodiversity"

PRODUCED BY:	INDEPENDENT EAP	PRODUCED FOR:
 Physical Address: 5 13th Avenue, Fairlands, Randburg 2170 Mobile Number: 071 2082 364 Email: info@ntumbulukoconsulting.co.za	 	 

March 2026

DOCUMENT CONTROL RECORD

Tel: +27 712082364
eFax: N/A
eMail: infor@ntumbulukoconsulting.co.za
1:

DOCUMENT CONTROL	
Document Title	PLANTS, ANIMALS & TERRESTRIAL BIODIVERSITY ASSESSMENT FOR THE PROPOSED INSTALLATION OF NEW SYNCHRONOUS CONDENSERS AT THE KORUSON SUBSTATION NEAR MIDDELBURG IN THE UMSOBOMVU LOCAL MUNICIPALITY, PIXLEY KA SEME DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE.
Consulting Firm	NTUMBULUKO CONSULTING (PTY) LTD
Employer	NATIONAL TRANSMISION COMPANY SOUTH AFRICA
Environmental Assessment Practitioner	QEMS CC
Consulting Engineers	Asceng EPC Services Provider and Thobile Engineering

INTERNAL APPROVAL			
Prepared by	Tshuxekani Maluleke	Checked By:	
Signature		Signature	
Title	Biodiversity and Wetland Specialist	Title	
Date	6 March 2026	Date	
CLIENT/ EMPLOYER APPROVAL			
Department 1		Department 2	
Signature		Signature	
Date		Date	

REVISION DETAILS					
Re v	Date	Revision Description	Prepared by	Checked by	Approved By
0.0	6 March 2026	Draft Plants, Animals & Terrestrial Biodiversity Assessment	T Maluleke		
0.0					
Version		00			

CONDITIONS RELATING TO THIS REPORT

DECLARATION OF INTEREST

Ntumbuluko Consulting Pty (Ltd) has no vested interest in the property studied nor is it affiliated with any other person/body involved with the property and/or proposed development. Ntumbuluko Consulting Pty (Ltd) is not a subsidiary, legally or financially of the proponent. The study was undertaken by Mr Tshuxekani Maluleke, he is a registered Natural Scientists with the following details:

Specialist Name	Tshuxekani Maluleke (Wetland and Biodiversity Specialist)
------------------------	---

Declaration of Independence	I declare, as a specialist appointed in terms of the National Environmental Management Act (Act No 108 of 1998) and the associated 2017 Environmental Impact Assessment (EIA) Regulations, 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 71 and is punishable in terms of Section 24F of the Act.

Signature



Date

2026/03/07

EXPERTISE OF THE SPECIALIST

Specialist	Role	Details
Tshuxekani Maluleke (Pr.Sci.Nat) Animal, Plant and Environmental Scientist	Fieldwork, primary author & sign-off	Tshuxekani is an independent professional natural scientist working as Environmental Scientist and Wetland / Aquatic and Terrestrial Ecologist at Ntumbuluko Consulting with a MSc in Environmental Science, BSc Honours in Zoology and BSc Honours in Animal, Plant & Environmental Sciences where he specialised in Animal, Plant and Environmental Sciences He is a registered Professional Natural Scientist (Pr. Sci. Nat.) with over 8 years' experience, having worked extensively on numerous Terrestrial Biodiversity and Animal species assessment projects across South Africa.
Selected Project Experience • Avian and Ecology Impact Assessment Report For The Proposed Expansion of the Eskom Carolina Customer Network Center (CNC), located in the Chief Albert Luthuli Local Municipality, Gert Sibande District of Mpumalanga Province. 2024 • Animal Species Impact Assessment Report For The Proposed Development Of A 160 Megawatts Leano Alpha Energy Solar Project, in Steelpoort, Fetakgomo Tubatse Local Municipality, Sekhukhune District Municipality Limpopo Province. 2024 • Terrestrial Biodiversity Impact Assessment: Proposed Manyeleti Nature Reserve Bush Camp, Bushbuckridge Local Municipality, Mpumalanga Province. (2022) • Terrestrial Biodiversity Assessment for the Proposed upgrade of the R40 Road, in the Bushbuckridge Local Municipality, Mpumalanga Province. (2022) • The Proposed Maholisi Borrow Pit and Upgrading of the National Road R578 Section 1 From N1 to Maholisi in the Makhado Local Municipality Within Magisterial District of Vhembe District in Limpopo Province.2023		

- Terrestrial Biodiversity Impact Assessment: The Proposed Construction of the Umflozi-Mbewu (Theta) Transmission Line, Kwazulu-Natal Province.2023
- Biodiversity Impact Assessment: Doornbosch-Steelpoort Mine, Fetakgomo Tubatse Local Municipality, Sekhukhune District Municipality of Limpopo Province (2020).
- Ecological Assessments Report -Propose development of a poultry farm Magalies-2 in Magaliesburg, Gauteng Province (GDARDREF.NO: GAUT 002/17-18/E0050) January 2018
- Botanical Walkthrough Report as per condition 34 of the of the Environmental authorization for the proposed construction of a 100m×100m 88/22kv Dam switching station, three 88kv interconnector power lines and dismantling of the T-off arrangement within Rustenburg and Madibeng Municipalities, in the North West Province (2017).

QUALIFICATIONS

SPECIALIST	QUALIFICATION
Mr Tshuxekani Maluleke (SACNASP Reg. No. 120501)	MSc Environmental Sciences (Wits University) BSc Hons Zoology (University of Limpopo) BSc Hons Animal, Plant and Environmental Sciences (Wits University)

INDEMNITY

Although Ntumbuluko Consulting Pty (Ltd) exercises due care and diligence in rendering services and preparing documents, the client takes full responsibility for this report and its implementation in terms of the National Environmental Management Act of 1998, and exempt Ntumbuluko Consulting Pty (Ltd) and its associates and their sub-contractors from any legal responsibility based on the timing of the assessment, the result and the duration thereof, which has an influence on the credibility and accuracy of this report. Ntumbuluko Consulting Pty (Ltd) accepts no liability, and the client indemnifies Ntumbuluko Consulting Pty (Ltd) and its directors, managers, agents, and employees against all actions, claims, demands, losses, liabilities, costs, damages, and expenses arising from or in connection with services rendered, directly or indirectly, by Ntumbuluko Consulting Pty (Ltd) and by the use of this document.

EXECUTIVE SUMMARY

Ntumbuluko Consulting (Pty) Ltd was appointed by QEMS Management and Business Solutions CC, on behalf of the National Transmission Company South Africa (NTCSA), to undertake a Plants, Animals and Terrestrial Biodiversity Assessment for the proposed installation of new synchronous condensers at the Koruson Substation near Middelburg, within the Umsobomvu Local Municipality of the Pixley Ka Seme District Municipality, Northern Cape Province. The purpose of the study was to evaluate the suitability of the proposed development footprint from a terrestrial biodiversity sensitivity and constructability perspective, with specific focus on vegetation, fauna, habitat condition, and ecological constraints.

A wet-season field survey was conducted on 23 January 2026, covering the full extent of the proposed development area using a stratified sampling approach. The assessment included the description and mapping of vegetation types, identification of species of conservation concern, evaluation of alien and invasive species presence, and an appraisal of potential impacts associated with the proposed development. Faunal assessments were undertaken at a desktop level, supplemented by field observations of signs, spoor, and habitat use.

The site is situated within the Gh4 Besemkaree Koppies Shrubland vegetation unit, characterised by karroid shrubland associated with koppies, buttes, and tafelbergs. According to the Northern Cape Critical Biodiversity Areas (CBA) Map, the preferred site including the existing substation—falls within a designated Critical Biodiversity Area. Although the site shows evidence of historical disturbance, it retains patches of natural habitat dominated by grasses and dwarf shrubs, with visible signs of grazing. No plant species of notable ethnobotanical value were recorded during the survey, although some species may hold occasional traditional use for surrounding Indigenous communities.

Disturbance on site has created favourable conditions for the proliferation of Mexican poppy (*Argemone mexicana*), an invasive species requiring management. Desktop faunal datasets indicate the potential occurrence of three amphibian species (none threatened), 53 reptile species (one threatened), and approximately 120 bird species, including nine species of conservation concern. Field observations confirmed the presence of medium-sized mammals such as hares (*Lepus* spp.) and baboons (*Papio* spp.), as well as various invertebrates including grasshoppers and spiders.

The proposed development will result in the loss of remaining natural habitat within the preferred site, affecting both flora and fauna. The summer timing of the survey may have

limited the detectability of certain plant species, and this seasonal constraint should be considered when interpreting species completeness. Importantly, the development footprint lies within a CBA, an area identified as essential for meeting biodiversity targets and maintaining ecological functioning. As such, development within this zone requires careful justification, strict impact minimisation, and adherence to mitigation and rehabilitation measures.

Despite the heightened conservation sensitivity, no fatal flaws were identified from a constructability or ecological feasibility perspective. The development can proceed, provided that activities are confined to already disturbed areas, sensitivity mapping is used to delineate no-go zones, and all construction is undertaken under the supervision of a suitably qualified Environmental Control Officer (ECO). ECO-led monitoring will be essential to ensure compliance with environmental management requirements and to prevent unintended impacts on sensitive habitats.

Constructability Statement

Overall, the site is considered suitable for the proposed synchronous condenser installation, subject to strict implementation of mitigation measures, invasive species control, and ongoing ecological oversight to safeguard biodiversity integrity within this CBA-designated landscape.

TABLE OF CONTENTS

1. INTRODUCTION AND PROJECT DESCRIPTION	1
1.1 INTRODUCTION	1
1.2 PROJECT BACKGROUND	2
1.2.1 General Project Requirements.....	3
1.2.2 Possible SynCon Layouts	3
1.3 STUDY AREA	3
1.4 SITE SENSITIVITY VERIFICATION AND MINIMUM REPORT CONTENT REQUIREMENTS	6
1.5 TERMS OF REFERENCE AND OBJECTIVES	6
1.6 SCOPE OF STUDY.....	6
1.6.1 FLORAL STUDY:.....	6
1.6.2 FAUNAL STUDY:	7
1.7 LIMITATIONS AND ASSUMPTIONS	7
2. REPORT LEGISLATIVE FRAMEWORK	7
3. LEGAL FRAMEWORK	9
3.1 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO 107 OF 1998) (NEMA) AS AMENDED.....	9
3.2 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (ACT NO 10 OF 2004) (NEM: BA).....	9
3.3 THE NATIONAL BIODIVERSITY FRAMEWORK (2017-2022).....	10
3.4 CONSERVATION OF AGRICULTURAL RESOURCES ACT (ACT NO 43 OF 1983) (CARA):.....	10
3.5 THE NATIONAL FOREST ACT (ACT NO 84 OF 1998) (NFA).....	10
3.6 CONVENTION ON BIOLOGICAL DIVERSITY	11
3.7 CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA (CITES)	11
3.8 CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS	11

3.9	THE INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE	11
3.10	CONVENTION ON WETLANDS (POPULARLY KNOWN AS THE RAMSAR CONVENTION).....	12
3.11	WORLD HERITAGE CONVENTION (WHC)	12
3.12	RAMSAR CONVENTION	12
3.13	INTERNATIONAL PLANT PROTECTION CONVENTION (IPPC).....	12
3.14	NORTHERN CAPE NATURE CONSERVATION ACT NO. 9 OF 2009	13
3.15	NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998)	13
3.16	NATIONAL FRESHWATER ECOSYSTEM PRIORITY AREA (NFEP) STATUS.....	14
4.	TERRESTRIAL BIOSIVERSITY METHODOLOGY.....	14
4.1	THE ASSESSMENT	14
4.2	SPECIES OF CONSERVATION CONCERN.....	15
4.3	SAMPLING PROTOCOL	15
4.4	VEGETATION MAPPING.....	16
4.5	FAUNA SURVEY.....	17
4.6	SENSITIVITY ASSESSMENT.....	17
4.7	TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT	18
4.7.1	IMPACT RATING METHODOLOGY	18
5.	SITE CHARACTERISTICS.....	25
5.1	GEOLOGY & SOILS.....	25
5.2	CLIMATE.....	25
5.3	VEGETATION TYPE- BESEMKAREE KOPPIES SHRUBLAND (Gh 4)	26
5.3.1	Distribution of the Vegetation Unit.....	26
5.3.2	Conservation Status of the Vegetation Unit	26
5.4	IMPORTANT TAXA ASSOCIATED WITH THE STUDY SITE	28
5.5	2024 NORTHERN CAPE BIODIVERSITY SPATIAL PLAN	29
6.	RESULTS.....	31
6.1	GENERAL OVERVIEW OF THE PROJECT AREA	31

6.2	VEGETATION TYPES RECORDED ON SITE.....	34
6.3	ETHNOBOTANICAL PLANT SPECIES	36
6.4	PLANT SPECIES OF CONSERVATION CONCERN	37
6.5	ALIEN INVASIVE SPECIES PRESENT ON SITE	38
6.6	FAUNAL ASSESSMENT.....	40
6.6.1	Amphibians	40
6.6.2	Reptiles	40
6.7	AVIFUANA.....	41
6.7.1	FIELD INVESTIGATION FINDINGS	42
6.8	Mammals.....	42
6.8.1	Field Investigation Findings.....	43
6.9	INVERTEBRATES	44
6.9.1	Field Investigation Findings.....	45
7.	TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT	46
7.1	GENERAL IMPACT ASSESSMENT	47
8.	IMPACT STATEMENT, CONCLUSIONS AND RECOMMENDATIONS	53
8.1	Ecological Characteristics of the study sites:	53
9.	STATEMENT AND OPINION OF THE SPECIALIST	54
10.	REFERENCES.....	55

LIST OF FIGURES

Figure 1-1: Three SyCons posostioned on the northern side of the substation.	3
Figure 1-2:Locality Map	5
Figure 4-1: Survey Path followed on the 23 January 2026.....	16
Figure 5-1: Koruson Substation site temperatures between 2012 and 2022 (Source:QEMS, 2025).....	25
Figure 5-2:Vegetation Map	27
Figure 5-3:Sensitivity Map.....	30
Figure 6-1: Over of the project area.	31
Figure 6-2: Current Condition of the Preferred SynCon Installation Site.	32

Figure 6-3: Evidence of the layered karroid shrubland, showing rocky outcrops with associated shrub and grass cover.	32
Figure 6-4: Overview of the site taller shrubs.....	33
Figure 6-5: Overview of the proposed laydown area, showing evidence of ongoing anthropogenic disturbance.....	34
Figure 6-6: <i>Tamarix usnoides</i> observed onsite.....	35
Figure 6-7: <i>Anginon difforme</i> and shrubs observed in the midst of <i>Aristida</i> species.	35
Figure 6-8: <i>Rhus erosa</i> , and <i>ciliata</i> , <i>Euclea crispa</i> , <i>Diospyros austro-africana</i> and <i>Olea europaea</i> subsp. <i>Africana</i> observed onsite.	36
Figure 6-9: <i>Berkheya purpurea</i> observed onsite.	36
Figure 6-10: Mexican poppy.	39
Figure 6-11: Dropping of Mammals and cattle grazing onsite.....	41
Figure 6-12: Hare and baboon droppings observed onsite.	44
Figure 6-13: Invertebrates observed onsite.	45

LIST OF TABLES

Table 2-1: Requirements of a Terrestrial Biodiversity Assessment Report.	8
Table 4-1: Criteria for establishing Site Ecological importance and description of criteria.	18
Table 4-2: Biodiversity Impact Assessment Parameter Ratings.....	20
Table 4-3: Probability Consequence Matrix.	23
Table 4-4: Significance Threshold Limits.	23
Table 5-1: Important Taxa within the study site (Mucina and Rutherford 2006)	28
Table 6-1: Species observed within the proposed development footprint.....	34
Table 6-2: Plant species of conservation concern expected to occur in grid square 3123CB (POSA, 2017; SANBI, 2017)	37
Table 6-3: List of Herpetofuana species in the area.....	40
Table 6-4: Threatened reptile species that are expected to occur within the proposed project area.	40
Table 6-5: List of bird species of regional or global conservation importance that are expected to occur in the project area.....	41
Table 6-6; Threatened mammal species that are expected to occur within proposed project area.	42
Table 7-1: Mitigation hierarchy of impacts	46
Table 7-2: Assessment of impacts associated with the proposed development.	47
Table 7-3: Loss of habitat during operation phase	50

Table 7-4: Loss of habitat during decommissioning	50
Table 7-5: Loss of habitat during post-closure phase	51

DEFINITIONS

Alien animal	(a) Any live vertebrate, including a bird and a reptile, but excluding a fish, belonging to a species or subspecies that is not a recognised domestic species and the natural habitat of which is not in the Republic; or (b) The egg of such vertebrate.
Biodiversity	Means the diversity of animals, plants or other organisms, including the diversity of animals, plants or other organisms found within and between— (a) Ecosystems; (b) Habitats; (c) The ecological complexes of which these systems and habitats are part; and (d) Species.
CITES	Means the Convention on International Trade in Endangered Species of Wild Fauna and Flora;
Endangered Species	Means a species is endangered when it is facing a very high risk of extinction in the wild in the near future and includes— (a) Any living or dead specimen of such a species; or (b) Any egg, skin, bone, feather, seed, flower or any other part or derivative of such a species.
Environment	Means the surroundings within which humans exist and that are made up of— (a) The land, water and atmosphere of the earth; (b) Microorganisms, plant and animal life; (c) Any part or combination of (a) and (b) and the interrelationships amongst and between them; and (d) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing;
Indigenous plant	(a) Means any living or dead plant which is indigenous to the Republic, whether artificially propagated or in its wild state; and (b) Includes the flower, pollen, seed, cone, fruit, bulb, tuber, stem or root or any other part or derivative of such plant but does not include a plant declared a weed in terms of any legislation.
Protected area	Means— (a) A provincial nature reserves; (b) A site of ecological importance; (c) A protected environment; (d) A private nature reserves; or (e) A resource use area.

PLANTS, ANIMALS & TERRESTRIAL BIODIVERSITY ASSESSMENT FOR THE PROPOSED INSTALLATION OF NEW SYNCHRONOUS CONDENSERS AT THE KORUSON SUBSTATION NEAR MIDDELBURG IN THE UMSOBOMVU LOCAL MUNICIPALITY, PIXLEY KA SEME DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE.

Protected environment	Means an area declared a Protected Environment or Private Nature Reserve in terms of section 21 (1) (a).
Rare species	Means a species of fauna and flora referred to in section 68 (a) (ii), and includes— (a) any living or dead specimen of such a species; or (a) any egg, skin, bone, feather, seed, flower or any other part or derivative of such a species.

1. INTRODUCTION AND PROJECT DESCRIPTION

1.1 INTRODUCTION

Ntumbuluko Consulting (Pty) Ltd was appointed by QEMS Management and Business Solutions CC, on behalf of the National Transmission Company South Africa (NTCSA), to undertake a Plants, Animals and Terrestrial Biodiversity Assessment for the proposed installation of new synchronous condensers at the Koruson Substation near Middelburg, within the Umsobomvu Local Municipality of the Pixley Ka Seme District Municipality, Northern Cape Province. The study aims to determine the site's suitability for constructability from a plants, animals, and terrestrial biodiversity sensitivity perspective.

The purpose of this study is to describe and characterise the terrestrial environment, habitats, species present on site. A wet season terrestrial biodiversity survey was conducted on the **23 January 2026**. The survey covered the entirety of the proposed development, with a stratified sampling methodology.

This assessment follows the requirements of the Environmental Impact Assessment Regulations, as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), published in the Government Notice (GN). No. 320 in terms of NEMA, dated 20 March 2020 for Terrestrial Biodiversity, and in GN. No. 1150 dated 30 October 2020 for Terrestrial Plant Species and Terrestrial Animal Species themes.

As per these Regulations, the approach for assessing sensitivity with respect to Terrestrial Biodiversity, Plant and Animal Species is in accordance with guidelines described in the latest version of the "Species Environmental Assessment Guideline", available at <https://bgis.sanbi.org/>. The results of the screening tool, together with the site sensitivity verification report (SSVR), ultimately determined the minimum report content requirements. As per the results of the Screening Report generated for the proposed development the Plant Species and terrestrial biodiversity theme sensitivity is classified as "Very High", while the Animal Species theme was classified as "High", the plant species theme was classified as "Very High" due to transformation of the natural habitats. Based on the results of the site inspection, a full Terrestrial Biodiversity Impact Assessment, including plants and animals, has been undertaken for the project area. The findings and recommendations of this report are intended to inform the Environmental Assessment

Practitioner (EAP) and regulatory authorities to make informed decisions as to the ecological viability or constructability of the proposed development.

1.2 PROJECT BACKGROUND

Eskom SOC Ltd, South Africa's state-owned power company, has historically relied on large coal-fired power stations and peaking plant for electricity generation. Peaking plants were comprised of a mix of gas fired turbines (burning diesel as fuel) and hydro plants to supplant base load electricity generation. The national transmission grid, primarily consisting of a range of 220 kV to 765 kV overhead lines, transmits power across the country. The latter is owned and operated by the National Transmission Company South Africa SOC Ltd (NTCSA), a subsidiary of Eskom SOC Ltd. In addition to the above, NTCSA manages a number of 88kV to 132 kV power lines that are strategic in nature as well.

To enhance grid reliability amid growing renewable energy adoption, NTCSA plans to implement Synchronous Condensers (SynCons). SynCons will provide several ancillary energy services, increasing rotating inertia in order to improve grid stability. The SynCons, do not generate power, however through their inertial, rotating mass provide grid stability to the local area of the national transmission grid where they are located. Currently, the only inertial, rotating mass is provided largely by the coal fired power stations, which are stationed in the north-eastern part of the country.

The SynCons are required to be added to the transmission grid by 2028 to address instabilities caused by renewable energy inverter-based technologies. Failure to stabilise the grid within this time period would result in alternative methods such as renewable energy curtailment to be adopted during peak periods of instability. Seven of the NTCSA's substations have been identified for this initiative. Koruson. Substation, located near Middelburg, Eastern Cape, is one of the identified substations due to the large penetration of wind and solar plants implemented or approved for construction in the specific area served by the substation.

To meet the required specification of the national grid at Koruson Substation, there is likely to be at least 3 SynCons which will cover a footprint of approximately between 2.55 to 3.25 hectares, when placed together.

1.2.1 General Project Requirements

To achieve the grid code ancillary service requirements, the SynCons need to be integrated onto the 400 kV busbar at the Koruson Substation. In the event that the Koruson Substation does not prove to be a feasible host substation for all or some of the required SynCon capacity a nearby substation may be used. As the SynCons are to be integrated at 400kV they should be located within a reasonable proximity to the 400 kV busbars. SynCons have large heavy components often weighing more than several hundred tons. For constructability and maintainability requirements these components need to be bought onto and off site with reasonable ease. This requires a certain proximity to heavy vehicle access roads with required turning radii.

1.2.2 Possible SynCon Layouts

The OE team has developed possible layouts for the SynCons based on the current substation layout. The one has the three SynCons positioned on the northern side of the substation. This is possible by extending the current servitude north- and westwards (Figure1-1).

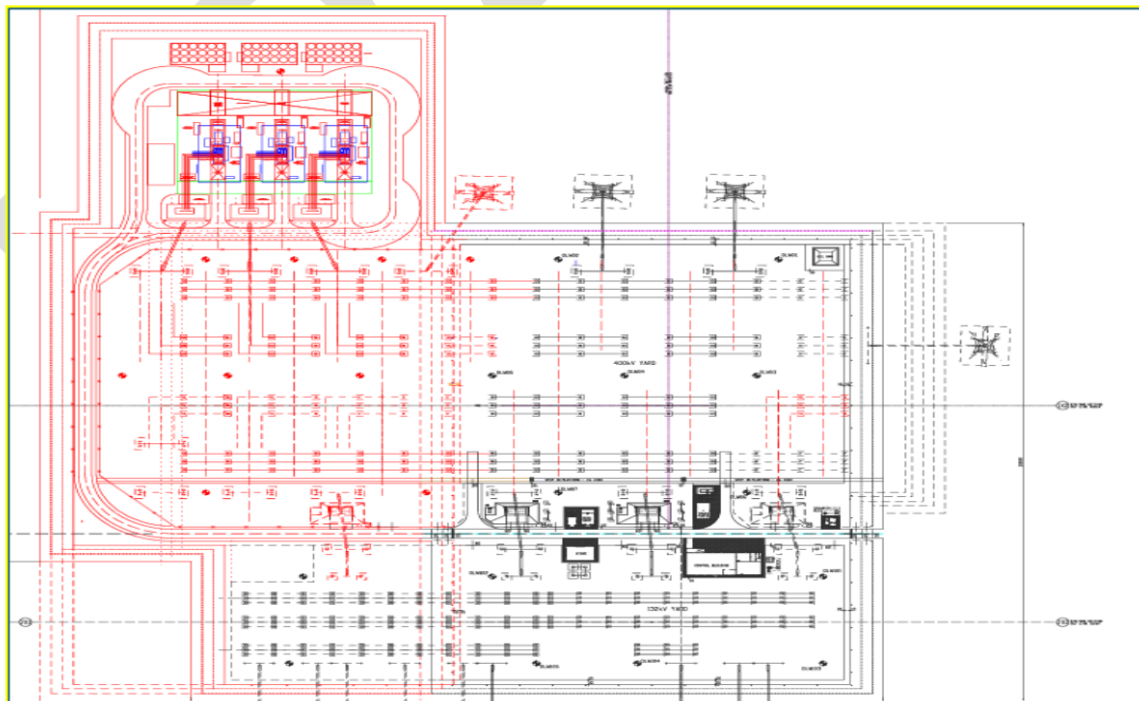


Figure 1-1: Three SyCons posostioned on the northern side of the substation.

1.3 STUDY AREA

Koruson Substation is situated on portion 8 of Farm Uitzicht No.3. It is bordered by R/E of Farm Elandskloof No.135 on its eastern boundary and encircled by portions 3,4,6 and 7 of

Farm Uitzicht No.3 on its north-western boundary. It is located outside Middelburg, Eastern Cape near Noupoort, in the eastern Karoo in Umsobomvu Local Municipality within the Pixley KaSeme District Municipality, Northern Cape (**Figure 1-2**). The central Coordinates of the Substation are as follows: 31°21'16.07"S 24°49'18.42"E

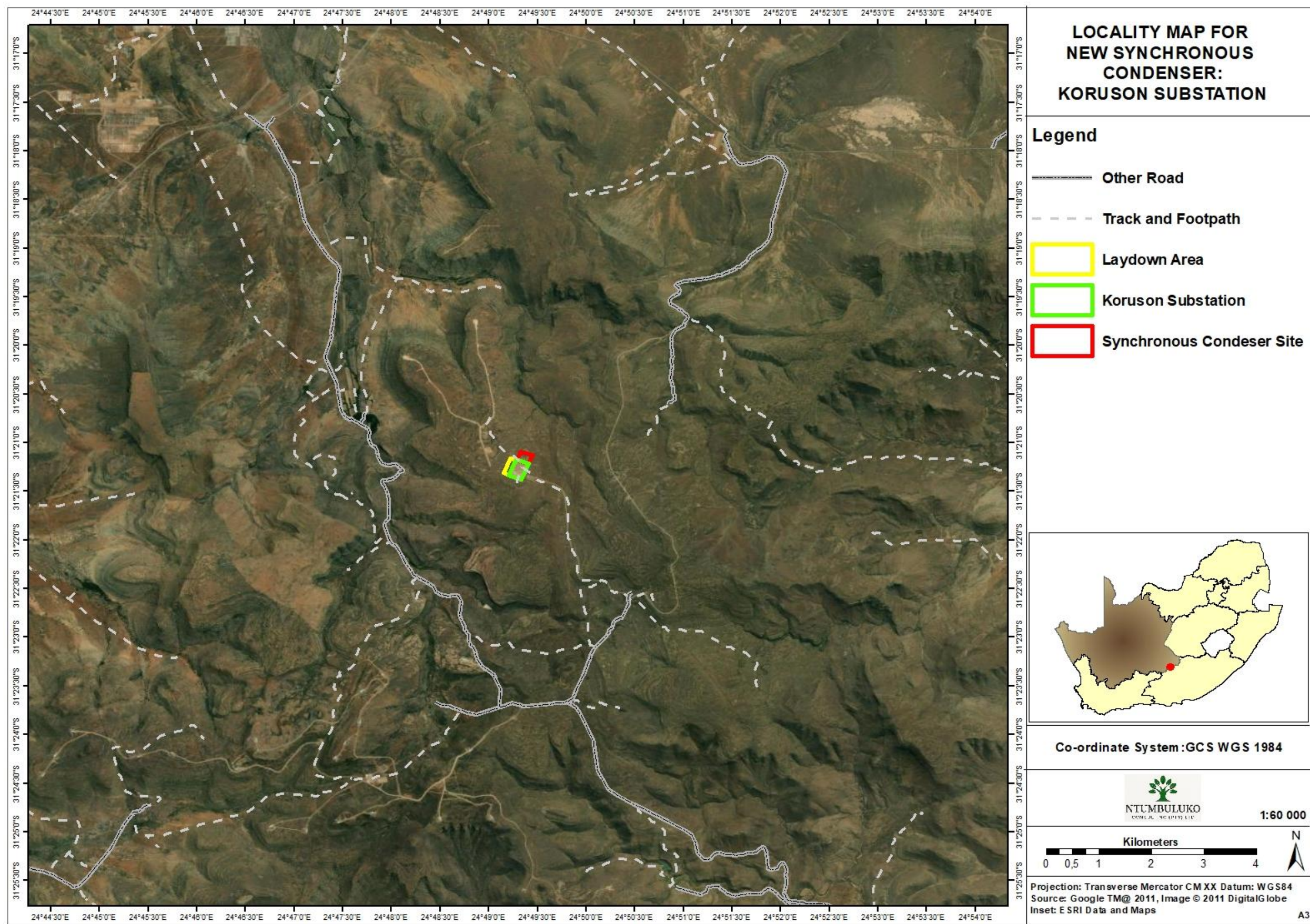


Figure 1-2: Locality Map

1.4 SITE SENSITIVITY VERIFICATION AND MINIMUM REPORT CONTENT REQUIREMENTS

In terms of the Protocol for the Specialist Assessment and Minimum Reporting Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN R. 320 of 2020) and Terrestrial Animal and Plant Species (GN R. 1150), prior to the commencement of a specialist assessment, the current use of the land and the potential environmental sensitivity of the site under consideration as identified by the screening tool, must be confirmed by undertaking a site sensitivity verification. The results of the screening tool, together with the site sensitivity verification, ultimately determines the minimum report content requirements.

1.5 TERMS OF REFERENCE AND OBJECTIVES

Ntumbuluko Consulting (Pty) Ltd has been appointed to undertake the following specialist functions:

- Describe and map the vegetation types in the study area.
- Describe the biodiversity and ecological state of each vegetation unit.
- Identify plant and animal species of conservation concern (Red Data List, PNCO and TOPS lists). In the case of the fauna, this was done at a desktop level.
- Identify alien plant species, assess the invasive potential and recommend management procedures.
- Assess the potential impacts of the proposed project on both the fauna and flora.
- Provide mitigation measures, rehabilitation process and/or vegetation removal procedures that would reduce the potential impacts of the developments on biodiversity.

1.6 SCOPE OF STUDY

1.6.1 FLORAL STUDY:

- Identify sensitive vegetation types and critical biodiversity areas on site.
- Identify Critical Biodiversity and Ecological Support Areas onsite.
- Describe the potential direct, indirect and cumulative negative and positive impacts of the proposed activity on the vegetation species during construction, operation and decommissioning phases of the project.

- Provide monitoring requirements, mitigation measures and recommendations.

1.6.2 FAUNAL STUDY:

- Describe the existing micro-habitats, and the species associated with those habitats.
- Provide a description of species composition and conservation status in terms of protected, endangered or vulnerable faunal species.
 - This description will include species which are likely to occur within, traverse across or forage within the proposed project area, as well as species which may not necessarily occur on site, but which are likely to be impacted upon as a result of the proposed development.

1.7 LIMITATIONS AND ASSUMPTIONS

This report is based on current available information and, as a result, the following limitations and assumptions are implicit:

- The report is based on a project description received from the client.
- The study was done during a single day over a single season.
- Species of Conservation Concern (SCC) are difficult to find and difficult to identify, thus species described in this report do not comprise an exhaustive list. It is almost certain that additional SCCs will be found during construction and operation of the development.
- The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

2. REPORT LEGISLATIVE FRAMEWORK

In line with the protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity, as per Government Notice 320 published in terms of NEMA, dated 20 March 2020. "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Act, 1998, when applying for Environmental Authorisation"-section 3, subsection 1:

- An applicant intending to undertake an activity identified in the scope of the protocol, on a site identified on the screening tool as being of 'Very High sensitivity

for terrestrial biodiversity, must submit a Terrestrial Biodiversity Specialist Assessment; however

- Where the information gathered from the site sensitivity verification differs from the designation of Very High terrestrial biodiversity sensitivity on the screening tool and it is found to be of a Low sensitivity, then a Terrestrial Biodiversity Compliance Statement must be submitted.

The information obtained from a site sensitivity verification, which involved both a desktop assessment as well as a field survey, confirmed that the powerline route is mostly of a 'Very High -High' sensitivity. Therefore, a Terrestrial Biodiversity Impact Assessment will be conducted and submitted for this project.

As per sections 2 and 3 of the protocol discussed above, a Terrestrial Biodiversity Compliance Statement must contain the information as presented in Table 2-1 below.

Table 2-1: Requirements of a Terrestrial Biodiversity Assessment Report.

Specialist Report Requirements According to GNR 320.		Chapter
Terrestrial Biodiversity		
3.1	The Animal, Plant and Terrestrial Biodiversity Specialist Assessment Report must contain, as a minimum, the following information:	
3.1.1	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page I-V
3.1.2	A signed statement of independence by the specialist;	Page I-V
3.1.3	A statement of the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Chapter 1 Page 1
3.1.4	A description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	Chapter 4
3.1.5	A description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;	Section 4
3.1.6	A location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Section 5.5
3.1.7	Additional environmental impacts expected from the proposed development;	Chapter 7
3.1.8	Any direct, indirect, and cumulative impacts of the proposed development;	Chapter 7
3.1.9	The degree to which the impacts and risks can be mitigated;	Chapter 7
3.1.10	The degree to which the impacts and risks can be reversed;	Chapter 7
3.1.11	The degree to which the impacts and risks can cause loss of irreplaceable resources;	Chapter 7
3.1.12	Proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Chapter 7
3.1.13	A motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a "low" terrestrial biodiversity sensitivity and that were not considered appropriate;	N/A
3.1.14	A substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, iXf it should receive approval or not; and	Chapter 9

3.1.15	Any conditions to which this statement is subjected.	Chapters 8.9 and 10
3.2	The findings of the Terrestrial Biodiversity Specialist Assessment must be incorporated into the Basic Assessment Report or the Environmental Impact Assessment Report, including the mitigation and monitoring measures as identified, which must be incorporated into the EMPr where relevant.	N/A
3.3	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	N/A

A signed copy of the Terrestrial Biodiversity Report must be appended to the Basic Assessment Report or Environmental Impact Assessment Report if necessary.

3. LEGAL FRAMEWORK

The following national and provincial legislative guidelines and requirements were followed as part of this study:

3.1 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO 107 OF 1998) (NEMA) AS AMENDED

This Act embraces all three (3) fields of environmental concern namely: resource conservation and exploitation; pollution control and waste management; and land-use planning and development. The environmental management principles include the duty of care for wetlands and special attention is given to management and planning procedures. NEMA provides for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.

3.2 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (ACT NO 10 OF 2004) (NEM: BA)

NEMBA was signed into law in mid-2004 and entered into effect on 1 September 2004. NEM: BA provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities. Certain activities, known as Restricted Activities, are regulated on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the act are keeping, moving, having in possession, importing and exporting, and selling.

3.3 THE NATIONAL BIODIVERSITY FRAMEWORK (2017-2022)

The National Biodiversity Framework (NBF) is a requirement under Section 38 of the National Environmental Management: Biodiversity Act (Act 10 of 2004, hereafter referred to as the 'Biodiversity Act'). The NBF is a short to medium-term coordination tool that shows the alignment between the strategic objectives and outcomes identified in the National Biodiversity Strategy and Action Plan (NBSAP v.2, 2015) and other key national strategies, frameworks and systems that currently guide the work of the biodiversity sector and identifies mechanisms through which this work is coordinated. It also identifies a set of interventions or "acceleration measures" that can unlock or fast-track implementation of the NBSAP and indicates the relative roles of the many agencies involved in implementing these activities. The purpose of the NBF is not to provide a comprehensive review of all work currently being undertaken in the biodiversity sector, nor to list all of the actions required to conserve and manage South Africa's biodiversity in support of sustainable development.

3.4 CONSERVATION OF AGRICULTURAL RESOURCES ACT (ACT NO 43 OF 1983) (CARA):

This act regulates the utilization and protection of wetlands, soil conservation and all matters relating thereto; control and prevention of veld fires, control of weeds and invader plants, the prevention of water pollution resulting from farming practices and losses in biodiversity.

3.5 THE NATIONAL FOREST ACT (ACT NO 84 OF 1998) (NFA)

The main objective of the National Forests Act, 1998 is to promote the sustainable management and development of forests and to provide protection for certain forests and trees. This said protection is provided through the protection of all natural forests (Section 7 (1), the protection of all trees declared to be protected in terms of section 12(1) of the Act, and the regulation of certain activities in a proclaimed State Forest (Section 23(1)(a) – (k)). It should be noted that there are other environmental legislation administered by other State Departments that also regulate natural resources. The Act is responsible for:

- Promotes the sustainable management and development of forests for the benefit of all;
- Creates the conditions necessary to restructure forestry in South Africa;
- Provide special measures for the protection of certain forests and protected trees;

- Promotes the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes;
- Promotes community forestry; and
- Promotes greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination.

3.6 CONVENTION ON BIOLOGICAL DIVERSITY

The objectives of the CBD are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from commercial and other utilization of genetic resources. The agreement covers all ecosystems, species, and genetic resources.

3.7 CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA (CITES)

The CITES aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival. Through its three appendices, the Convention accords varying degrees of protection to more than 30,000 plant and animal species.

3.8 CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

The CMS, or the Bonn Convention aims to conserve terrestrial, marine and avian migratory species throughout their range. Parties to the CMS work together to conserve migratory species and their habitats by providing strict protection for the most endangered migratory species, by concluding regional multilateral agreements for the conservation and management of specific species or categories of species, and by undertaking co-operative research and conservation activities.

3.9 THE INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

The objectives of the Treaty are the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security. The Treaty covers all plant genetic resources for food and

agriculture, while it's Multilateral System of Access and Benefit-sharing covers a specific list of 64 crops and forages. The Treaty also includes provisions on Farmers' Rights.

3.10 CONVENTION ON WETLANDS (POPULARLY KNOWN AS THE RAMSAR CONVENTION)

The Ramsar Convention provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The convention covers all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities.

3.11 WORLD HERITAGE CONVENTION (WHC)

The primary mission of the WHC is to identify and conserve the world's cultural and natural heritage, by drawing up a list of sites whose outstanding values should be preserved for all humanity and to ensure their protection through a closer co-operation among nations.

3.12 RAMSAR CONVENTION

The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Ramsar Convention is the only global environmental treaty that deals with a particular ecosystem. The treaty was adopted in the Iranian city of Ramsar in 1971 and the Convention's member countries cover all geographic regions of the planet.

3.13 INTERNATIONAL PLANT PROTECTION CONVENTION (IPPC)

The IPPC aims to protect world plant resources, including cultivated and wild plants by preventing the introduction and spread of plant pests and promoting the appropriate measures for their control. The convention provides the mechanisms to develop the International Standards for Phytosanitary Measures (ISPMs), and to help countries to implement the ISPMs and the other obligations under the IPPC, by facilitating the national capacity development, national reporting and dispute settlement. The Secretariat of the IPPC is hosted by the Food and Agriculture Organization of the United Nations (FAO).

3.14 NORTHERN CAPE NATURE CONSERVATION ACT NO. 9 OF 2009

To provide for the sustainable utilisation of wild animals, aquatic biota and plants; to provide for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); to provide for offences and penalties for contraventions of the Act; to provide for the appointment of nature conservators to implement the provisions of the Act; to provide for the issuing of permits and other authorisations; and to provide for matters connected therewith.

3.15 NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998)

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in responsible ways. Of specific importance to this application is Section 19 of the NWA, which states that an owner of land, a person in control of land or a person who occupies or uses the land which thereby causes, has caused or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring and must therefore comply with any prescribed waste standard or management practices.

Regulations GN 704 dated June 1999 under the NWA, 1998 (Act 36 of 1998) stipulates that no development activities may take place within the 1:100 year floodline of a watercourse, or within 100 m of the watercourse, whichever is the furthest.

Regulations GN 509 dated August 2016 under the Section 21 c and i water uses of the NWA, 1998 (Act No 36 of 1998) stipulates the:

"Extent of a watercourse" as:

- (a) The outer edge of the 1 in 100-year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam.

"Regulated area of a watercourse" for section 21(c) or (i) of the Act water uses in terms of this Notice means:

- (a) The outer edge of the 1 in 100-year flood line and /or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;
- (b) In the absence of a determined 1 in 100-year flood line or riparian area the area within 100 m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act); or
- (c) A 500 m radius from the delineated boundary (extent) of any wetland or pan.

3.16 NATIONAL FRESHWATER ECOSYSTEM PRIORITY AREA (NFEP) STATUS

In an attempt to better conserve aquatic ecosystems, South Africa has recently categorised its river systems according to set ecological criteria (i.e. ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver et al. 2011) The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act (NEM:BA) biodiversity goals (Nel et al. 2011).

4. TERRESTRIAL BIOSIVERSITY METHODOLOGY

4.1 THE ASSESSMENT

A site inspection was undertaken on **22nd of January 2026** to assess the site-specific ecological state, current land-use, identify potential sensitive ecosystems and identify fauna and flora species associated with the proposed project activities. The site inspection also served to identify potential impacts of the proposed development, and its impacts on the surrounding ecological environment.

In addition to the site visit, key resources that were consulted include the following:

- South African Vegetation Map (SA VEGMAP) (Mucina et al., 2018);
- The National Freshwater Ecosystem Priority Areas (NFEP, 2011/14);
- The National Environmental Management: Biodiversity Act (NEM:BA), 2004: List of Threatened Ecosystems (2011);
- National Biodiversity Management: Biodiversity Act (NEMBA) List of Threatened or Protected Species (2005);
- The 2024 Northern Cape Biodiversity Spatial Plan ; and
- International Union for Conservation of Nature (IUCN).

4.2 SPECIES OF CONSERVATION CONCERN

Data on the known distribution and conservation status for each potential Species of Conservation Concern (SCC) has to be obtained to develop a list of 'Species of Concern'. These species are those that may be impacted significantly by the proposed activity. In general, these will be species that are already known to be threatened or at risk, or those that have restricted distributions (endemics) with a portion of their known range falling within the study area i.e. strict endemic and near endemic species. Species that are afforded special protection, notably those that are protected by NEM:BA (Act No. 10 of 2004).

4.3 SAMPLING PROTOCOL

The study site was visually surveyed to evaluate vegetation composition, and faunal assemblages and to provide detailed information on the plant communities present. The aim of the site inspection was to characterise and describe each fauna and flora community within the study site as well as identify areas of high sensitivity and SCC. Prior to the site visit, sampling locations representative of each vegetation type were identified (**Figure 4-1**). At these sampling locations, vegetation types within the study area were assessed and surveyed using plant identification guides and other published literature. Vegetation communities were then described according to the dominant set of species recorded from each type. These were mapped and assigned a sensitivity score using the methodology outlined in Species Environmental Assessment Guideline Document.

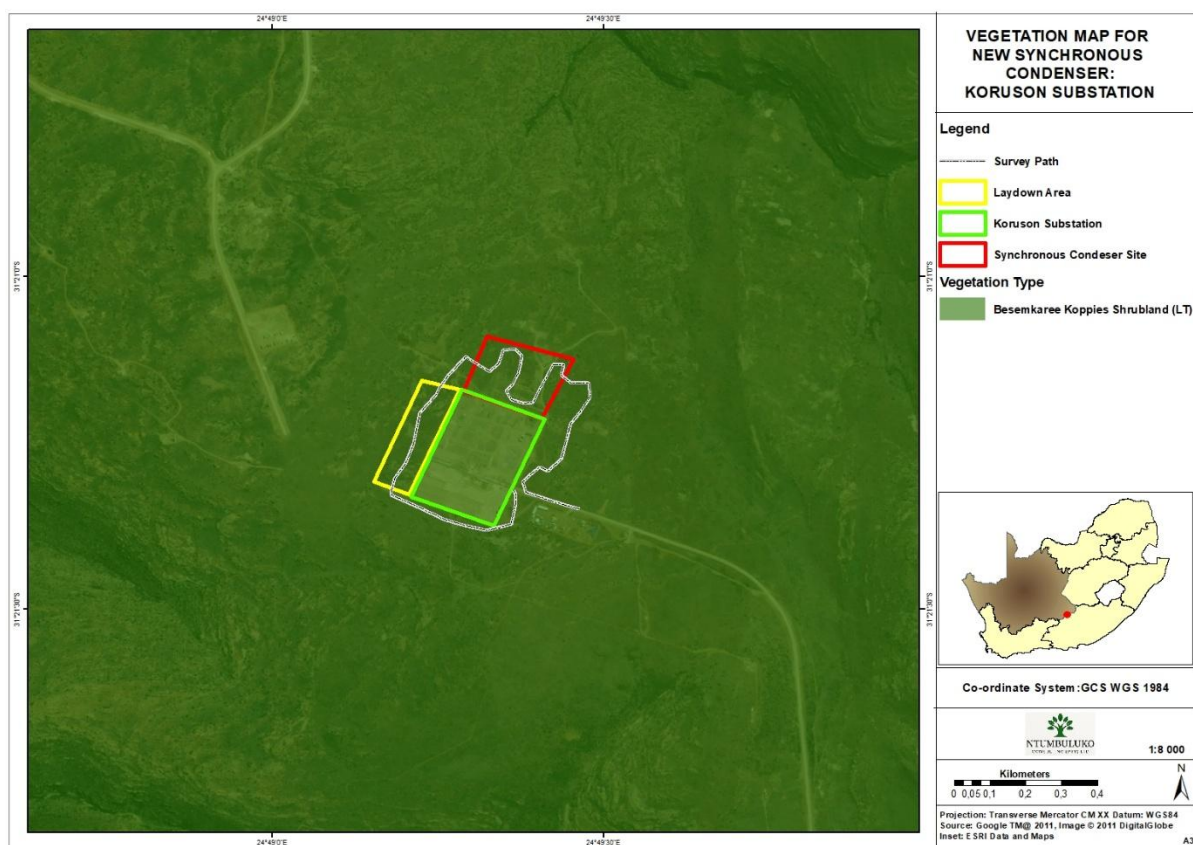


Figure 4-1: Survey Path followed on the 23 January 2026.

4.4 VEGETATION MAPPING

The revised SA VEGMAP (2018) was established in order to “provide floristically based vegetation units of South Africa, Lesotho and Swaziland at a greater level of detail than had been available before.” The map was developed using a wealth of data provided by a network of ecologists, biologists and conservation planners that make periodic contributions to the project. These contributions have allowed for the best national vegetation map to date, the last being that of Acocks developed over 50 years ago. The SANBI Vegetation map informs finer scale bioregional plans and includes an additional 47 new vegetation units since its refinement in 2012.

The SA VEGMAP project has two main aims:

1. To determine the variation in and units of Southern African vegetation based on the analysis and synthesis of data from vegetation studies throughout the region, and
2. To compile a vegetation map- The aim of the map was to accurately reflect the distribution and variation on the vegetation and indicate the relationship of the vegetation with the environment. For this reason, the collective expertise of

vegetation scientists from various universities and state departments were harnessed to make this project as comprehensive as possible.

The map and accompanying book describes each vegetation type in detail, along with the most important species, including endemic species and those that are biogeographically important.

The SA VEGMAP is compared to actual conditions of vegetation observed onsite during the site assessment through mapping from aerial photographs, satellite images, literature descriptions (e.g. SANBI and ECBP) and related data gathered on the ground.

4.5 FAUNA SURVEY

The faunal field survey comprised of the following and passive techniques:

- Active hand-searches are used for species that shelter in or particular microhabitats. Diagnostic features of the individuals that were captured were photographed at site and realised: and
- Visual and auditory searches- This typically comprised of traversing the PAOI and using a camera to view species from a distance without them being disturbed as well as listening to species calls. Due to the secretive behaviour as well as climatic and habitat characteristics of the project area, the use of signs and tracks was vital in recording species.

Relevant field guides and texts consulted for identification purposes included the following.

- Field Guide to snakes and other Reptiles of Southern Africa: and
- Mammals of Southern Africa and their Tracks and Signs.

4.6 SENSITIVITY ASSESSMENT

The Species Environmental Assessment guideline (SANBI, 2020) was applied to assess the Site Ecological Importance (SEI) of the project area. The habitats and the species of conservation concern in the project area were assessed based on their conservation importance, functional integrity and receptor resilience (**Table 4-1**). The combination of these resulted in a rating of SEI and interpretation of mitigation requirements based on the ratings.

The sensitivity map was developed using available spatial planning tools as well as by applying the SEI sensitivity based on the field survey.

Table 4-1: Criteria for establishing Site Ecological importance and description of criteria.

CRITERIA	DESCRIPTION
Conservation Importance (CI)	The importance of a site for supporting biodiversity features of conservation concern present e.g. populations of IUCN Threatened and Near-Threatened species (CR, EN, VU & NT), Rare, range- restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes.
Functional Integrity (FI)	A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts.
Biodiversity Importance (BI) is a function of Conservation Importance (CI) and the Functional Integrity (FI) of a receptor.	
Receptor Resilience (RR)	The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.
Site Ecological Importance (SEI) is a function of Biodiversity Importance (BI) and Receptor Resilience (RR)	

4.7 TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT

4.7.1 IMPACT RATING METHODOLOGY

To ensure a balanced and objective approach to assessing the significance of potential impacts, a standardized rating scale was adopted which allows for the direct comparison of specialist studies. This rating scale has been developed in accordance with the requirements of the NEMA EIA Regulations (2014 and subsequent 2017 amendments).

The potential impacts of the proposed establishment of a powerline route (Corridor) is rated using a clearly defined rating scale. The significance rating formula is as follows:

$$\text{Significance} = \text{Consequence} \times \text{Probability}$$

Where

Consequence = Type of Impact x (Intensity + Spatial Scale + Duration)

And

Probability = Likelihood of an Impact Occurring

In addition, the formula for calculating consequence:

Type of Impact = +1 (Positive Impact) or -1 (Negative Impact)

The weight assigned to the various parameters for positive and impacts to biodiversity is provided for in the formula and is presented in **Table 4-2**. The probability consequence matrix is displayed in **Table 4-3**, with the impact significance rating described in **Table 4-4**.

Table 4-2: Biodiversity Impact Assessment Parameter Ratings

RATING	INTENSITY		SPATIAL SCALE	DURATION	PROBABILITY
	Negative Impacts (Type of Impact = -1)	Positive Impacts (Type of Impact = +1)			
7	Very significant impact on the environment. Irreparable damage to highly valued species, habitat or ecosystem. Persistent severe damage. Irreparable damage to highly valued items of great cultural significance or complete breakdown of social order.	Noticeable, on-going social and environmental benefits which have improved the livelihoods and living standards of the local community in general and the environmental features.	International The effect will occur across international borders.	Permanent: No Mitigation The impact will remain long after the life of the Project.	Certain/ Definite. There are sound scientific reasons to expect that the impact will definitely occur.
6	Significant impact on highly valued species, habitat or ecosystem. Irreparable damage to highly valued items of cultural significance or breakdown of social order.	Great improvement to livelihoods and living standards of a large percentage of population, as well as significant increase in the quality of the receiving environment.	National Will affect the entire country.	Beyond Project Life The impact will remain for some time after the life of a Project.	Almost certain/Highly probable It is most likely that the impact will occur.

PLANTS, ANIMALS & TERRESTRIAL BIODIVERSITY ASSESSMENT FOR THE PROPOSED INSTALLATION OF SYNCHRONOUS CONDENSERS AT THE KORUSON SUBSTATION NEAR MIDDELBURG IN THE UMSOBOMVU LOCAL MUNICIPALITY, PIXLEY KA SEME DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE.

5	Very serious, long-term environmental impairment of ecosystem function that may take several years to rehabilitate. Very serious widespread social impacts. Irreparable damage to highly valued items.	On-going and widespread positive benefits to local communities which improves livelihoods, as well as a positive improvement to the receiving environment.	Province/ Region Will affect the entire province or region.	Project Life The impact will cease after the operational life span of the project	Likely The impact may occur.
4	Serious medium-term environmental effects. Environmental damage can be reversed in less than a year. On-going serious social issues. Significant damage to structures / items of cultural significance.	Average to intense social benefits to some people. Average to intense environmental enhancements.	Municipal Area Will affect the whole municipal area.	Long term 6-15 years.	Probable Has occurred here or elsewhere and could therefore occur.
3	Moderate, short-term effects but not affecting ecosystem function. Rehabilitation requires intervention of external specialists and can be done in less than a month.	Average, on-going positive benefits, not widespread but felt by some.	Local Extending across the site and to nearby settlements.	Medium term 1-5 years.	Unlikely Has not happened yet but could happen once in the lifetime of the Project, therefore there is a possibility

PLANTS, ANIMALS & TERRESTRIAL BIODIVERSITY ASSESSMENT FOR THE PROPOSED INSTALLATION OF SYNCHRONOUS CONDENSERS AT THE KORUSON SUBSTATION NEAR MIDDELBURG IN THE UMSOBOMVU LOCAL MUNICIPALITY, PIXLEY KA SEME DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE.

	On-going social issues. Damage to items of cultural significance.				that the impact will occur.
2	Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally with/ without help of external consultants. Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.	Low positive impacts experience by very few of population.	Limited Limited to the site and its immediate surroundings.	Short term Less than 1 year.	Rare/ improbable Conceivable, but only in extreme circumstances and/ or has not happened during lifetime of the Project but has happened elsewhere. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures.
1	Limited damage to minimal area of low significance that will have no impact on the environment.	Some low-level social and environmental benefits felt by very few of the population.	Very limited Limited to specific isolated parts of the site.	Immediate Less than 1 month.	Highly unlikely/None Expected never to happen.

PLANTS, ANIMALS & TERRESTRIAL BIODIVERSITY ASSESSMENT FOR THE PROPOSED INSTALLATION OF SYNCHRONOUS CONDENSERS AT THE KORUSON SUBSTATION NEAR MIDDELBURG IN THE UMSOBOMVU LOCAL MUNICIPALITY, PIXLEY KA SEME DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE.

Minimal social impacts, low-level repairable damage to commonplace structures.				
--	--	--	--	--

Table 4-3: Probability Consequence Matrix.

		Significance																																							
Probability		Significance																																							
	7	-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147		
	6	-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126		
	5	-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105		
	4	-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84		
	3	-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63		
	2	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42		
	1	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21		
	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21			

Table 4-4: Significance Threshold Limits.

Score	Description	Rating
109 to 147	A very beneficial impact which may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change.	

Score	Description	Rating
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and/or social) environment.	
36 to 72	An important positive impact. The impact is insufficient by itself to justify the implementation of the project. These impacts will usually result in positive medium to long-term effect on the social and/or natural environment.	
3 to 35	A small positive impact. The impact will result in medium to short term effects on the social and/or natural environment.	
-3 to -35	An acceptable negative impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the social and/or natural environment.	
-36 to -72	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.	
-73 to -108	A serious negative impact which may prevent the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term change to the (natural and/or social) environment and result in severe effects.	
-109 to -147	A very serious negative impact which may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects.	

5. SITE CHARACTERISTICS

5.1 GEOLOGY & SOILS

The area consists of Dolerite koppies and sills embedded within Karoo Supergroup sediments. The dolerite dykes and sills are igneous intrusions that are the result of extensive volcanic activity, which accompanied the break-up of Gondwana in the Jurassic. In places the slopes of mesas and butts carrying this vegetation type have a mixed geology where dolerites occur together with sandstones and mudstones of the Ecca and Beaufort Groups. Fb land type covers almost 60% of the area, followed by Ib.

5.2 CLIMATE

Due to the large extent of the area, the rainfall pattern differs slightly from west to east. Seasonal summer rainfall prevails when the patches are found embedded within other units of the Grassland Biome, but the southern and southwestern regions show hints of bimodal climate patterns typical of the Nama-Karoo. Far more importantly, despite an overall MAP of almost 400 mm, MAP ranges from about 280 mm in the west (De Aar) to more than double, 580 mm, in the east (Edenburg). Much of the rainfall is of convective origin. MAT 15°C. See also climate diagram for Gh 4 Besemkaree Koppies Shrubland (**Figure 5-1**)

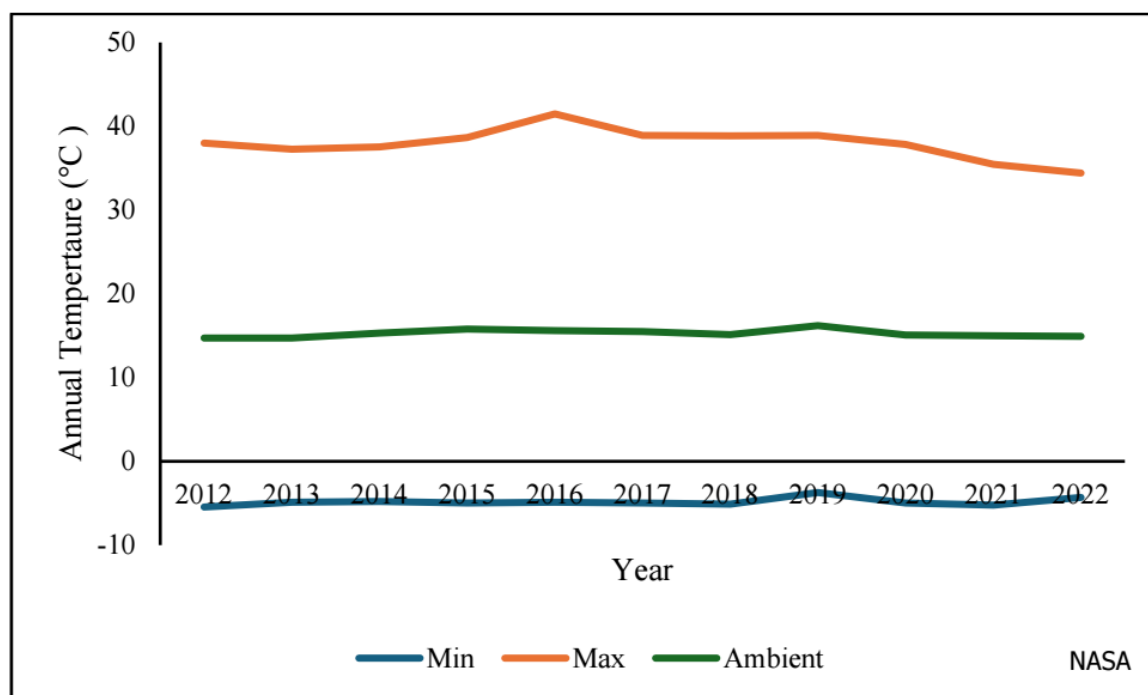


Figure 5-1: Koruson Substation site temperatures between 2012 and 2022 (Source:QEMS, 2025)

5.3 VEGETATION TYPE- BESEMKAREE KOPPIES SHRUBLAND (Gh 4)

The site falls within the Gh 4 Besemkaree Koppies Shrubland vegetation unit. This unit is characterised by the slopes of koppies, buttes, and tafelbergs that support a distinctive two-layered karroid shrubland. The lower layer forms a closed canopy dominated by dwarf, small-leaved shrubs, with grasses becoming abundant in years with higher rainfall. The upper layer forms a loose, taller shrub canopy, typically comprising *Rhus erosa*, *Rhus burchellii*, *Rhus ciliata*, *Euclea crispa* subsp. *ovata*, *Diospyros austro-africana*, and *Olea europaea* subsp. *africana*.

5.3.1 Distribution of the Vegetation Unit

The Gh 4 Besemkaree Koppies Shrubland vegetation unit is distributed across the Northern Cape, Free State, and Eastern Cape. It occurs mainly on the plains of the Eastern Upper Karoo, stretching between Richmond and Middelburg in the south and the Orange River to the north, as well as within the dry grasslands of the southern and central Free State. The unit also includes the extensive dolerite-dominated landscapes along the upper Orange River. Its range extends northwards to around Fauresmith in the northwest and to the Wepener District in the northeast. The vegetation occurs at altitudes of 1 120–1 680 m.

5.3.2 Conservation Status of the Vegetation Unit

The Gh 4 Besemkaree Koppies Shrubland vegetation unit is classified as Least Threatened, primarily because it is largely excluded from intensive agricultural activities. The conservation target is 28%, of which approximately 5% is currently secured within statutory protected areas, including the Rolfontein, Tussen die Riviere, Oviston, Gariep Dam, Caledon, and Kalkfontein Dam Nature Reserves. A small additional portion is protected within the privately managed Vulture Conservation Area.

Approximately 3% of the vegetation unit has been lost due to the construction of major dams, including Bethulie, Egmont, Gariep, Kalkfontein, Vanderkloof, and Welbedacht Dams. Levels of soil erosion within the unit are estimated as moderate (68%), high (20%), and low (10%).

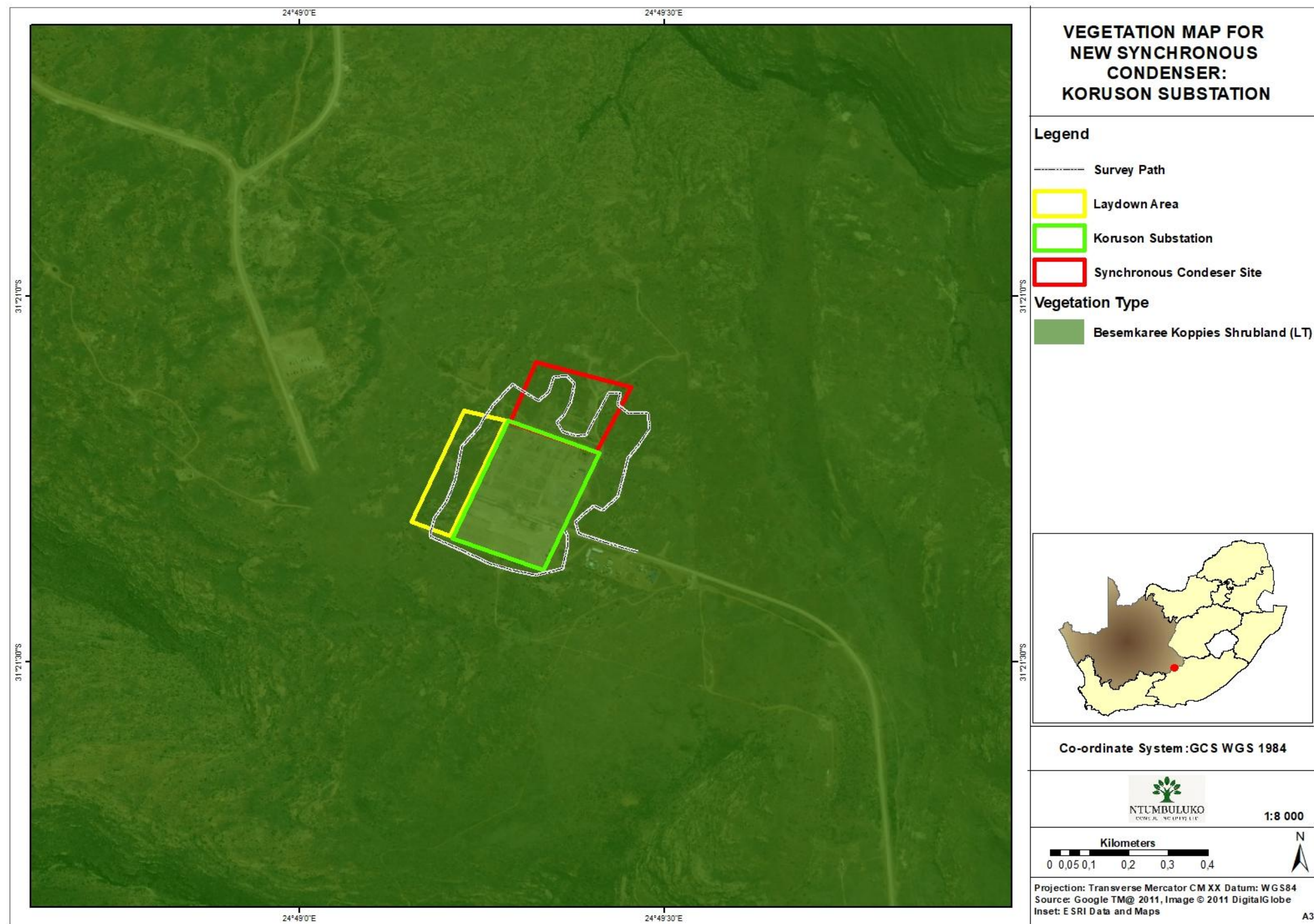


Figure 5-2:Vegetation Map

5.4 IMPORTANT TAXA ASSOCIATED WITH THE STUDY SITE

Table 5-1: Important Taxa within the study site (Mucina and Rutherford 2006)

PLANT FORM	SPECIES
Small Trees	<i>Cussonia paniculata</i> , <i>Ziziphus mucronata</i>
Tall Shrubs	<i>Diospyros austro-africana</i> (d), <i>Euclea crispa</i> subsp. <i>ovata</i> (d), <i>Olea europaea</i> subsp. <i>africana</i> (d), <i>Rhus burchellii</i> (d), <i>R. ciliata</i> (d), <i>R. erosa</i> (d), <i>Buddleja saligna</i> , <i>Diospyros lycioides</i> subsp. <i>lycioides</i> , <i>Ehretia rigida</i> , <i>Grewia occidentalis</i> , <i>Gymnosporia polyacantha</i> , <i>Tarchonanthus minor</i> .
Low Shrubs	<i>Asparagus suaveolens</i> (d), <i>Chrysocoma ciliata</i> (d), <i>Amphiglossa triflora</i> , <i>Aptosimum elongatum</i> , <i>Asparagus striatus</i> , <i>Diospyros pallens</i> , <i>Eriocephalus ericoides</i> , <i>E. spinescens</i> , <i>Euryops empetrifolius</i> , <i>Felicia filifolia</i> subsp. <i>filifolia</i> , <i>F. muricata</i> , <i>Helichrysum dregeanum</i> , <i>H. lucilioides</i> , <i>Hermannia multiflora</i> , <i>H. vestita</i> , <i>Lantana rugosa</i> , <i>Limeum aethiopicum</i> , <i>Lycium cinereum</i> , <i>Melolobium candicans</i> , <i>M. microphyllum</i> , <i>Nenax microphylla</i> , <i>Pegolettia retrofracta</i> , <i>Pentzia globosa</i> , <i>Rhigozum obovatum</i> , <i>Selago saxatilis</i> , <i>Stachys linearis</i> , <i>S. rugosa</i> , <i>Sutera halimifolia</i> , <i>Wahlenbergia albens</i> .
Succulent Shrubs	<i>Aloe broomii</i> , <i>Chasmatophyllum musculinum</i> , <i>C. verdoorniae</i> , <i>Cotyledon orbiculata</i> var. <i>dactyloopsis</i> , <i>Pachypodium succulentum</i> .
Graminoids	<i>Aristida adscensionis</i> (d), <i>A. congesta</i> (d), <i>A. diffusa</i> (d), <i>Cenchrus ciliaris</i> (d), <i>Cymbopogon caesius</i> (d), <i>Cynodon incompletus</i> (d), <i>Digitaria eriantha</i> (d), <i>Eragrostis curvula</i> (d), <i>E. lehmanniana</i> (d), <i>Heteropogon contortus</i> (d), <i>Setaria lindenberghiana</i> (d), <i>Themeda triandra</i> (d), <i>Tragus koelerioides</i> (d), <i>Cymbopogon pospischilii</i> , <i>Enneapogon scoparius</i> , <i>Eragrostis chloromelas</i> , <i>E. obtusa</i> , <i>Eustachys paspaloides</i> , <i>Fingerhuthia africana</i> , <i>Hyparrhenia hirta</i> , <i>Sporobolus fimbriatus</i> .
Herbs	<i>Convolvulus sagittatus</i> , <i>Dianthus caespitosus</i> subsp. <i>caespitosus</i> , <i>Gazania krebsiana</i> subsp. <i>krebsiana</i> , <i>Hibiscus pusillus</i> , <i>Indigofera alternans</i> , <i>I. rhytidocarpa</i> , <i>Lepidium africanum</i> subsp. <i>africanum</i> , <i>Pollichia campestris</i>
Herbaceous Climber	<i>Argyrolobium lanceolatum</i>
Geophytic Herbs	<i>Albuca setosa</i> , <i>Asplenium cordatum</i> , <i>Cheilanthes bergiana</i> , <i>C. eckloniana</i> , <i>Freesia andersoniae</i> , <i>Haemanthus humilis</i> subsp. <i>humilis</i> , <i>Oxalis depressa</i> , <i>Pellaea calomelanos</i> .
Succulent Herbs	<i>Aloe grandidentata</i> , <i>Crassula nudicaulis</i> , <i>Duvalia caespitosa</i> , <i>Euphorbia pulvinata</i> , <i>Huernia piersii</i> , <i>Stapelia grandiflora</i> , <i>S. olivacea</i> , <i>Tridentea gemmiflora</i> .

5.5 2024 NORTHERN CAPE BIODIVERSITY SPATIAL PLAN

The Northern Cape CBA Map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) which, together with protected areas, are important for the persistence of a viable representative sample of ecosystems and species, as well as the long-term ecological functioning of the landscape as a whole. The database consist of the following information:

1. Protected Areas (PA);
2. Critical Biodiversity Areas 1 (CBA1);
3. Critical Biodiversity Areas 2 (CBA2);
4. Ecological Support Area 1 (ESA1);
5. Ecological Support Area 2 (ESA2);
6. Other Natural Areas (ONA).

According to the Northern Cape Critical Biodiversity Areas (CBA) Map, the preferred site including the existing substation is situated within a Critical Biodiversity Area (**Figure 5-3**). Critical Biodiversity Areas (CBAs) represent portions of the landscape that are essential for safeguarding biodiversity pattern and ecological processes. These areas are identified through systematic biodiversity planning and are prioritised to ensure the long-term persistence of species, ecosystems, and ecological functioning. CBAs are therefore regarded as irreplaceable or highly significant for maintaining regional biodiversity targets and ecological resilience.

Within the project area, CBAs indicate locations where landscape integrity must be maintained, and where development or land-use change should be avoided or strictly managed. Activities within CBAs should align with biodiversity-compatible land uses, and any proposed transformation must demonstrate that ecological functionality will not be compromised. Where impacts are unavoidable, mitigation must follow the biodiversity mitigation hierarchy, with a strong emphasis on avoidance and minimisation.

CBAs form part of the broader Biodiversity Sector Plan and are supported by associated land-use guidelines that inform environmental decision-making, spatial planning, and regulatory processes. Their protection contributes directly to meeting national and provincial conservation targets, maintaining ecological connectivity, and supporting climate-change resilience.

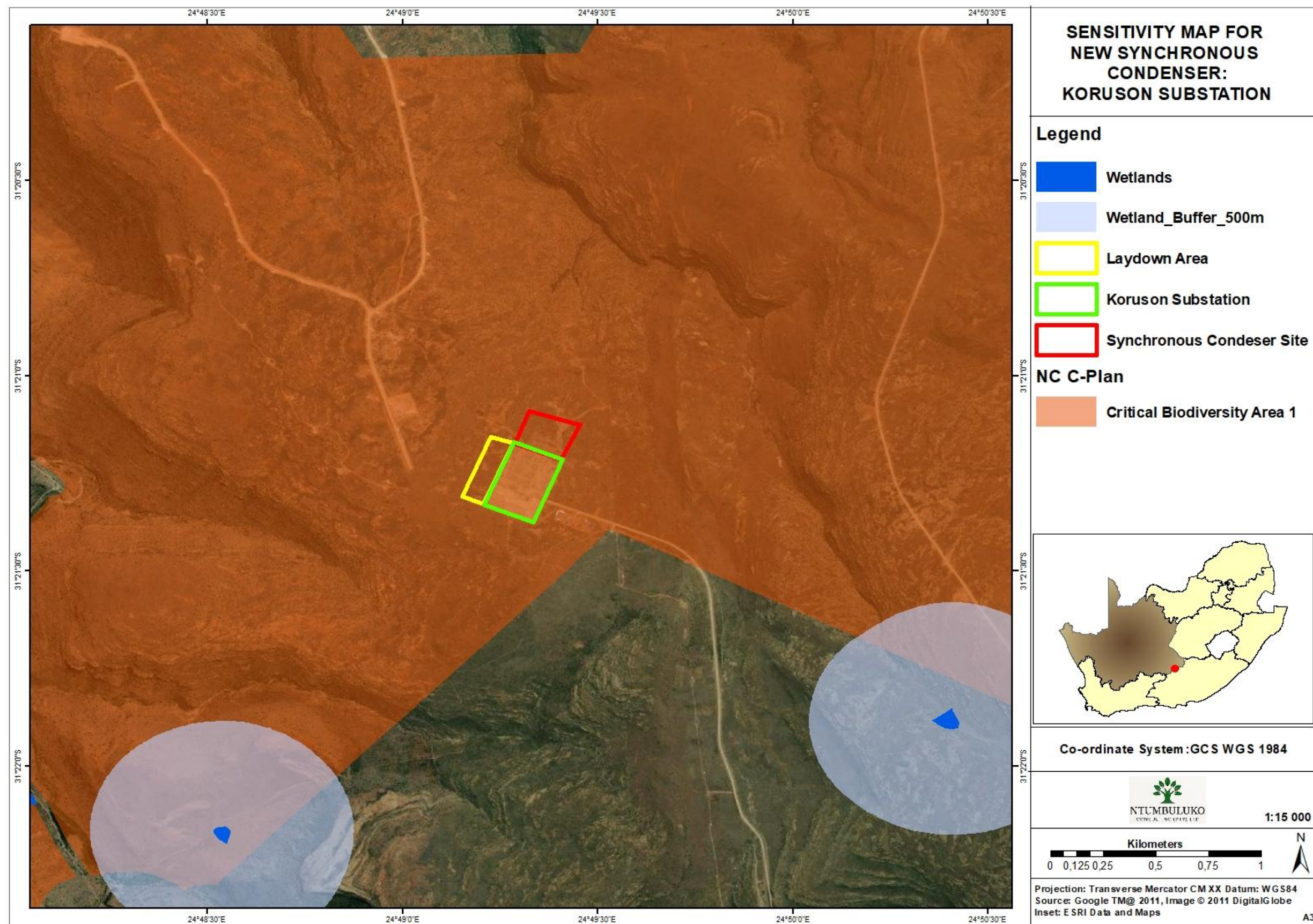


Figure 5-3: Sensitivity Map.

6. RESULTS

6.1 GENERAL OVERVIEW OF THE PROJECT AREA

While National level vegetation maps have described broad vegetation types, local conditions, and micro-habitats (rainfall, soil structure, rocky outcrops, etc.) can result in variations in plant composition. As such, site surveys are critical for the verification of desktop findings and establishing the baseline ecological conditions of a site. The site visit conducted on 23 January 2026 confirmed the presence of a single vegetation unit, Gh 4 Besemkaree Koppies Shrubland. The project area is characterised by predominantly flat to gently sloping plains, bordered by surrounding mountainous terrain. Evidence of disturbance was observed across the site, attributable to the construction and operation of the existing substation, as well as the operation of wind turbines in the broader area. Additional disturbance is associated with livestock grazing, which remains an active land-use practice on the site (**Figure 6-1**).



Figure 6-1: Over of the project area.

The area earmarked for the installation of the SynCon falls within the existing powerline servitude. As a result, the vegetation was already transformed during the construction of the powerlines. In addition, the site has been subjected to prolonged overgrazing, which reflects poor veld management practices. These pressures have facilitated the encroachment of bankrupt bush across the area (**Figure 6-2**).



Figure 6-2: Current Condition of the Preferred SynCon Installation Site.

As indicated above, the vegetation within the assessment area is described as Gh 4 Besemkaree Koppies Shrubland, occurring along the slopes of koppies, buttes and tafelbergs where a distinct two-layered karroid shrubland structure is evident. The lower stratum forms a relatively closed canopy dominated by dwarf, small-leaved shrubs, with grasses becoming more prominent during wetter years and contributing to seasonal increases in ground cover (**Figure 6-3**).



Figure 6-3: Evidence of the layered karroid shrubland, showing rocky outcrops with associated shrub and grass cover.

The upper stratum comprises a looser, open canopy of taller shrubs, represented by species such as *Rhus erosa*, *Rhus burchellii*, *Rhus ciliata*, *Euclea crispa* subsp. *ovata*, *Diospyros austro-africana* and *Olea europaea* subsp. *africana*. This structural composition is characteristic of koppie-associated shrublands in the region and reflects the influence of local geology and semi-arid climatic conditions (**Figure 6-4**).



Figure 6-4: Overview of the site taller shrubs.

The developer has identified an alternative area that could be used as the laydown site during the construction or installation of the SynCons. This area is situated directly behind the substation, to the west. The site shows evidence of historical disturbance, although the extent of this disturbance is less pronounced than that observed at the preferred SynCon site. Vegetation cover is dominated by grasses and dwarf shrubs, with clear signs of grazing activity. (**Figure 6-5**).



Figure 6-5: Overview of the proposed laydown area, showing evidence of ongoing anthropogenic disturbance.

6.2 VEGETATION TYPES RECORDED ON SITE

The species recorded onsite during the inspection are summarised below, providing an overview of the representative flora associated with the habitat present within the proposed development footprint.

Table 6-1: Species observed within the proposed development footprint.

PLANT FORM	SPECIES
Small Trees	<i>Cussonia paniculata</i> , <i>Ziziphus mucronata</i>
Tall Shrubs	<i>Diospyros austro-africana</i> (d), <i>Euclea crispa</i> subsp. <i>ovata</i> (d), <i>Olea europaea</i> subsp. <i>africana</i> (d), <i>Rhus burchellii</i>
Low Shrubs	<i>Asparagus suaveolens</i> (d), <i>Chrysocoma ciliata</i> (d), <i>Amphiglossa triflora</i> , <i>Aptosimum elongatum</i> , <i>Asparagus striatus</i> , <i>Diospyros pallens</i> , <i>Eriocephalus ericoides</i> , <i>E. spinescens</i> , <i>Euryops empetrifolius</i> , <i>Felicia filifolia</i> subsp. <i>filifolia</i> , <i>F. muricata</i> ,
Succulent Shrubs	<i>Aloe broomii</i> , <i>Chasmatophyllum musculinum</i> , <i>C. verdoorniae</i> , <i>Cotyledon orbiculata</i> var. <i>dactyloopsis</i> , <i>Pachypodium succulentum</i> .
Graminoids	<i>Aristida adscensionis</i> (d), <i>A. congesta</i> (d), <i>A. diffusa</i> (d), <i>Cenchrus ciliaris</i> (d), <i>Cymbopogon caesius</i> .
Herbs	<i>Convolvulus sagittatus</i> , <i>Dianthus caespitosus</i> subsp. <i>caespitosus</i> , <i>Gazania krebsiana</i> subsp. <i>krebsiana</i> , <i>Hibiscus pusillus</i> , <i>Indigofera alternans</i> , <i>I. rhytidocarpa</i> , <i>Lepidium africanum</i> subsp. <i>africanum</i> , <i>Pollichia campestris</i>

PLANTS, ANIMALS & TERRESTRIAL BIODIVERSITY ASSESSMENT FOR THE PROPOSED INSTALLATION OF SYNCHRONOUS CONDENSERS AT THE KORUSON SUBSTATION NEAR MIDDELBURG IN THE UMSOBOMVU LOCAL MUNICIPALITY, PIXLEY KA SEME DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE.

Herbaceous Climber	<i>Argyrobium lanceolatum</i>
Geophytic Herbs	<i>Albuca setosa</i> , <i>Asplenium cordatum</i> , <i>Cheilanthes bergiana</i> , <i>C. eckloniana</i> , <i>F</i>
Succulent Herbs	<i>Aloe grandidentata</i> , <i>Crassula nudicaulis</i> ,



Figure 6-6: *Tamarix usnoides* observed onsite.



Figure 6-7: *Anginon difforme* and shrubs observed in the midst of *Aristida* species.



Figure 6-8: *Rhus erosa*, and *ciliata*, *Euclea crispa*, *Diospyros austro-africana* and *Olea europaea* subsp. *Africana* observed onsite.



Figure 6-9: *Berkheya purpurea* observed onsite.

6.3 ETHNOBOTANICAL PLANT SPECIES

Ethnobotany/ Ethnoecology is a branch of botany that focuses on the use of plants for medicines, cultural and recreational purposes. The overexploitation of indigenous plants for ethnobotanical purposes can be detrimental to populations of those particular plant species, and the other species that depend on its existence for their survival. South Africa

has a rich diversity of medicinal plants that not only have a global significance but also have a cultural and historical role (van Wyk *et al.* 2009). There is a rapidly growing concern for conservation of medicinal plants that are dwindling in number due to illegal harvesting (Institute of Natural Resources 2003). This is particularly apparent in rural areas where medicinal plants are overexploited by traditional doctors (Mazid *et al.*, 2012).

No species of notable ethnobotanical value were identified within the development footprint during the survey; however, it remains possible that some of the existing plant species may hold traditional or occasional use for surrounding Indigenous communities.

6.4 PLANT SPECIES OF CONSERVATION CONCERN

According to provincial and national assessments, the Northern Cape is home to an estimated 5 400 plant species, occurring across six major biomes including the Succulent Karoo and Richtersveld; more than 30% of these species are endemic, and many have very restricted ranges.

A substantial number of Northern Cape plants are considered rare or threatened due to habitat loss, mining impacts, illegal collection (notably succulent poaching), and climate change, with recent Red List updates showing rising threat levels for several succulent groups¹. The plant species expected to occur within the study site are outlined in **Table 6-2**.

Table 6-2: Plant species of conservation concern expected to occur in grid square 3123CB (POSA, 2017; SANBI, 2017)

SPECIES OF CONSERVATION CONCERN	RED STATUS	Provincial	OBSERVED ONSITE
<i>Aizoon africanum</i>	LC	Schedule 4	No
<i>Delosperma multiflorum</i>	LC	Schedule 4	No
<i>Drosanthemum dejagerae</i>	-	Schedule 4	No
<i>Drosanthemum hispidum</i>	LC	Schedule 4	No

¹ [F – Flora | Northern Cape South Africa](#)

<i>Malephora lutea</i>	LC	Schedule 4	No
<i>Mesembryanthemum coriarium</i>	LC	Schedule 4	No
<i>Ruschia intricata</i>	LC	Schedule 4	No
<i>Ruschia spinosa</i>	LC	Schedule 4	No
<i>Stomatium duthiae</i>	LC	Schedule 4	No
<i>Boophone disticha</i>	LC	Schedule 4	No
<i>Gomphocarpus fruticosus</i>	LC	Schedule 4	No
<i>Pachypodium succulentum</i>	LC	Schedule 4	No
<i>Aloe broomii</i>	LC	Schedule 4	No
<i>Aloe claviflora</i>	LC	Schedule 4	No
<i>Haworthia semiviva</i>	LC	Schedule 4	No
<i>Moraea polystachya</i>	LC	Schedule 4	No
<i>Moraea sp.</i>	LC	Schedule 4	No
<i>Romulea tortuosa</i>	LC	Schedule 4	No

6.5 ALIEN INVASIVE SPECIES PRESENT ON SITE

An “invasive species” is any species whose establishment and spread outside of its natural distribution range (i) threatens ecosystems, habitats or other species or has a demonstrable potential to threaten ecosystems, habitats or other species; and (ii) may result in economic or environmental harm or harm to human health. Invasive alien plant species are globally considered as one of the greatest threats to the environment, biodiversity, ecosystem integrity and the economy.

According to the Conservation of Agricultural Resources Act (No. 43 of 1983 - Regulation 15, 30 March 2001) (CARA), for agricultural land, and the National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEMBA), for natural areas, invasive alien plant species should be controlled and eradicated with an emphasis on urgent action in biodiversity priority areas. NEMBA published a list of Alien and Invasive Species (No 599) in 2014 which regulates the management of alien and invasive plants in natural environments.

Due to the level of disturbance observed onsite, the conditions provide suitable habitat for the proliferation of Mexican poppy (*Argemone mexicana*) (Figure 6-10).

Disturbed and exposed soils, particularly those associated with construction activities, vehicle movement, and reduced vegetation cover, create favourable opportunities for this opportunistic species to establish and spread. As a pioneer and often invasive plant, Mexican poppy readily colonises such environments, which may necessitate monitoring and management during the construction phase to prevent further encroachment.



Figure 6-10: Mexican poppy.

6.6 FAUNAL ASSESSMENT

6.6.1 Amphibians

According on the IUCN Red List Spatial Data and AmphibianMap, 3 amphibian species are expected to occur within the area. None of these species are threatened.

Table 6-3: List of Herpetofuana species in the area.

Species Name	Common Name	Conservation Status
<i>Sclerophrys pardalis</i>	Eastern Leopard Toad	Least Concern
<i>Hyperolius poweri</i> complex	Eastern Coast Reed Frog	Not yet assessed
<i>Cacosternum boettgeri</i>	Boettger's Caco	Endangered

6.6.2 Reptiles

Based on the IUCN Red List Spatial Data and the ReptileMAP database, 53 reptile species are expected to occur within the area . One (1) is regarded as threatened (Table 6-3).

Table 6-4: Threatened reptile species that are expected to occur within the proposed project area.

#	Scientific name	Common name	Conservation Status	Endemism	Likelihood of Occurrence
1	<i>Psammobates tentorius verroxii</i>	Verrox's Tent Tortoise	NT	Near-Endemic	Unconfirmed
2	<i>Cordylus cordylus</i>	Cape Girdled Lizard	Least Concern	-	High
3	<i>Chamaesaura anguina</i>	Cape Grass Lizard	Least Concern	-	High
4	<i>Pachydactylus spp</i>	Various Nama/Karoo Geckos	Least Concern (varies by species)	-	High
5	<i>Dendroaspis angusticeps</i>	Eastern Green Mamba	Least Concern	Vulnerable regionally)	Moderate
6	<i>Cryptactites peringueyi</i>	Peringuey's Leaf-toed Gecko	Least Concern	-	High
7	<i>Bitis arietans</i>	Puff Adder	Least Concern	-	High
8	<i>Chersobius boulengeri</i>	Karoo Dwarf Tortoise	Near Threatened	-	High

The study area is predominantly used for grazing; however, evidence of small mammal activity was also recorded on site (**Figure 6-11**).



Figure 6-11: Dropping of Mammals and cattle grazing onsite.

6.7 AVIFUANA

Based on the South African Bird Atlas Project, Version 2 (SABAP2) database, 120 bird species have the potential to occur in the vicinity of the project area. Of the potential bird species, nine (9) species are listed as SCC either on a regional or global scale (Table 3-5).

Table 6-5: List of bird species of regional or global conservation importance that are expected to occur in the project area.

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
<i>Afrotis afra</i>	Korhaan, Southern Black	VU	VU	Low
<i>Aquila verreauxii</i>	Eagle, Verreaux's	VU	LC	Low
<i>Circus maurus</i>	Harrier, Black	EN	VU	Low
<i>Coracias garrulus</i>	Roller, European	NT	LC	Low
<i>Eupodotis vigorsii</i>	Korhaan, Karoo	NT	LC	Low
<i>Neotis ludwigii</i>	Bustard, Ludwig's	EN	LC	Low
<i>Phoenicopterus roseus</i>	Flamingo, Greater	NT	LC	Low
<i>Polemaetus bellicosus</i>	Eagle, Martial	EN	VU	Low
<i>Gyps coprotheres</i>	Cape Vulture	EN	VU	Moderate

6.7.1 FIELD INVESTIGATION FINDINGS

The study is located outside of an Important Bird Area, and the sensitivity is considered Medium to High especially within the neighboring properties. Furthermore, no Species of Conservation Concern were observed during the survey. A few avifaunal species were spotted onsite during the site inspection, All of the avifaunal species observed within the study site are considered to be of Least Concern by the IUCN and are common and widespread species .

6.8 Mammals

The IUCN Red List Spatial Data lists 56 mammal species that could be expected to occur within the area. This list excludes large mammal species that are limited to protected areas. Eight (8) of these expected species are regarded as threatened (**Table 6-6**), five of these have a low likelihood of occurrence based on the lack of suitable habitat in the project area.

Table 6-6; Threatened mammal species that are expected to occur within proposed project area.

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
<i>Aonyx capensis</i>	Cape Clawless Otter	NT	NT	Low
<i>Hystrix africaeaustralis</i>	Cape Porcupine	LC	LC	Low
<i>Orycteropus afer</i>	Aardvark	LC	LC	High
<i>Sylvicapra grimmia</i>	Common (Grey) Duiker	LC	LC	High
<i>Rhabdomys pumilio</i>	Four-striped Grass Mouse	LC	LC	Moderate
<i>Genetta tigrina</i>	Large-spotted Genet	LC	LC	Low
<i>Bunolagus monticularis</i>	Riverine Rabbit	EN	CR	Low
<i>Felis nigripes</i>	Black-footed Cat	VU	VU	Low
<i>Graphiurus ocularis</i>	Spectacular Dormouse	NT	LC	Low
<i>Leptailurus serval</i>	Serval	NT	LC	Low
<i>Panthera pardus</i>	Leopard	VU	VU	Low

Pelea capreolus	Grey Rhebok	NT	NT	Low
Poecilogale albinucha	African Striped Weasel	NT	LC	Low

Felis nigripes (Black-footed cat) is endemic to the arid regions of southern Africa. This species is naturally rare, has cryptic colouring is small in size and is nocturnal. These factors have contributed to a lack of information on this species. Given that the highest densities of this species have been recorded in the more arid Karoo region of South Africa. The habitat in the project area is regarded as suitable for the species as such the likelihood of occurrence is rated as high.

Pelea capreolus (Grey Rhebok) is endemic to a small region in southern Africa, inhabiting montane and plateau grasslands of South Africa, Swaziland, and Lesotho. In South Africa, their distribution is irregular and patchy, and they no longer occur north of the Orange River in the Northern Cape, or in parts of the North-West Province (IUCN, 2017). Grey Rhebok can be found in suitable habitat which has rocky hills, grassy mountain slopes, and montane and plateau grasslands in southern Africa. They are predominantly browsers, and largely water independent, obtaining most of their water requirements from their food. In the central part of the project area, mountainous habitat can be found that could be suitable. This species was confirmed present on site during the September 2021 assessment.

Poecilogale albinucha (African Striped Weasel) is usually associated with savanna habitats, although it probably has a wider habitat tolerance (IUCN, 2017). Due to its secretive nature, it is often overlooked in many areas where it does occur. There is sufficient habitat for this species in the project area and the likelihood of occurrence of this species is therefore considered to be moderate.

6.8.1 Field Investigation Findings

During the site inspection, multiple signs of medium-sized mammal activity were recorded within the study area. Evidence included spoor, grazing marks, and droppings attributable to hares (*Lepus* spp.) and Baboons (*Papio* spp) (**Figure 6-12**). These observations indicate that the site and its surrounding natural veld provide suitable foraging habitat and movement corridors for these species. Their presence also reflects the broader ecological functioning of the area, particularly the availability of open grassland and shrubland patches that support small to medium herbivores.



Figure 6-12: Hare and baboon droppings observed onsite.

6.9 INVERTEBRATES

Invertebrate diversity within the Middelburg (Eastern Cape) area is shaped by the region's semi-arid grassland and karoo-transition habitats, which support a range of soil-dwelling and surface-active species. Typical assemblages include ants, beetles, spiders, and other detritivores that play key roles in nutrient cycling and soil turnover. Although invertebrate activity is often cryptic, field observations commonly reveal burrows, surface tracks, and foraging signs that indicate a functioning micro-faunal community adapted to the area's seasonal temperature and moisture fluctuations. During the site, grasshopper and spiders species were observed onsite (Figure 6-13).

6.9.1 Field Investigation Findings



Figure 6-13: Invertebrates observed onsite.

7. TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT

The impact assessment is aimed predicting potential impacts of the proposed projects. Impact assessment strives to avoid damage, loss of ecosystems services, and where they cannot be avoided, to reduce and mitigate these impacts (DEA, 2013). Offsets to compensate for loss of habitat are regarded as a last resort, after all efforts have been made to avoid, reduce and mitigate. The mitigation hierarchy is represented in **Table 7-1**.

Table 7-1: Mitigation hierarchy of impacts

	Avoid or prevent	Refers to considering options in project location, sitting, scale, layout, technology and phasing to avoid impacts on biodiversity, associated ecosystem services and people. This is the best option but is not always possible. Where environmental and social factors give rise to unacceptable negative impacts, the activity should not take place. In such cases, it is unlikely to be possible or appropriate to rely on the other steps in the mitigation.
	Minimise	Refers to considering alternatives in the project location, sitting, scale, layout, technology and phasing that would minimise impacts on biodiversity, associated ecosystem services. In cases where there are environmental constraints, every effort should be made to minimise impacts.
	Rehabilitate	Refers to rehabilitation of areas where impacts are unavoidable, and measures are provided to return impacted areas to near natural state or an agreed land use after mine closure. Rehabilitation can, however, fall short of replicating the diversity and complexity of natural systems.
	Offset	Refers to measures over and above rehabilitation to compensate for the residual negative impacts on biodiversity after every effort has been made to minimise and then rehabilitate the impacts. Biodiversity offsets can provide a mechanism to compensate for significant residual impacts on biodiversity.

A significant portion of the preferred site with the remaining natural habitat is anticipated to be disturbed due to the proposed construction and associated activities. The impact of the proposed activity will involve a loss of habitat for both flora and fauna (**Table 7-2**).

7.1 GENERAL IMPACT ASSESSMENT

Table 7-2: Assessment of impacts associated with the proposed development.

CONSTRUCTION PHASE	
IMPACT 1: LOSS OF VEGETATION	
<u>Cause and Comment</u>	
<i>Direct Impact</i>	
	The clearing of land for the construction will result in the loss of vegetation. However, vegetation clearance will only be restricted to the project footprint. Therefore, the clearance of vegetation required for the required soil material is likely to impact on the extent and long-term conservation of this vegetation types.
	The overall significance of the project activities at this site, provided the recommended mitigation measures are implemented, would be moderate negative.
<i>Cumulative Impact</i>	
	The bulk of the vegetation is still intact, with evidence of disturbance along certain sections of the substation. The proposed development will have a negative impact on the vegetation onsite. The additional loss of vegetation as a consequence of the proposed development will therefore have a High cumulative impact.
<i>No-Go Alternative</i>	
	If the project does not go ahead, the current impacts associated with existing substation will continue. However, these are relatively minor within the proposed site and as such, the No-go Alternative is classified as low negative .

Mitigation Measures:

- ☐ Construction vehicles and machinery must not encroach into identified 'sensitive' areas or areas outside the project footprint. Refer to **Figure 5-3**
- ☐ Topsoil (20 cm, where possible) must be collected and stored in an area of low sensitivity and used to rehabilitate impacted areas that are no longer required during the operational phase (e.g. laydown areas).
- ☐ Only indigenous species must be used for rehabilitation. The species included in **Table 5-1** for the full list of indigenous species.
- ☐ Lay down area must not be located within any watercourses or drainage lines.
- ☐ Employees must be prohibited from making open fires during the construction phase.

<u>Significance Assessment:</u>										
Impact	Nature	Duration	Extent	Severity	Likelihood	Significance Before Mitigation	Reversibility	Irreplaceable Loss	Mitigation Potential	Significance After Mitigation
Available Site	Direct	Permanent	Study-Area	Moderate	Definite	MODERATE (-)	Reversible	Resource will be partly lost	Achievable	MODERATE (-)
Cumulative	Cumulative	Long-Term	Study-Area	Slight	Possible	Low (-)	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or farming activities in the area. However, it is imperative that the applicant			N/A

PLANTS, ANIMALS & TERRESTRIAL BIODIVERSITY ASSESSMENT FOR THE PROPOSED INSTALLATION OF SYNCHRONOUS CONDENSERS AT THE KORUSON SUBSTATION NEAR MIDDELBURG IN THE UMSOBOMVU LOCAL MUNICIPALITY, PIXLEY KA SEME DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE.

							implement the mitigation measures listed above for the direct impacts.	
No-Go	Direct	Short-Term	Localised	Moderate	Probable	Low (-)	N/A	

OPERATIONAL PHASE

No direct loss of habitat is expected during this phase of the project. Alien plant invasion is, however expected to occur. In addition, vehicular transport through the site may increase the risk of roadkill of fauna species that occur (**Table 7-3**).

Table 7-3: Loss of habitat during operation phase

Loss of habitat					
Phase	Operational				
Criteria	Details / Discussion				
Description of impact	Establishment of alien plant species in disturbed areas				
Mitigation required	- Manage alien invasive species establishment continually through chemical or mechanical removal. - Reinstate vegetation cover through concurrent rehabilitation - Erect signage to control the speed limit for trucks and other vehicles moving through the site				
Parameters	Intensity	Spatial scale	Duration	Probability	Significance
Pre-Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Major (negative) (54)
Post Mitigation	Limited (1)	Minor (2)	Short-term (3-5 years) (3)	Likely (4)	Minor (negative) (24)

DECOMMISSIONING PHASE

No direct loss of habitat is expected during this phase of the project. Alien plant invasion is, however expected to occur as vehicles and machinery move throughout the site and disturb the soil (**Table 7-4**).

Table 7-4: Loss of habitat during decommissioning

Loss of habitat	
Phase	Decommissioning
Criteria	Details / Discussion

Description of impact	- Removal infrastructure and equipment - Disturbance of the soil - Vehicle operation				
Mitigation required	- Minimise the impacted area and revegetate with indigenous where disturbed - Avoid erosion, manage alien invasive species establishment, ensure the re-establishment of natural vegetation - Employ stormwater management measures				
Parameters	Intensity	Spatial scale	Duration	Probability	Significance
Pre-Mitigation	Very Significant (7)	National (6)	Permanent (6)	Likely (6)	Major (negative) (115)
Post Mitigation	Significant (6)	National (6)	Short-term (3-5 years) (3)	Likely (6)	Minor (negative) (90)

POST CLOSURE PHASE

No direct loss of habitat is expected during this phase of the project. Alien plant invasion should be monitored for up to 1-6 months after closure (**Table 7-5**).

Table 7-5: Loss of habitat during post-closure phase

Loss of habitat					
Phase	Post-closure				
Criteria	Details / Discussion				
Description of impact	On-going establishment of alien plant species in disturbed areas				
Mitigation required	- Manage alien invasive species establishment continually through chemical or mechanical removal. - Revegetation of the site where previously disturbed.				
Parameters	Intensity	Spatial scale	Duration	Probability	Significance
Pre-Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Major (negative) (54)

**PLANTS, ANIMALS & TERRESTRIAL BIODIVERSITY ASSESSMENT FOR THE PROPOSED INSTALLATION OF SYNCHRONOUS
CONDENSERS AT THE KORUSON SUBSTATION NEAR MIDDELBURG IN THE UMSOBOMVU LOCAL MUNICIPALITY, PIXLEY KA
SEME DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE.**

Post Mitigation	Limited (1)	Minor (2)	Short-term (3- 5 years) (3)	Likely (4)	Minor (negative) (24)
--------------------	-------------	-----------	--------------------------------	------------	-----------------------------

8. IMPACT STATEMENT, CONCLUSIONS AND RECOMMENDATIONS

The site inspection was undertaken during the summer season, which inherently limits the detectability of certain plant species. Flora that emerge, flower, or are identifiable only during alternative seasons or under specific environmental conditions may therefore have been overlooked or misidentified. This seasonal constraint should be considered when interpreting the completeness of the species inventory.

A biodiversity assessment conducted on 23 January 2026 confirmed the overall ecological condition of the study area. According to the Northern Cape C-Plan, the proposed development footprint is situated within a Critical Biodiversity Area (CBA). CBAs represent spatial priorities required to meet biodiversity targets, maintain ecosystem functioning, and secure ecological resilience. As such, they carry heightened conservation importance and are generally intended to remain in a natural or near-natural state. Development within a CBA is therefore subject to stricter scrutiny, and any land-use change must demonstrate that ecological integrity will be maintained, impacts will be minimised, and unavoidable disturbances will be offset or mitigated to the satisfaction of the competent authority.

In line with this classification, development must be restricted to the preferred, least-sensitive portions of the landscape to minimise habitat disturbance and maintain ecological function. Sensitivity mapping should guide the delineation of no-go areas, and all boundaries must be verified in the field under the supervision of a suitably qualified Environmental Control Officer (ECO). This oversight is essential to ensure that construction activities remain compliant with environmental management requirements and avoid unintended impacts on sensitive features.

From a constructability and environmental feasibility perspective, no fatal flaws were identified, and the proposed development can proceed, provided that the development is restricted to the disturbed areas, and ECO-led compliance monitoring is fully implemented.

A summary of the biodiversity assessment is outlined Below:

8.1 Ecological Characteristics of the study sites:

The proposed site falls within the Besemkaree Koppies Shrubland (Gh 4) vegetation unit, which is classified as Least Threatened. The areas earmarked for the installation of the synchronisers, as well as the potential laydown area, have experienced varying degrees

of disturbance associated with the construction and ongoing maintenance of the existing substation. No animal and plant species of special concern were recorded during the site inspection. From an ecological perspective, the overall sensitivity of the area is therefore regarded as low.

9. STATEMENT AND OPINION OF THE SPECIALIST

The proposed development is considered environmentally acceptable, provided that all mitigation measures and recommendations outlined in this report are fully implemented and strictly adhered to. No species of special conservation concern were observed during the site inspection. However, as a precautionary measure, it must be noted that the broader area is known to support sensitive species (refer to Table 6-3). Should any such species be encountered during the construction phase, the necessary permits must be obtained for their relocation outside the development footprint.

Species known to survive translocation should be moved to the nearest suitable and comparable habitat, preferably in adjacent areas located outside the development footprint. The ECO will provide guidance throughout this process. Where feasible, rocky outcrops situated outside the development footprint should be avoided. Additional caution is required when cutting through the mountainous section of the site, as these areas are associated with Critical Biodiversity Areas.

10. REFERENCES

- Acocks, J.P.H. 1953. Veld types of South Africa. Mem. Bot. Surv. S. Afr. 28: 1-192.
- Branch, B. 1998. Field Guide to Snakes and Other Reptiles of Southern Africa. Struik Publishers, Cape Town.
- Du Preez V. and Carruthers L. 2009. A Complete guide to the frogs of Southern Africa.
- Germihuizen, G. and Meyer, N.L. (eds) 2003. Plants of southern Africa: an annotated checklist. Strelitzia 14.
- Institute of Natural Resources 2003. Indigenous medicinal plant trade: Sector analysis. Investigation report: no. 248.
- LepiMAP 2014. Accessed at: <http://lepimap.adu.org.za/> on 2014-09-12.
- Maria Luisa Bárcenas-Argüello, Ma. del Carmen Gutiérrez- Castorena and Teresa Terrazas. 2013. The Role of Soil Properties in Plant Endemism – A Revision of Conservation Strategies. Soil trends and current trends in quality assessment.
- Mazid, M., Khan, T.A. and Mohammad, F., 2012. Medicinal plants of rural India: a review of use by Indian folks. *Indo Global journal of pharmaceutical sciences*, 2(3), pp.286-304.
- Mucina L. and Rutherford M.C. (eds) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.
- RAIMONDO, Domitilla. The Red List of South African plants: a global first. *S. Afr. j. sci.*, Pretoria , v. 107, n. 3-4, p. 01-02, Apr. 2011 . Available from<http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S0038-23532011000200003&lng=en&nrm=iso>. access on 17 Aug. 2021. <http://dx.doi.org/10.4102/sajs.v107i3/4.653>.
- SARCA 2014. Southern African Reptile Conservation Assessment. Accessed at: 9:05am on 2014-04-29. Accessed at: http://vmus.adu.org.za/vm_sp_list.php.
- Van Wyk B., van Oudtshoorn B. and Gericke N. 2009. Medicinal Plants of South Africa. Briza Publications: 330 pp.

Young, S., 2010. Monitoring threatened species in South Africa: A review of the South African National Biodiversity Institutes' Threatened Species Programme: 2004-2009.