REPORT CODE: SVE – MKP – 2009/01

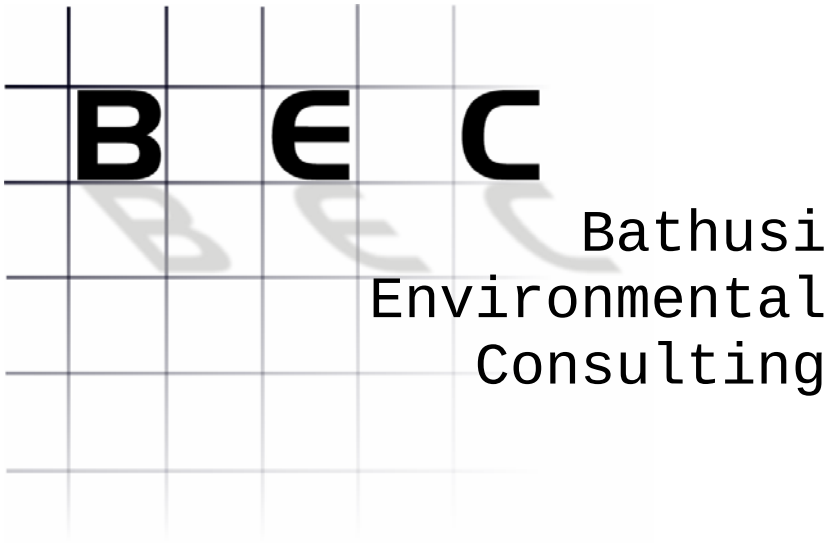
Biodiversity Scoping Assessment for the proposed new 765kV transmission lines between:

- Delta Substation the new Mokopane Substation;
- Delta Substation and Witkop Substation;
- Mokopane Substation and Witkop Substation;

and

- Transmission Substation Site, Mokopane; and
- Turn-in Lines from the Matimba-Witkop 400kV

submitted by



November 2008

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Address:	PO Box 77448 Eldoglen Centurion 0171

SPECIALIST INVESTIGATORS

The Natural Scientific Professions Act of 2003 aims to 'provide for the establishment of the South African Council of Natural Scientific Professions (SACNASP) and for the registration of professional, candidate and certified natural scientists; and to provide for matters connected therewith'. Quoting the Natural Scientific Professions Act of 2003: '*Only a registered person may practice in a consulting capacity*' (20(1) – pg 14).

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Affiliation:	South African Council for Natural Scientific Professions
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Capacity:	Faunal Investigator
Qualification:	M.Sc. (Conservation Biology)
Affiliation:	South African Council for Natural Scientific Professions
Registration number:	400204/05
Fields of expertise:	Ecological Scientist & Zoological Scientist.

DECLARATION

- All specialist investigators, project investigators and members of companies employed for conducting this particular investigation declare that:
- we consider ourselves bound to the rules and ethics of the South African Council for Natural Scientific Professions;
- at the time of completing this report, we did not have any interest, hidden or otherwise, in the proposed development as outlined in this document, except for financial compensation for work done in a professional capacity;
- we will not be affected in any manner by the outcome of the environmental process of which this report forms part of, other than being part of the general public;
- we do not have any influence over decisions made by the governing authorities;
- we do not necessarily object to or endorse the proposed development, but aim to present facts and recommendations based on scientific data and relevant professional experience;
- should we consider ourselves to be in conflict with any of the above declarations, we shall formally submit a Notice of Withdrawal to all relevant parties and formally register as an Interested and Affected Party; and
- This document and all information contained herein are and will remain the intellectual property of Bathusi Environmental Consulting cc and Riaan A.J. Robbeson. Information contained within this document may not be altered in any manner or form or for any purpo

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1 EXECUTIVE SUMMARY

The aim of this document is to provide the reader with an overview of biological attributes of the study area and the inherent environmental sensitivity of the region. Results and recommendations from this report will ultimately be taken forward into the EIA phase of the project and selected areas will be subjected to more detailed biodiversity investigations.

The study area is situated approximately between the towns Lephalale in the west and Polokwane in the east. Four potential sites for the proposed substation site were identified, located on the following farms:

- Substation Site 1 – Doornfontein 721/ Aaronsfontein 722;
- Substation Site 2 – Doornfontein 721/ Aaronsfontein 722;
- Substation Site 3 – Zuid Holland 733; and
- Substation Site 4 – Noord Braband 774.

The study area is situated within the Limpopo catchment area. Numerous rivers and drainage lines are crossed by the various alternatives. Hans Strijdom dam is situated approximately 9km south of Medupi-Mokopane 3 and Glen Alpine dam 30km north of Medupi-Mokopane 2.

An analysis of the topography and landform revealed that the proposed corridors would cross landform types ranging from plains in the north to a number of areas consisting of hills and mountains in the south, which are especially important since they provide for high spatial heterogeneities, thereby likely to sustain populations of conservation important invertebrate species. An analysis of slopes revealed that selected portions of the proposed corridors would cross areas where the general slopes exceed 9%.

Some areas within the study area have known importance in terms of floristic and faunal attributes. These areas frequently exhibit characteristics of a pristine nature, the presence of Red Data flora and fauna species, a high diversity or atypical or threatened vegetation types.

A number of conservation areas are present within the surrounds of the study area. This is mainly as a result of the largely untransformed status of the area and the suitability of the bushveld area toward the ecotourism/ wildlife management activities. All three line variants will impact on the Waterberg Biosphere.

A total of eight VEGMAP vegetation units will be traversed by the proposed line variants or affected by the proposed substation sites. None of these vegetation types are regarded to have a Threatened status. The Central Sandy Bushveld and Makhado Sweet Bushveld are regarded the more sensitive vegetation types in the affected environment.

PRECIS data from SANBI indicate the presence of 1,711 species within the ¼ degree grids in which the study area is situated. This high diversity is an indication of the high floristic status of the region. A total of 36 plant species of conservation importance are known to occur in the general region of the study area. Of the 46 protected tree species that occur in South Africa, 14 occur within the study area. A total of 44 Red Data fauna species are regarded to have a high probability of occurring within the study area as a result of suitable habitat being present.

A combination of sensitivities attributed to respective biophysical habitat attributes of the region indicate that extensive areas within the central part of the study area exhibit characteristics of extremely high connectivity and low isolation, fragmentation and transformation. Predicted impacts of the proposed development within high sensitivity areas are expected to be significant and the mitigation thereof costly and mostly unsuccessful, i.e. habitat transformation is not reversible.

Although traversing some areas of high biodiversity sensitivities, Medupi - Mokopane 2 represents the preferred alternative between Medupi and Mokopane. Medupi - Mokopane 1 and 3 will impact on significant areas of high biodiversity sensitivities. Mokopane - Witkop 1 will traverse areas of high biodiversity sensitivity (Percy Fyfe Nature Reserve) and is therefore not regarded as the preferred alternative from a biodiversity perspective.

Substation Site Option 2 is situated within an area of high biodiversity sensitivity and is regarded the least preferable of the four substation site options. Substation Site Option 3 is regarded the most preferable of the four options and, although situated within an area of medium-high biodiversity sensitivity, the turn-in lines from the existing Matimba-Witkop lines and potential lines from Medupi-Mokopane is expected to result in the low impact on biodiversity attributes of the region.

A realignment of the proposed line variation directly east of Witkop Sub station is recommended in order to avoid impacts on areas of high biodiversity sensitivities. It is recommended that the realignments to the recommended Medupi Mokopane 2 alternative be investigated in order to avoid impacts on areas of high biodiversity sensitivities. It should be noted that realignments are recommended purely on the basis of regional biodiversity sensitivities and does not take any other aspect or technical feasibility into consideration.

2 INTRODUCTION

Witkop Substation is the only nodal point of power supply in the Polokwane area that is supporting platinum group metals load growth. The load forecast shows a shift of load towards the Mokopane area with several customer applications. The proposed load cannot be supplied from Witkop as there are thermal, voltage stability and space constraints. Therefore, Eskom Transmission propose the introduction of the Mokopane Integration Project. This project includes the following components:

- Construction of a new 765/132kV substation near Mokopane;
- Integration of the new substation into the transmission system by looping in and out of one of the Matimba – Witkop 400kV transmission lines (i.e. two lines in parallel for a distance of approximately 10km);
- Construction of a new 765kV transmission power lines between the Delta Substation (a new substation to be located at the Medupi Power Station) and the new Mokopane Substation, a distance of approximately 150km;
- Construction of a new 765kV transmission power line between the new Mokopane Substation and the existing Witkop Substation, a distance of approximately 60km;
- Construction of a new 765kV transmission power line between Delta Substation and the existing Witkop Substation, distance of approximately 200km; and
- Associated works to integrate the new substation into the Transmission grid (such as access roads, communication tower, etc) and accommodate the near lines at existing substations (such as the construction of new feeder bays within the existing substation site).

Eskom Holdings Ltd has appointed Savannah Environmental (PTY) Ltd to undertake an Environmental Impact Assessment (EIA) for the proposed Mokopane Integration Project. Bathusi Environmental Consulting has been appointed, on behalf of Savannah Environmental (PTY) Ltd to conduct a strategic Biodiversity Scoping Assessment for the project. Dewald Kamffer (FSI) assessed the faunal discipline; Riaan Robbeson (BEC) assessed the floristic attributes and compiled the ecological assessment and sensitivity interpretations.

3 AIMS & OBJECTIVES

The aim of this report is to present the reader with a biodiversity scoping assessment for the new 765kV lines between the following locations:

- Delta Substation (located at the Medupi Power Station near Lephalale) and the new Mokopane Substation;
- Delta Substation and the Witkop Substation (located near Polokwane); and
- Mokopane Substation and the Witkop Substation.

Four potential new Transmission Substation sites near Mokopane as well as the associated turn-in lines from one of the Matimba-Witkop 400kV lines to this new substation are included in this assessment. This scoping report includes:

- A description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed project;
- A description and evaluation of environmental issues and potential impacts (including direct, indirect and cumulative impacts) that have been identified;
- Direct, indirect and cumulative impacts of the identified issues will be evaluated in terms of the following criteria:

    * The nature, which shall include a description of what causes the effect, what will be affected and how it will be affected;
    * The extent, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international;
- A statement regarding the potential significance of the identified issues based in the evaluation of the issues/ impacts;
- A comparative evaluation of identified feasible alternatives, and nomination of preferred alternatives or locations for consideration in the EIA phase;
- Identification of potentially significant impacts to be assessed within the EIA phase and details of the methodology to be adopted in assessing these impacts.

4 LIMITATIONS OF THIS INVESTIGATION

- This report is based on a strategic investigation of some parts of the study area. No detailed or long-term investigation of biological attributes and biological diversity that may be present in the study area was conducted for the purpose of this scoping assessment.
- This company, the consultants and/or specialist investigators do not accept any responsibility for conclusions, suggestions, limitations and recommendations made in good faith, based on the information presented to them, obtained from these assessments or requests made to them for the purpose of this report since reliable and accurate biological information can only be compiled by means of detailed surveys conducted over a period of several years. Every effort is however made to consider available information at every scale.
- Additional information may come to light during a later stage of the process for which no allowance could have been made at the time of this report.
- No definite conclusions may be drawn with regards to biological diversity or conservation strategies as far as this report is concerned as a result of limited information being available at the time.
- BEC withholds the right to amend this report, recommendations and/ or conclusions at any stage of the project should significant information come to light.
- Information contained in this report cannot be applied to any other area, however similar in appearance or any other aspect, without proper investigation.
- This document and all information contained herein are and will remain the intellectual property of Bathusi Environmental Consulting cc and Riaan A.J. Robbeson. Information contained within this document may not be altered in any manner or form or for any purpose without the specific and written consent of Riaan A.J. Robbeson.

6 THE BIOPHYSICAL ENVIRONMENT

6.1 Location

The study area is situated approximately between the towns of Lephalale in the west and Polokwane in the east (Figure 1). The line alternatives, which will contain two parallel constructed 765kV lines, are as follows:

- Medupi Mokopane 1 (central);
- Medupi Mokopane 2 (north);
- Medupi Mokopane 3 (south);
- Mokopane Witkop 1 (south);
- Mokopane Witkop 2 (central); and
- Mokopane Witkop 3 (north).

Four potential substation sites were identified, located on the following farms:

- Substation Site 1 – Doornfontein 721/ Aaronsfontein 722;
- Substation Site 2 – Doornfontein 721/ Aaronsfontein 722;
- Substation Site 3 – Zuid Holland 733; and
- Substation Site 4 – Noord Braband 774.

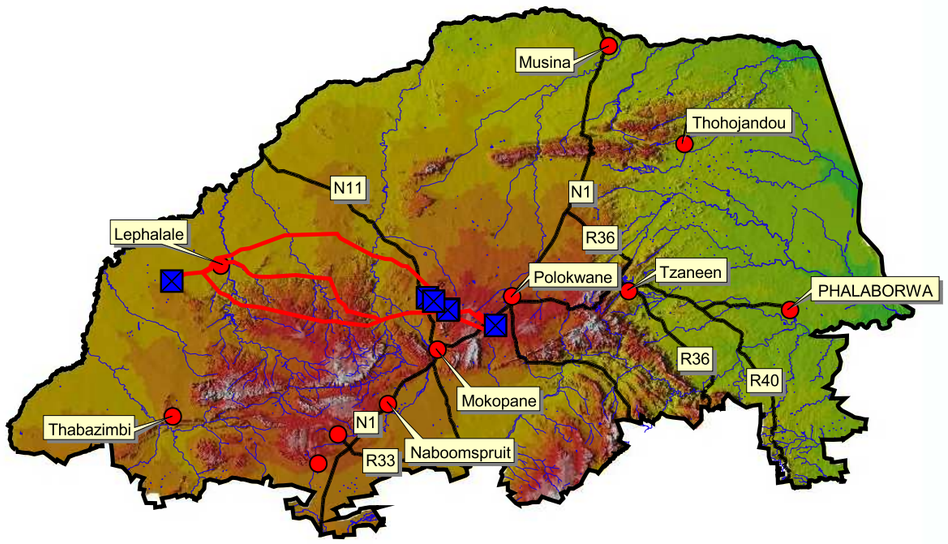
These sites are situated approximately 30km north of Mokopane in the Limpopo Province and situated east of the N11 highway.

6.2 Surface Water

The study area is situated within the Limpopo catchment area. Numerous rivers and drainage lines are crossed by the various alternatives. Major rivers that will be crossed include the following (Figure 2):

- Bloed River
- Boer se Loop
- Goud River
- Lephalale River
- Melk River
- Mogalakwena River
- Mokamole River
- Mokolo River
- Rietspruit
- Sterk River
- Tambotie River

Hans Strijdom dam is situated approximately 9km south of Medupi-Mokopane 3 and Glen Alpine dam 30km north of Medupi-Mokopane 2. An assessment of the anticipated river/ wetland crossings for each of the line alternatives is presented in Table 1.



Substation Sites
Corridor Alternatives

Towns
National Roads
Rivers

28°15' 28°30' 28°45' 29°00' 29°15' 29°30' 29°45'

23°15' 23°30' 23°45' 24°00' 24°15' 24°30'

27°30' 27°45' 28°00' 28°15' 28°30' 28°45' 29°00' 29°15' 29°30' 29°45'

N11
DENDRON
N1
Lephalale
Medupi Mokopane 2
Medupi Mokopane 1
Delta SS
Medupi Mokopane 3
SS Option 3
SS Option 4
SS Option 1
SS Option 2
R71
Mokopane Witkop 3
N1
Mokopane Witkop 1
R37
N1
N11
Naboomspruit
Thabazimbi

Table 1: Anticipated River Crossings			
Line Alternative	**River Crossings**	**Wetland Crossings**	**Total**
Medupi Mokopane 1	5	2	**7**
Medupi Mokopane 2	3	0	**3**
Medupi Mokopane 3	15	1	**16**
Mokopane Witkop 1	0	0	**0**
Mokopane Witkop 2	1	0	**1**
Mokopane Witkop 3	1	0	**1**

6.3 Topography and Slopes

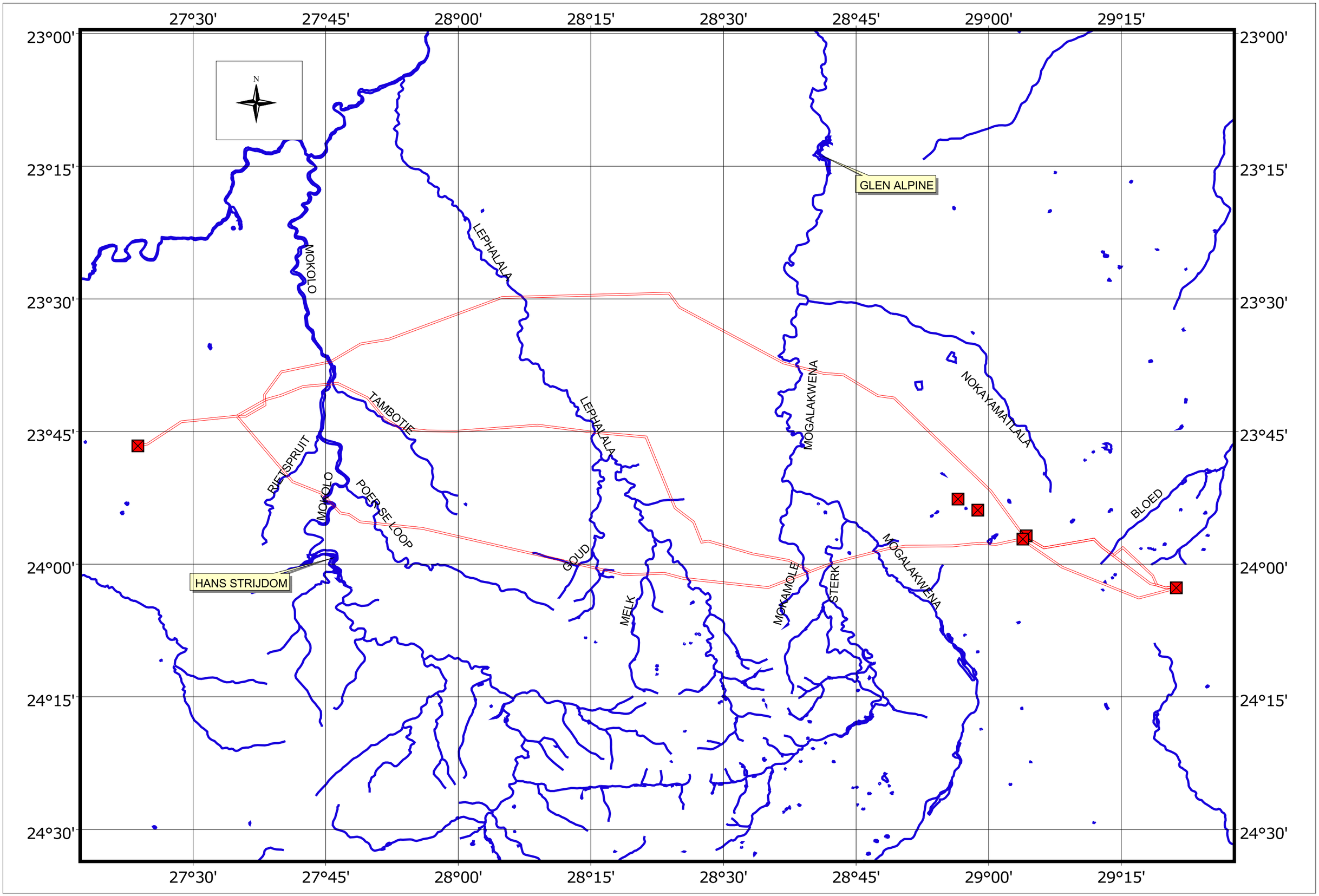
An analysis of the topography and landform revealed that the proposed corridors would cross landform types ranging from plains in the north to a number of areas consisting of hills and mountains in the south (Figure 3). These hills and ridges are especially important since they provide for high spatial heterogeneities, thereby likely to sustain populations of conservation important invertebrate species such as the rock scorpion *Hadogenes* spp. and baboon spiders of the genera *Harpactira* (both genera are currently protected by Schedule B1 of the list of threatened and protected species issued in terms of Section 56(1) of the National Environmental Management: Biodiversity Act, 2004).

From a functional point of view, these hills and ridges are important landscape features assisting winged invertebrates in locating potential mating partners. On a landscape scale, ridges facilitate animal dispersal to other nearby rocky outcrops and ridges (so-called "stepping stones") and thereby function as important ecological linkages. In addition, the faunal populations colonising these patches of outcrops provide a balance through recruitment of individuals (e.g. immigration-emigration) among these patches, thereby maintaining meta-populations dynamics. Topographical types that are crossed by the proposed line variants that are frequently associated with biodiversity aspects of importance include the following:

- Escarpments;
- Low Mountains;
- Lowlands with Mountains; and
- Table-lands.

The proposed substation sites are situated within the following topographical variations:

- Lowlands with mountains;
- Low mountains; and
- Strongly undulating plains.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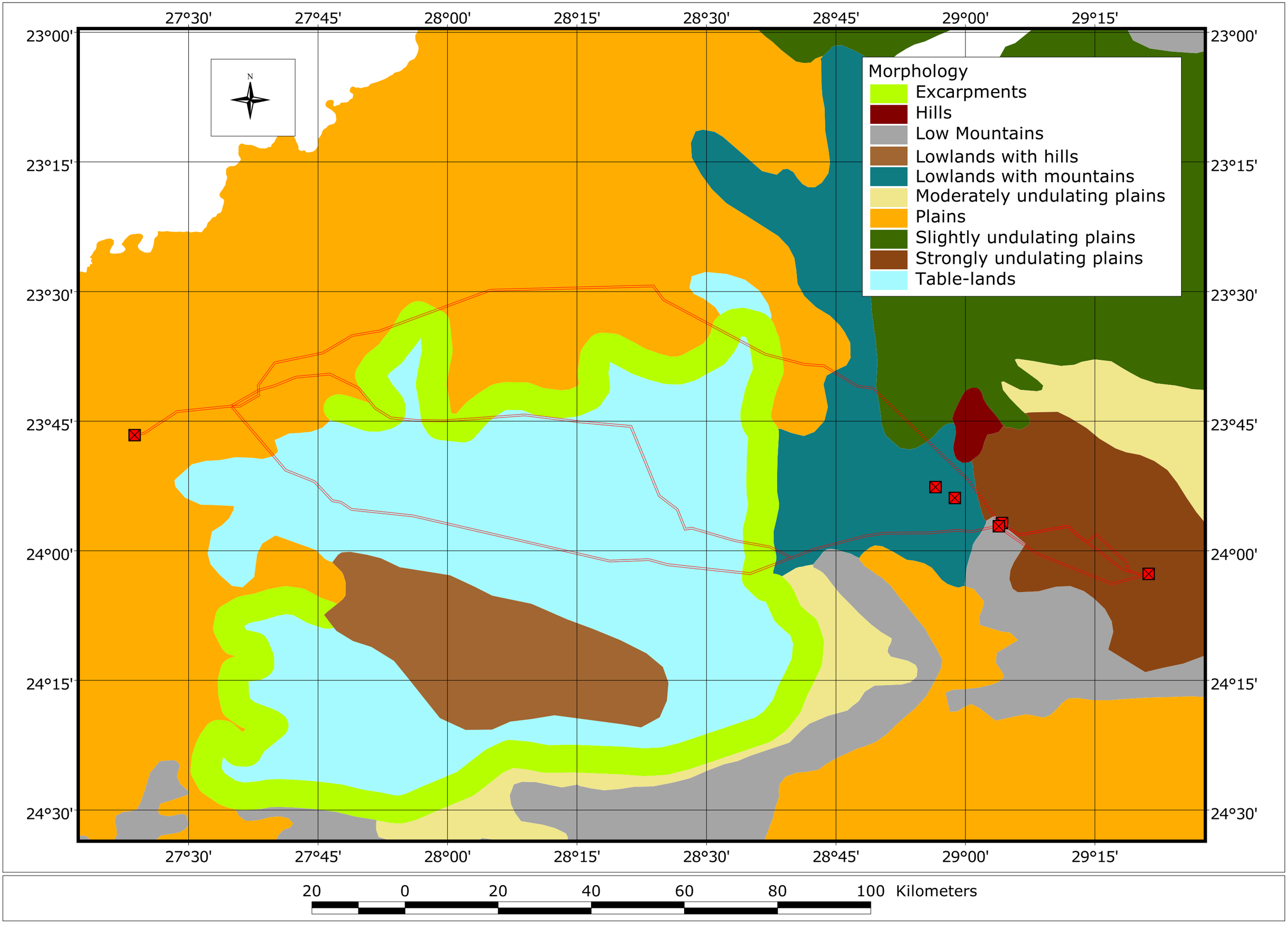
24°15'
24°30'
N
GLEN ALPINE
HANS STRIJDOM
MOKOLO
LEPHALALA
TAMBOTIE
RIETSPRUIT
POEPSE LOOP
GOUD
MELK
MOKAMOLE
STERK
MOGALAKWENA
NOKAYAMATLALA
BLOED
20 0 20 40 60 80 100 Kilometers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24°00'
24°15'
24°30'
N
Morphology
Excarpments
Hills
Low Mountains
Lowlands with hills
Lowlands with mountains
Moderately undulating plains
Plains
Slightly undulating plains
Strongly undulating plains
Table-lands
20 0 20 40 60 80 100 Kilometers

An analysis of slopes revealed that selected portions of the proposed corridors would cross areas where the general slopes exceed 9% (Figure 4). A slope of 9% (5°) or more is considered significant since the association between increasing slopes and conservation important species is positively related.

From the contours (Figure 4) it is evident that the southern parts of the study area are extremely variable in terms of topography. Altitude varies from approximately 1,000m in the west to nearly 1,500m in the east. Line variants Medupi Mokopane 1 and 3 in particular will be crossing areas of topographical heterogeneity, implying technical aspects of concern as far as the biophysical environment is concerned.

6.4 Areas of Known Botanical Importance

Some areas within the study area have known importance in terms of floristic attributes. These areas frequently exhibit characteristics of a pristine nature, the presence of Red Data flora species, a high diversity or atypical or threatened vegetation types (Figure 5). Line variants Medupi Mokopane 1 and 3 in particular will be crossing areas of known botanical importance (Waterberg region) while Line variant Medupi Mokopane 2 will infringe marginally on some sensitive areas.

6.5 Areas of Known Faunal Importance

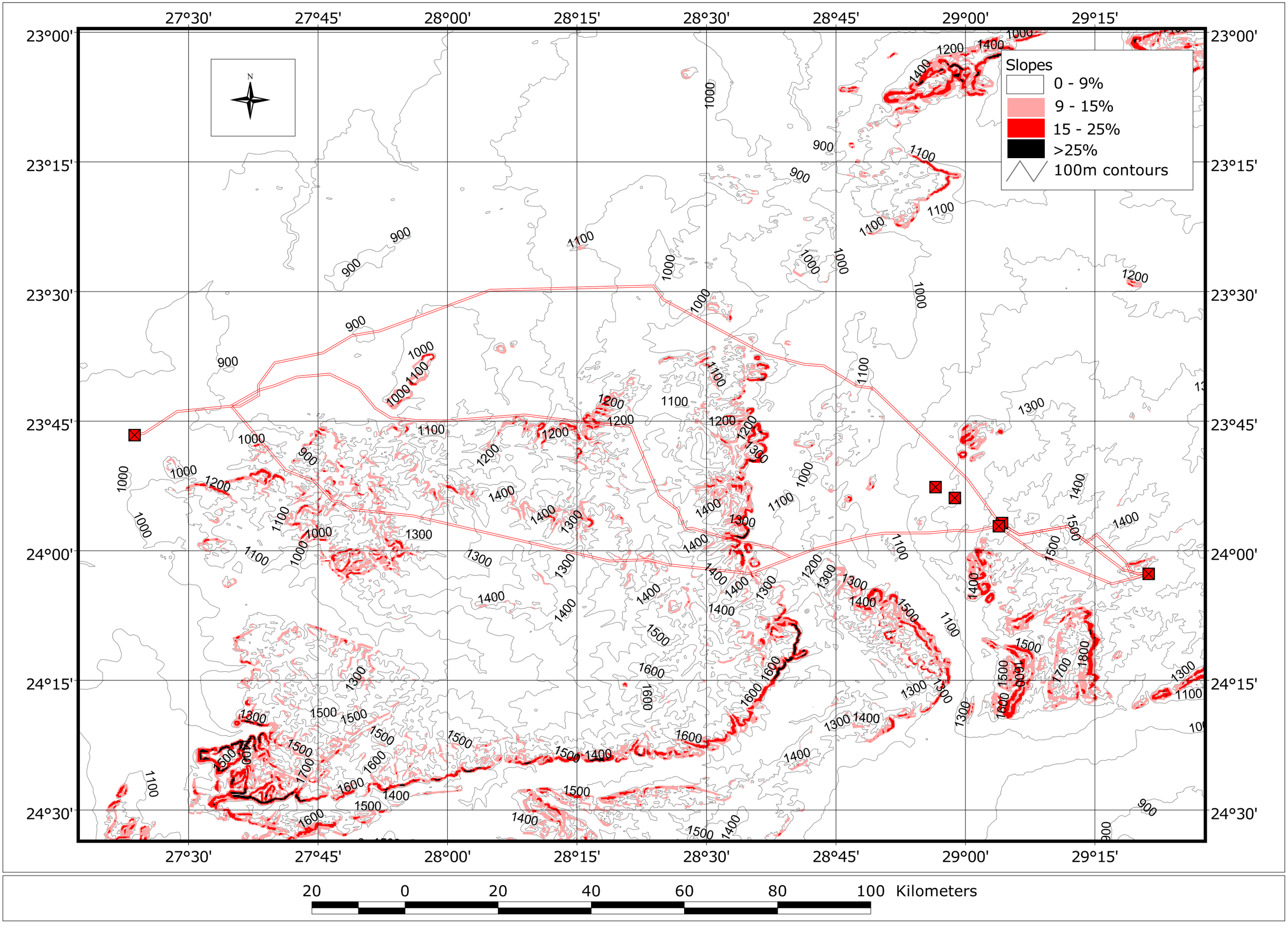
Areas within the study area have known importance in terms of faunal attributes. These areas frequently exhibit characteristics of a pristine nature, the presence of naturally occurring or free roaming (not introduced) Red Data fauna species or a high diversity of atypical habitat types (Figure 6). Only free roaming animals are included in this assessment.

6.6 Declared Areas of Conservation

A number of conservation areas are present within the surrounds of the study area. This is mainly as a result of the largely untransformed status of the area (Figure 7) and the suitability of the bushveld area toward the ecotourism/ wildlife management activities.

6.7 Biospheres

The Waterberg Biosphere is present within the study area (Figure 8). All three line variants will impact on this biosphere. No information is available on permitted activities and developments within the Waterberg Biosphere.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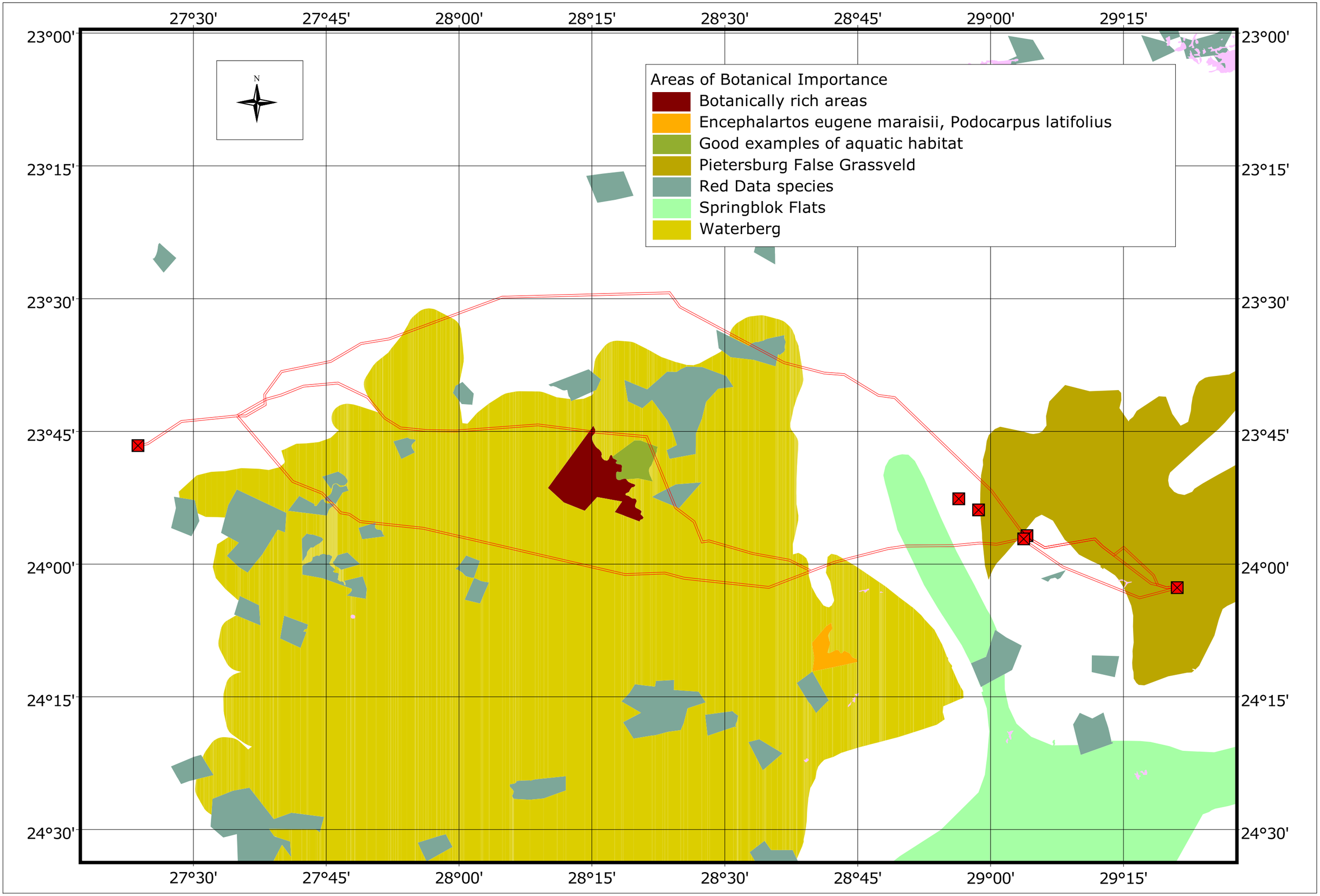
29°15'
23°00'
23°15'
23°30'
23°45'
24°00'
24°15'
24°30'
N
Slopes
0 - 9%
9 - 15%
15 - 25%
>25%
100m contours
20 0 20 40 60 80 100 Kilometers


Areas of Botanical Importance
Botanically rich areas
Encephalartos eugene maraisii, Podocarpus latifolius
Good examples of aquatic habitat
Pietersburg False Grassveld
Red Data species
Springblok Flats
Waterberg
N
27°30'
27°45'
28°00'
28°15'
28°30'
28°45'
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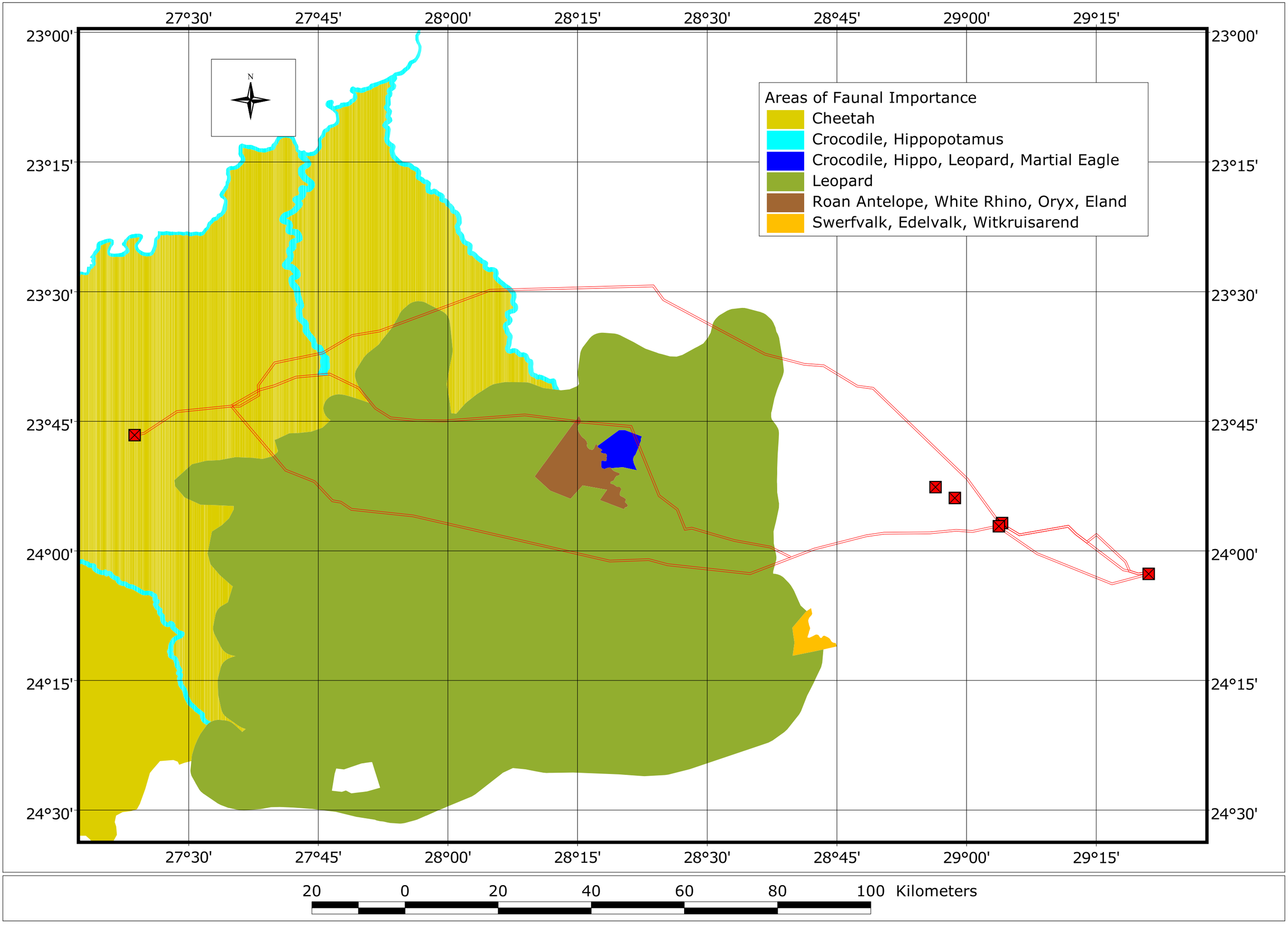
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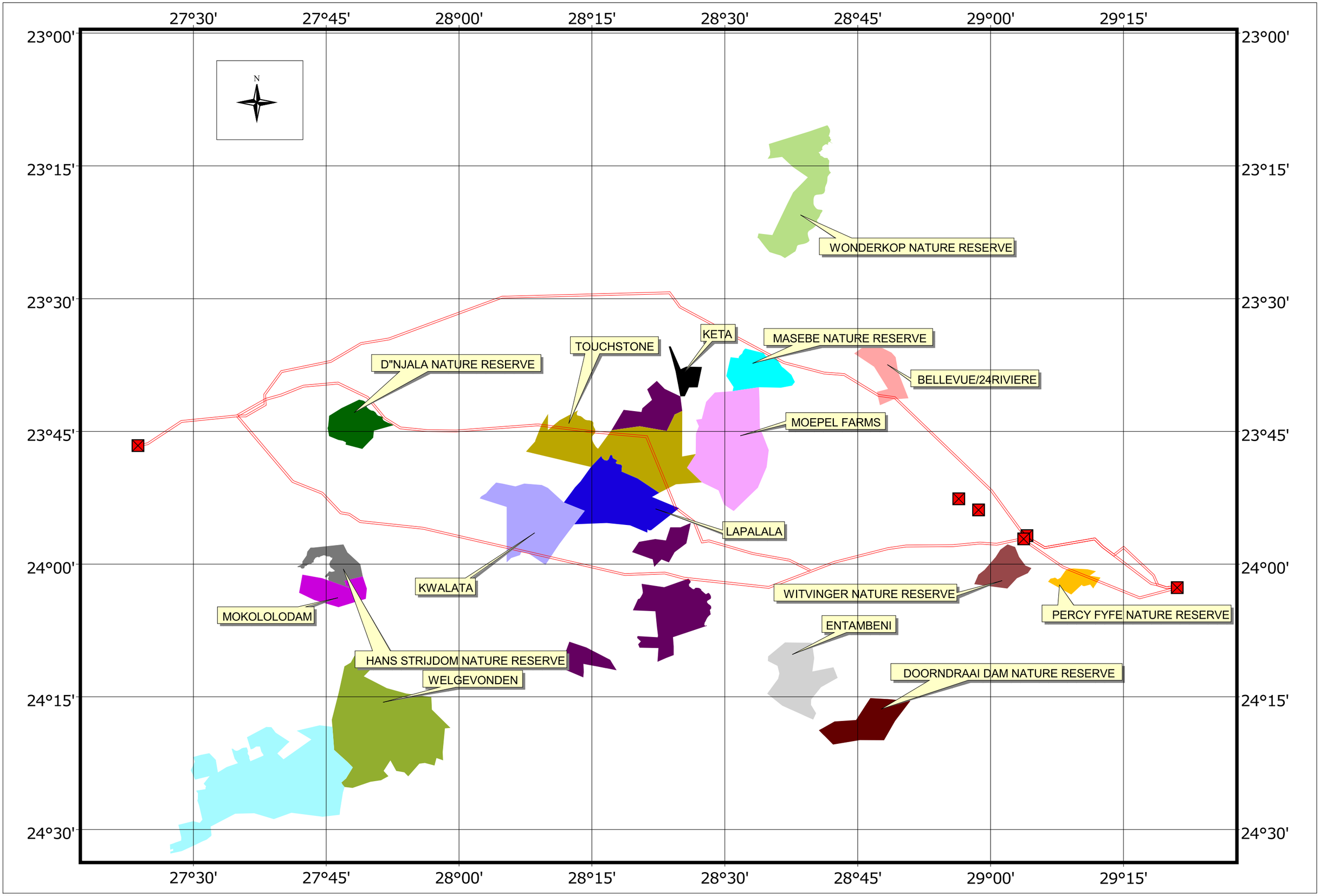
23°45'
24°00'
24°15'
24°30'
N
Areas of Faunal Importance
Cheetah
Crocodile, Hippopotamus
Crocodile, Hippo, Leopard, Martial Eagle
Leopard
Roan Antelope, White Rhino, Oryx, Eland
Swerfvalk, Edelvalk, Witkruisarend
20 0 20 40 60 80 100 Kilometers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23°30'
23°45'
24°00'
24°15'
24°30'
N
WONDERKOP NATURE RESERVE
KETA
TOUCHSTONE
MASEBE NATURE RESERVE
D"NJALA NATURE RESERVE
BELLEVUE/24RIVIERE
MOEPEL FARMS
LAPALALA
KWALATA
WITVINGER NATURE RESERVE
PERCY FYFE NATURE RESERVE
MOKOLOLODAM
ENTAMBENI
HANS STRIJDOM NATURE RESERVE
WELGEVONDEN
DOORNDRAAI DAM NATURE RESERVE
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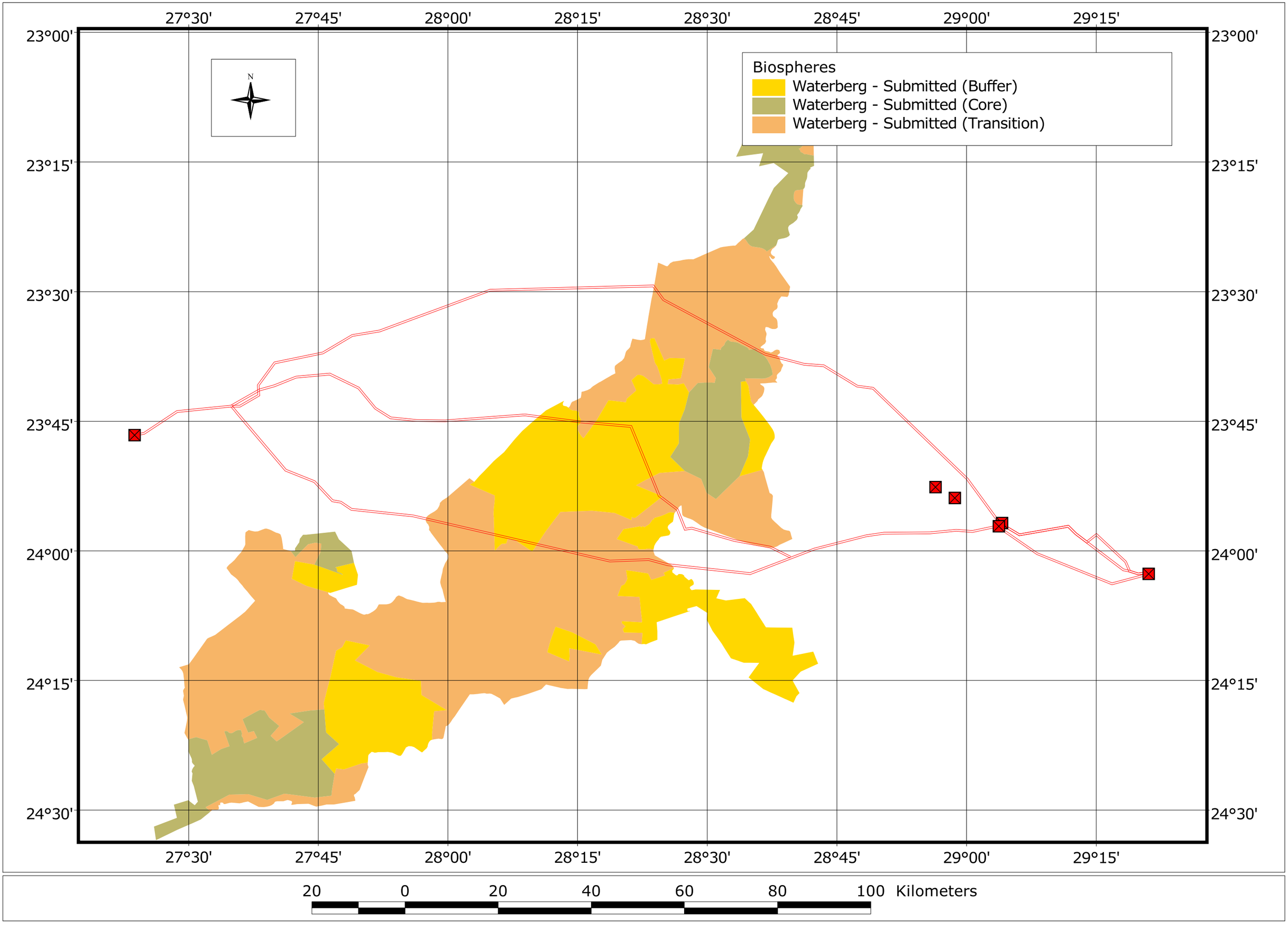
Biospheres
Waterberg - Submitted (Buffer)
Waterberg - Submitted (Core)
Waterberg - Submitted (Transition)
N
27°30'
27°45'
28°00'
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24°30'
20 0 20 40 60 80 100 Kilometers

6.8 Land Cover

It is evident from Figure 9 that most of the study area comprises areas of natural habitat, including Thicket & Bushland and Woodland. The central and eastern parts of the study area are characterised by moderate degradation of woodland, transformation and extensive areas of cultivation. This information was obtained from the Land Cover 2001 survey database. Subsequent information is available, but is viewed as having critical errors and is therefore of lower accuracy. The 2001 database might be outdated in some instances and information obtained from groundtruthing as well as from land owners are regarded critical in this regard.

6.9 Regional Vegetation - VEGMAP

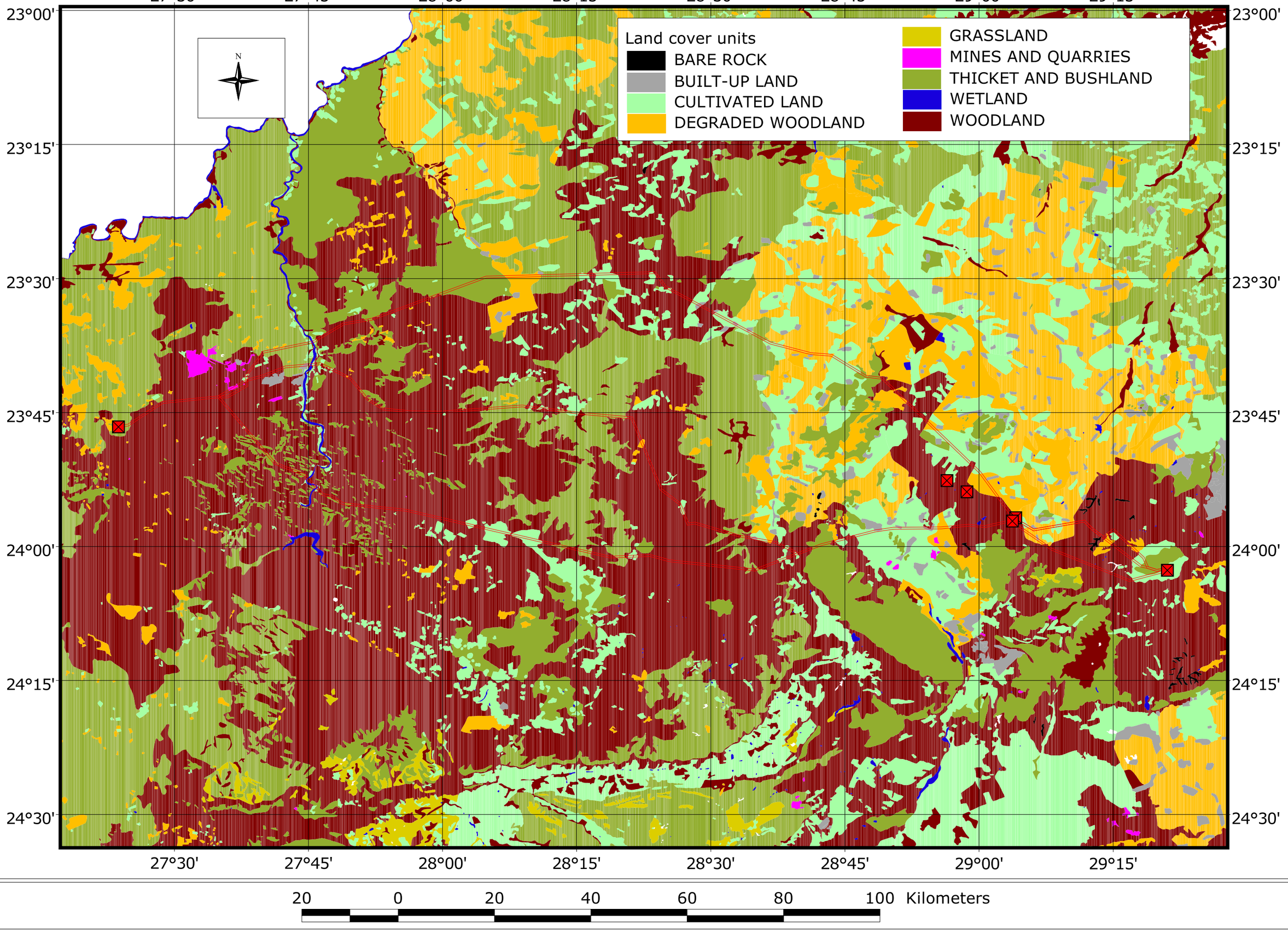
The following VEGMAP vegetation units will be traversed by the proposed line variants or affected by the proposed substation sites (Figure 10):

- Central Sandy Bushveld;
- Limpopo Sweet Bushveld;
- Makhado Sweet Bushveld;
- Mamabolo Mountain Bushveld;
- Polokwane Plateau Bushveld;
- Roodeberg Bushveld
- Subtropical Alluvial Vegetation; and
- Waterberg Mountain Bushveld;

Table 1: VEGMAP Conservation Status

VEGMAP Unit	% Conserved	% Transformed	Target	Status
Central Sandy Bushveld	3%	24%	19%	**Vulnerable**
Limpopo Sweet Bushveld	<1%	5%	19%	**Least Threatened**
Makhado Sweet Bushveld	1%	27%	19%	**Vulnerable**
Mamabolo Mountain Bushveld	8%	6%	24%	**Least Threatened**
Polokwane Plateau Bushveld	2%	17%	19%	**Least Threatened**
Roodeberg Bushveld	6%	18%	19%	**Least Threatened**
Subtropical Alluvial Vegetation	71%	16%	31%	**Least Threatened**
Waterberg Mountain Bushveld	9%	3%	24%	**Least Threatened**

Central Sandy Bushveld and Makhado Sweet Bushveld are regarded the more sensitive vegetation types in the affected environment.


Land cover units
BARE ROCK
BUILT-UP LAND
CULTIVATED LAND
DEGRADED WOODLAND
GRASSLAND
MINES AND QUARRIES
THICKET AND BUSHLAND
WETLAND
WOODLAND
N
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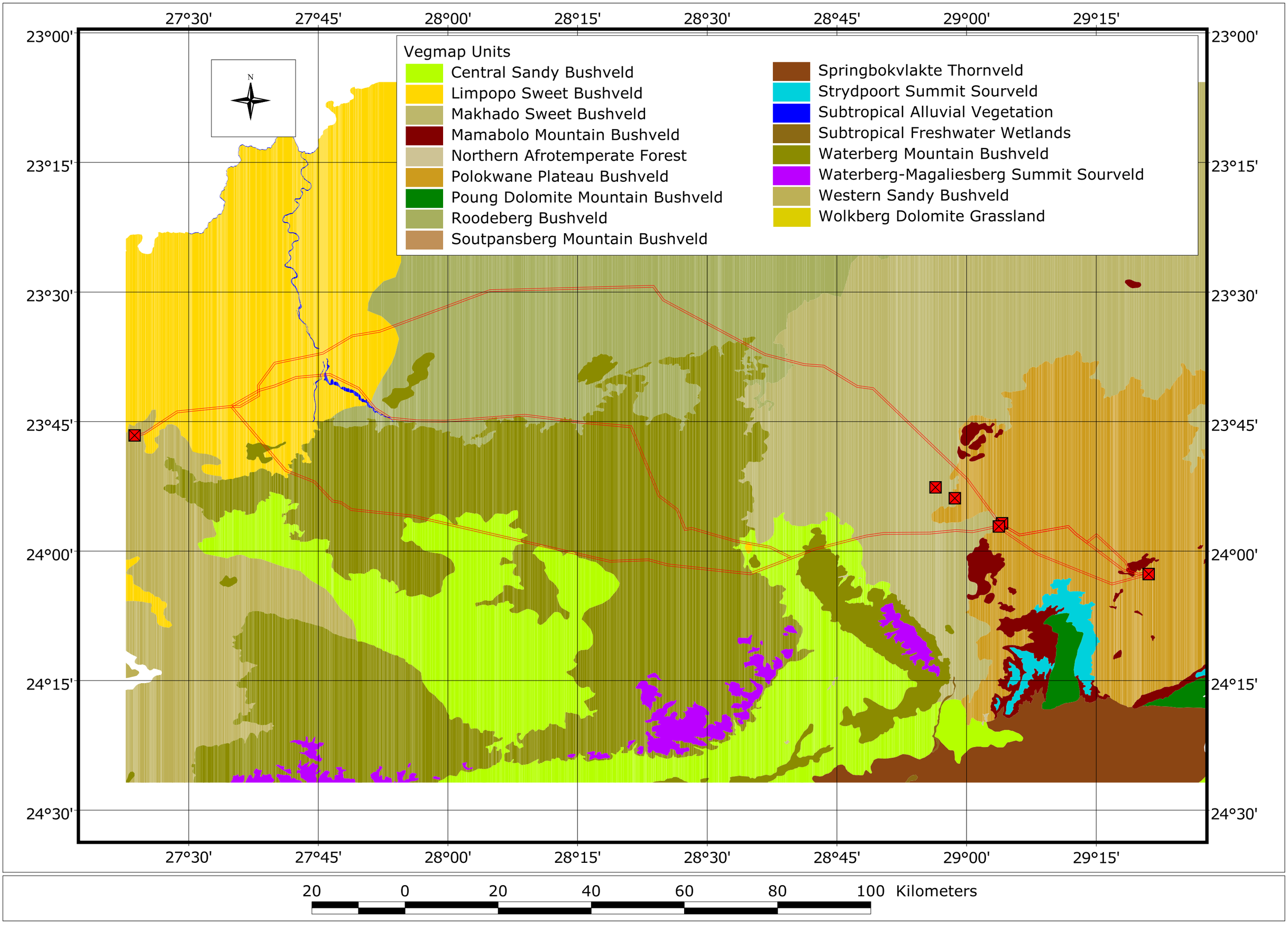
Vegmap Units
Central Sandy Bushveld
Limpopo Sweet Bushveld
Makhado Sweet Bushveld
Mamabolo Mountain Bushveld
Northern Afrotemperate Forest
Polokwane Plateau Bushveld
Poung Dolomite Mountain Bushveld
Roodeberg Bushveld
Soutpansberg Mountain Bushveld
Springbokvlakte Thornveld
Strydpoort Summit Sourveld
Subtropical Alluvial Vegetation
Subtropical Freshwater Wetlands
Waterberg Mountain Bushveld
Waterberg-Magaliesberg Summit Sourveld
Western Sandy Bushveld
Wolkberg Dolomite Grassland
N
27°30'
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6.10 Red Data Flora Species

PRECIS data from SANBI indicate the presence of 1,711 species within the ¼ degree grids in which the study area is situated. This high diversity is an indication of the high floristic status of the region. The following species are known to occur in the region of the study area (Table 2).

Table 2: Red Data flora species for the study area

Taxon	Interim 2007 National Status
Adenia gummifera var. *gummifera*	Declining
Argyrolobium muddii	EN
Bowiea volubilis subsp. *volubilis*	VU
Brachystelma hirtellum	NT
Brachystelma inconspicuum	Rare
Callilepis leptophylla	Declining
Chorisochora transvaalensis	Bio-geographically important
Combretum petrophilum	Rare
Crotalaria mollii	Endemic
Delosperma macellum	EN
Dicleptera minor subsp. *pratis-manna*	Endemic
Drimia angustifoli	LC
Elaeodendrum transvaalense	Declining
Elephantorrhiza praetermissa	Rare
Encephalartos eugene-maraisii	EN
Erythrophysa transvaalensis	Bio-geographically important
Eulalia aure	NT
Euphorbia clivicola	CR
Euphorbia louwii	Rare
Euphorbia waterbergensis	Rare
Freylinia tropica	Rare
Gladiolus dolomiticus	Rare
Grewia rogersii	Endemic
Hypoxis hemerocallidea	Declining
Isoetes transvaalensis	NT
Khadia media	Bio-geographically important
Ledebouria crispa	Bio-geographically important
Ledebouria sp.	Rare
Mosdenia leptostachys	Bio-geographically important
Oxygonum dregeanum subsp. *canescens* var. *dissectum*	Bio-geographically important
Oxygonum dregeanum subsp. *canescens* var. *pilosum*	Endemic
Pachystigma triflorum	Endemic
Panicum dewinteri	NT
Piaranthus atrosanguineus	Bio-geographically important
Prunus africana	Declining
Tetradenia barberae	Rare

6.11 Protected Tree Species

The National Forest Act (No. 84 of 1998: National Forest Act, 1998) provides a list of tree species that are considered important in a South African perspective as a result of scarcity, high utilisation, common value, etc. In terms of the National Forests Act of 1998, these tree species may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold - except under licence granted by the Department of Water Affairs and Forestry (or a delegated authority). Obtaining relevant permits are therefore required prior to any impact on these individuals. Of the 46 tree species that are protected 14 occur within the study area (Table 3).

Table 3: Protected Tree species for the study area	
Taxon	**Common Name**
Acacia erioloba	Camel Thorn
Adansonia digitata	Baobab
Boscia albitrunca	Shepherd's tree
Catha edulis	Bushman's tea
Combretum imberbe	Leadwood
Curtisia dentata	Assegai
Elaeodendrum transvaalense	Bushveld saffron
Erythrophysa transvaalensis	Bushveld red balloon
Philenoptera violaceae	Apple-leaf
Pittosporum viridiflorum	Cheesewood
Podocarpus latifolius	Real yellowwood
Prunus africana	Red stinkwood
Sclerocarya birrea subsp. *caffra*	Marula
Securidaca longipedunculatum	Violet tree

6.12 Red Data Fauna Species

Please note that birds were excluded from this assessment as this discipline is the subject of a separate investigation. The following free roaming animal species are known to occur in the study area, or have a probability of occurring in the study area as a result of suitable habitat being present. Species indicated in **bold** are estimated to have a high probability of occurring within the study area.

Table 4: Red Data Probabilities for fauna species			
SPECIES DETAILS			**RESULT**
Biological Name	**English Name**	**RD Status**	**Probability**
INVERTEBRATES			
Erikssonia acraeina	Eriksson's Copper	Endangered	moderate
Hyalites induna	Induna Acraea	Vulnerable	low
Lepidochrysops lotana	**Lotana Blue**	**Critically Rare**	**high**

Table 4: Red Data Probabilities for fauna species			
SPECIES DETAILS			**RESULT**
Biological Name	**English Name**	**RD Status**	**Probability**
Aloeides stevensoni	Stevenson's Copper	Vulnerable	low
Pseudonympha swanepoeli	Swanepoel's Brown	Vulnerable	low
Dingana dingana clara	Wolkberg Widow	Vulnerable	low
Alaena margaritacea	Wolkberg Zulu	Critically Rare	low
FROGS			
Breviceps sylvestris	Northern Forest Rain Frog	Vulnerable	moderate
Pyxicephalus adspersus	**Giant Bullfrog**	**Near Threatened**	**high**
REPTILES			
Acontophiops lineatus	Woodbush Legless Skink	Vulnerable	low
Australolacerta rupicola	Soutpansberg Rock Lizard	Near Threatened	low
Homopholis mulleri	**Muller's Velvet Gecko**	**Near Threatened**	**high**
Lamprophis swazicus	Swazi Rock Snake	Near Threatened	low
Lygodactylus methueni	Methuen's Dwarf Gecko	Vulnerable	low
Platysaurus relictus	Soutpansberg Flat Lizard	Near Threatened	low
Python natalensis	**Southern African Python**	**Vulnerable**	**high**
Xenocalamus transvaalensis	Transvaal Quillsnout Snake	Data Deficient	low
MAMMALS			
Acinonyx jubatus	**Cheetah**	**Vulnerable**	**high**
Amblysomus hottentotus	Hottentot's Golden Mole	Data Deficient	low
Atelerix frontalis	South African Hedgehog	Near Threatened	high
Calcochloris obtusirostris	Yellow Golden Mole	Vulnerable	low
Canis adustus	Side-striped Jackal	Near Threatened	low
Cercopithecus mitis	Samango Monkey	Vulnerable	low
Cercopithecus mitis labiatus	Samango Monkey	Endangered	low
Cloeotis percivali	**Short-eared Trident Bat**	**Critically Rare**	**high**
Cricetomys gambianus	Giant Rat	Vulnerable	moderate
Crocidura cyanea	**Reddish-grey Musk Shrew**	**Data Deficient**	**high**
Crocidura fuscomurina	Tiny Musk Shrew	Data Deficient	moderate
Crocidura hirta	**Lesser Red Musk Shrew**	Data Deficient	**high**
Crocidura maquassiensis	Maquassie Musk Shrew	Vulnerable	low
Crocidura mariquensis	**Swamp Musk Shrew**	**Data Deficient**	**high**
Crocidura silacea	Lesser Grey-brown Musk Shrew	Data Deficient	moderate
Crocuta crocuta	**Spotted Hyaena**	**Near Threatened**	**high**
Damaliscus lunatus lunatus	**Tsessebe**	**Endangered**	**high**
Dasymys incomtus	**Water Rat**	**Near Threatened**	**high**
Dendromus nyikae	Nyika Climbing Mouse	Near Threatened	low
Diceros bicornis minor	**Black Rhinoceros**	**Vulnerable**	**high**
Elephantulus brachyrhynchus	**Short-snouted Elephant-shrew**	**Data Deficient**	**high**
Elephantulus intufi	**Bushveld Elephant-shrew**	**Data Deficient**	**high**
Epomophorus gambianus crypturus	**Gambian Epauletted Fruit Bat**	**Data Deficient**	**high**
Glauconycteris variegatus	Butterfly Bat	Near Threatened	moderate
Grammomys cometes	Mozambique Woodland Mouse	Data Deficient	low

Table 4: Red Data Probabilities for fauna species			
SPECIES DETAILS			RESULT
Biological Name	**English Name**	**RD Status**	**Probability**
Grammomys dolichurus	**Woodland Mouse**	**Data Deficient**	**high**
Graphiurus platyops	**Rock Dormouse**	**Data Deficient**	**high**
Hipposideros caffer	**Sundevall's Leaf-nosed Bat**	**Data Deficient**	**high**
Hippotragus equinus	**Roan Antelope**	**Vulnerable**	**high**
Hippotragus niger niger	**Sable Antelope**	**Vulnerable**	**high**
Hyaena brunnea	**Brown Hyaena**	**Near Threatened**	**high**
Kerivoula argentata	Damara Woolly Bat	Endangered	low
Kerivoula lanosa	Lesser Woolly Bat	Near Threatened	low
Laephotis botswanae	**Botswana Long-eared Bat**	**Vulnerable**	**high**
Lemniscomys rosalia	**Single-striped Mouse**	**Data Deficient**	**high**
Leptailurus serval	**Serval**	**Near Threatened**	**high**
Lutra maculicollis	Spotted-necked Otter	Near Threatened	moderate
Lycaon pictus	**African Wild Dog**	**Endangered**	**high**
Manis temminckii	**Pangolin**	**Vulnerable**	**high**
Mellivora capensis	**Honey Badger**	**Near Threatened**	**high**
Miniopterus fraterculus	Lesser Long-fingered Bat	Near Threatened	moderate
Miniopterus schreibersii	**Schreiber's Long-fingered Bat**	**Near Threatened**	**high**
Mus neavei	Thomas' Pygmy Mouse	Data Deficient	low
Myosorex cafer	**Dark-footed Forest Shrew**	**Data Deficient**	**high**
Myosorex varius	**Forest Shrew**	**Data Deficient**	**high**
Myotis bocagei	Rufous Hairy Bat	Data Deficient	low
Myotis tricolor	**Temminck's Hairy Bat**	**Near Threatened**	**high**
Myotis welwitschii	**Welwitsch's Hairy Bat**	**Near Threatened**	**high**
Neamblysomus gunningi	Gunning's Golden Mole	Endangered	low
Neamblysomus juliane	**Juliana's Golden Mole**	**Vulnerable**	**high**
Neotragus moschatus zuluensis	Suni	Vulnerable	low
Nycteris woodi	Wood's Slit-faced Bat	Near Threatened	low
Panthera leo	**Lion**	**Vulnerable**	**high**
Paracynictis selousi	Selous' Mongoose	Data Deficient	moderate
Petrodromus tetradactylus	Four-toed Elephant-shrew	Endangered	low
Pipistrellus anchietae	**Anchieta's Pipistrelle**	**Near Threatened**	**high**
Pipistrellus rusticus	**Rusty Bat**	**Near Threatened**	**high**
Poecilogale albinucha	**African Weasel**	**Data Deficient**	**high**
Raphicerus sharpei	Sharp's Grysbok	Near Threatened	moderate
Rhinolophus blasii	**Peak-saddle Horseshoe Bat**	**Vulnerable**	**high**
Rhinolophus clivosus	**Geoffroy's Horseshoe Bat**	**Near Threatened**	**high**
Rhinolophus darlingi	**Darling's Horseshoe Bat**	**Near Threatened**	**high**
Rhinolophus fumigatus	Ruppel's Horseshoe Bat	Near Threatened	low
Rhinolophus hildebrantii	**Hildebrant's Horseshoe Bat**	**Near Threatened**	**high**
Rhinolophus landeri	Lander's Horseshoe Bat	Near Threatened	low
Rhinolophus swinnyi	Swinny's Horseshoe Bat	Endangered	low
Rhynchogale melleri	Meller's Mongoose	Data Deficient	low

Table 4: Red Data Probabilities for fauna species			
SPECIES DETAILS			RESULT
Biological Name	**English Name**	**RD Status**	**Probability**
Suncus infinitesimus	Least Dwarf Shrew	Data Deficient	moderate
Suncus lixus	**Greater Dwarf Shrew**	**Data Deficient**	**high**
Suncus varilla	Lesser Dwarf Shrew	Data Deficient	moderate
Tatera leucogaster	**Bushveld Gerbil**	**Data Deficient**	**high**

7 BIODIVERSITY SENSITIVITIES

Ecological sensitivities are attributed to respective bio-physical attributes of the study area and are compiled to present an overview of the regional biodiversity sensitivity of the area. These sensitivities are based on an interpretation of the compiled sensitivities and are presented in the following classes:

- High;
- Medium-High;
- Medium;
- Medium-Low; and
- Low.

Biodiversity sensitivities of the study area are illustrated in Figure 11. Figure 12 provides a more detailed illustration of the proposed sub stations.

6.2 Surface Water

All areas of surface water are ascribed a high biodiversity sensitivity.

6.3 Topography and Slopes

Sensitivities ascribed to topographical variations are based on a subjective assessment of the likelihood of these variations being inhabited by biological attributes of high sensitivity or displaying suitable habitat characteristics for important biological attributes. Areas where slopes exceed 9% are ascribed a high biodiversity sensitivity.

Topographical types were ascribed the following levels of biodiversity sensitivity:

Escarpments	High
Hills	Medium
Low Mountains	Medium
Lowlands with Hills	Medium
Lowlands with Mountains	Medium-high
Table-lands	High

6.4 Areas of Botanical Importance

Sensitivity of areas of botanical importance is based on a subjective assessment of these areas being inhabited by biological attributes of high sensitivity or displaying suitable habitat characteristics for important biological attributes. Areas of botanical importance in the region of the study area are ascribed the following levels of biodiversity sensitivity:

Blouberg	Medium
Botanically rich areas	Medium
Climax *Burkea* Woodland	Medium
Examples of aquatic habitat	High
Habitat of threatened species	High
Indigenous forest	Medium-high
Pietersburg False Grassveld	Medium
Red Data species	High
Soupansberg	Medium
Springbok flats	Medium
Waterberg	Medium

6.5 Areas of Faunal Importance

Areas within the study area that has known importance in terms of faunal attributes is ascribed a medium-high level of biodiversity sensitivity.

6.6 Areas of Conservation

All areas of conservation within the study area are ascribed a high level of biodiversity sensitivity.

6.7 Biospheres

All biospheres within the study area are ascribed a high level of biodiversity sensitivity.

6.8 Land Cover

Sensitivity of specific areas of land cover classes is based on a subjective assessment of the potential of certain areas being inhabited by biological attributes of high sensitivity or displaying suitable habitat characteristics for important biological attributes. Land cover classes are afforded the following levels of biodiversity sensitivity:

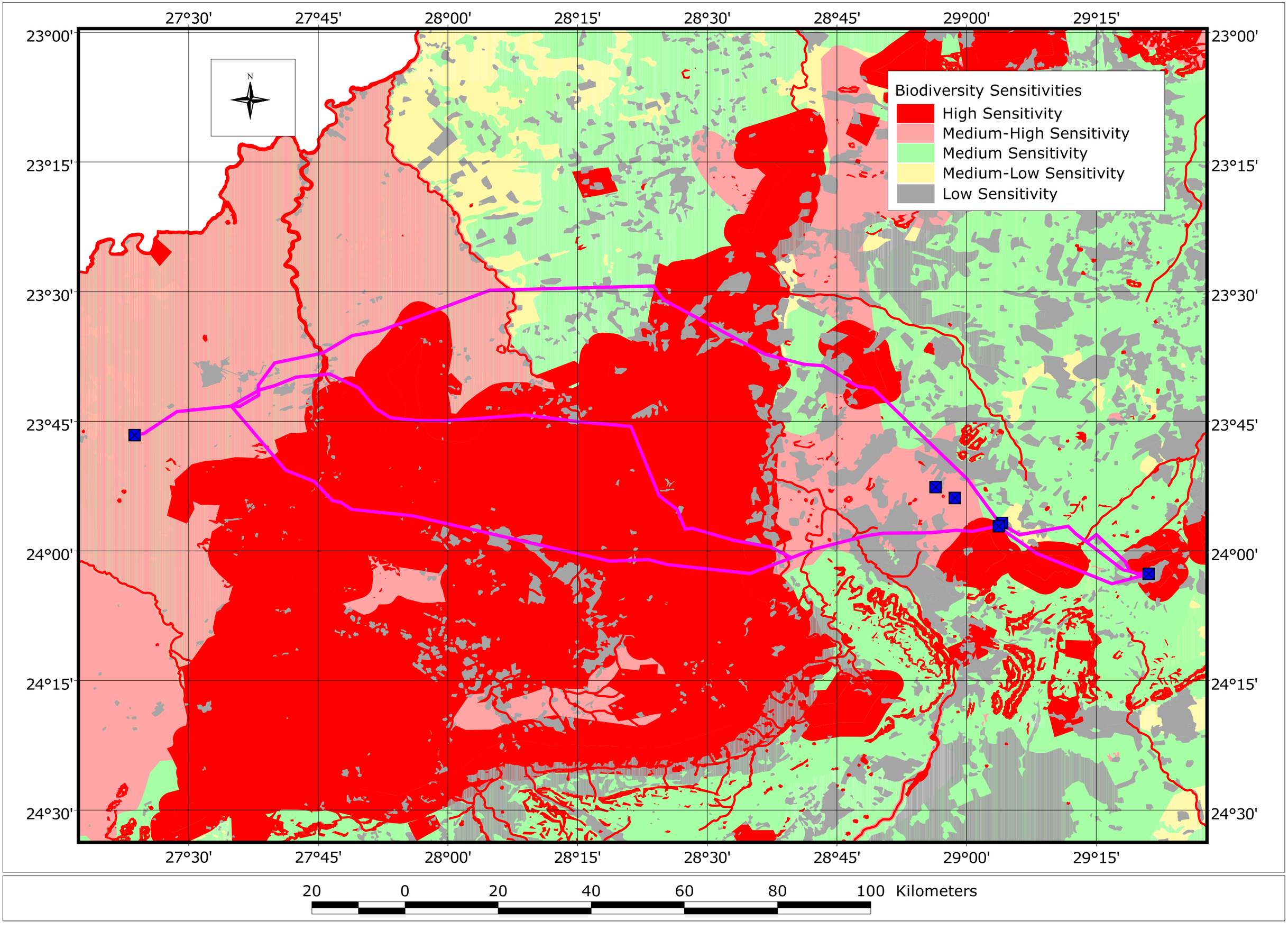
Bare rock	High
Built up land	Low
Cultivated land	Low
Degraded woodland/ bushland	Medium-Low
Mines & Quarries	Low

Thicket & Bushland	Medium
Wetland	High
Woodland	Medium

6.9 Regional Vegetation - VEGMAP

Sensitivity of VEGMAP classes is based on the VEGMAP conservation status attributed to respective vegetation types as well as a subjective assessment of the potential of certain areas being occupied by biological attributes of high sensitivity or displaying suitable habitat characteristics for important biological attributes. VEGMAP vegetation units are ascribed the following levels of biodiversity sensitivity:

Central Sandy Bushveld	Medium
Limpopo Sweet Bushveld	Medium-Low
Makhado Sweet Bushveld	Medium
Mamabolo Mountain Bushveld	Medium-Low
Polokwane Plateau Bushveld	Medium-Low
Subtropical Alluvial Vegetation	Medium-Low
Waterberg Mountain Bushveld	Medium-Low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Biodiversity Sensitivities
High Sensitivity
Medium-High Sensitivity
Medium Sensitivity
Medium-Low Sensitivity
Low Sensitivity
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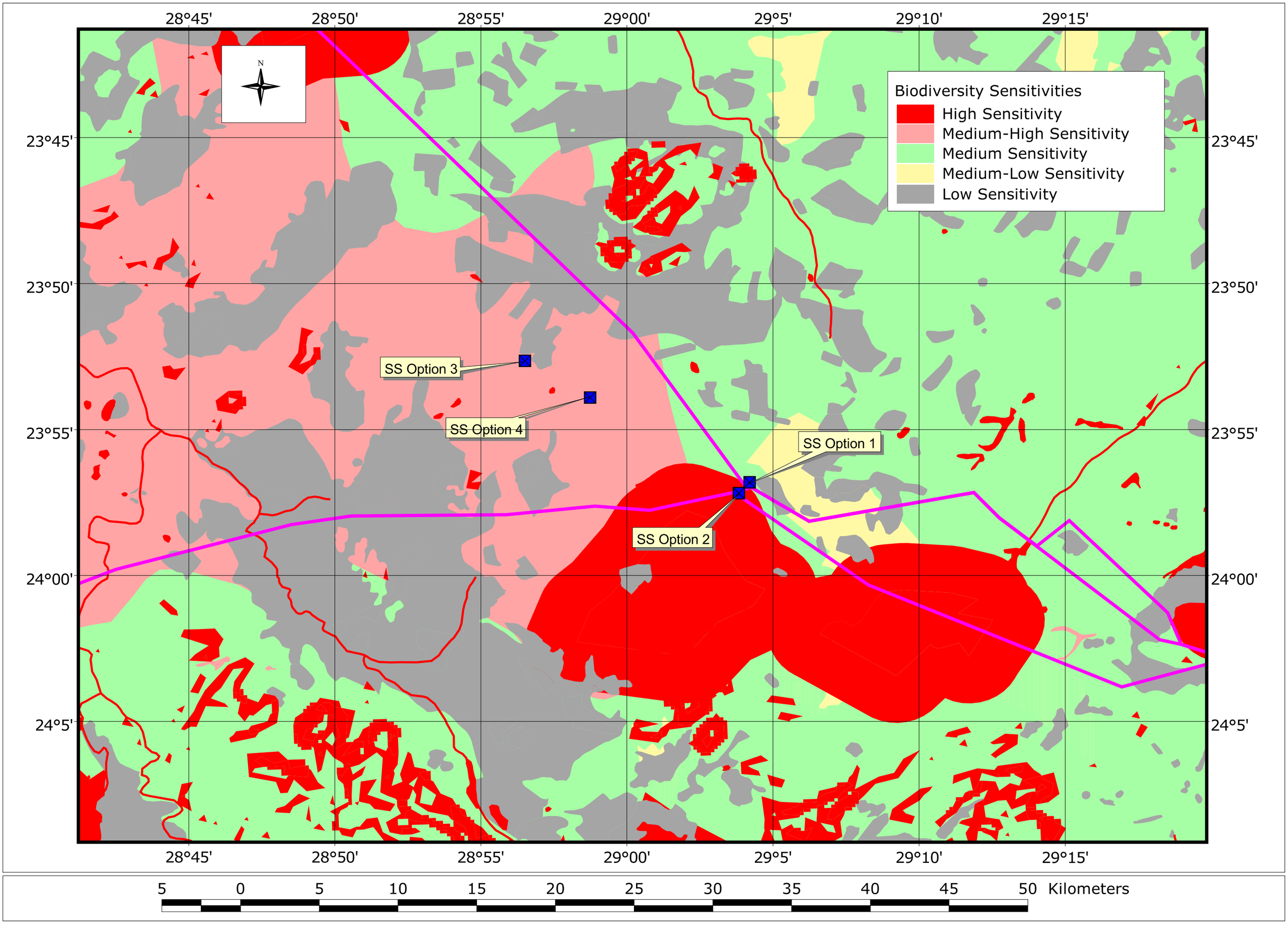


5 0 5 10 15 20 25 30 35 40 45 50 Kilometers

6.10 Discussion & Recommendations

6.10.1 Medupi – Mokopane Line Variants

Extensive areas within the central part of the study area exhibit characteristics of extremely high connectivity and low isolation, fragmentation and transformation. These regional attributes are regarded as a major reason for the high conservation potential of the area and as a result numerous areas of conservation, biospheres and biodiversity hotspots are present within these parts. This is regarded as being significant attributes in terms of biodiversity conservation and hence a high environmental sensitivity is attributed to these parts. Consequently, predicted impacts of the proposed development within high sensitivity areas are expected to be significant and the mitigation thereof costly and mostly unsuccessful, i.e. habitat transformation is not reversible.

While the impacts of power lines within grassland areas are not as severe on biodiversity attributes, woodland regions are affected to a higher degree as a result of the clearance and trimming of woody vegetation. Changes to the structure of the vegetation will ultimately affect the ecological status of habitat.

Areas of moderate and lower biodiversity sensitivities are regarded more suited to the proposed activity since habitat status is already compromised to a degree or biodiversity attributes present within these areas are not as sensitive, more common or adequately represented on a local and regional scale.

Although traversing some areas of high biodiversity sensitivities, Medupi - Mokopane 2 represents the preferred alternative between Medupi and Mokopane. Medupi - Mokopane 1 and 3 will impact on significant areas of high biodiversity sensitivities.

6.10.2 Mokopane – Witkop Line Variants

Mokopane - Witkop 1 will traverse areas of high biodiversity sensitivity (Percy Fyfe Nature Reserve) and is therefore not regarded as the preferred alternative from a biodiversity perspective. Both Mokopane - Witkop 2 and 3 will have some impact on biodiversity attributes, but these are regarded more manageable. It is nonetheless recommended that the possibility be investigated to realign the eastern section of these two alternatives towards the south in order to avoid impacts in areas of high sensitivity (Kuschke Nature Reserve buffer zone).

6.10.3 Substation Site Option 1

Although situated within areas of relatively low biodiversity sensitivity, the proximity to areas of high biodiversity sensitivity renders this option less suitable for the proposed development, particularly when turn-in lines from the existing Matimba-Witkop lines and

potential lines from Medupi-Mokopane 1 and 3 are considered. This site is considered the second preferred option.

6.10.4 Substation Site Option 2

This particular site is situated within an area of high biodiversity sensitivity and is regarded the least preferable of the four substation site options.

6.10.5 Substation Site Option 3

This site is regarded the most preferable of the four options and, although situated within an area of medium-high biodiversity sensitivity, the turn-in lines from the existing Matimba-Witkop lines and potential lines from Medupi-Mokopane is expected to result in the low impact on biodiversity attributes of the region.

6.10.6 Substation Site Option 4

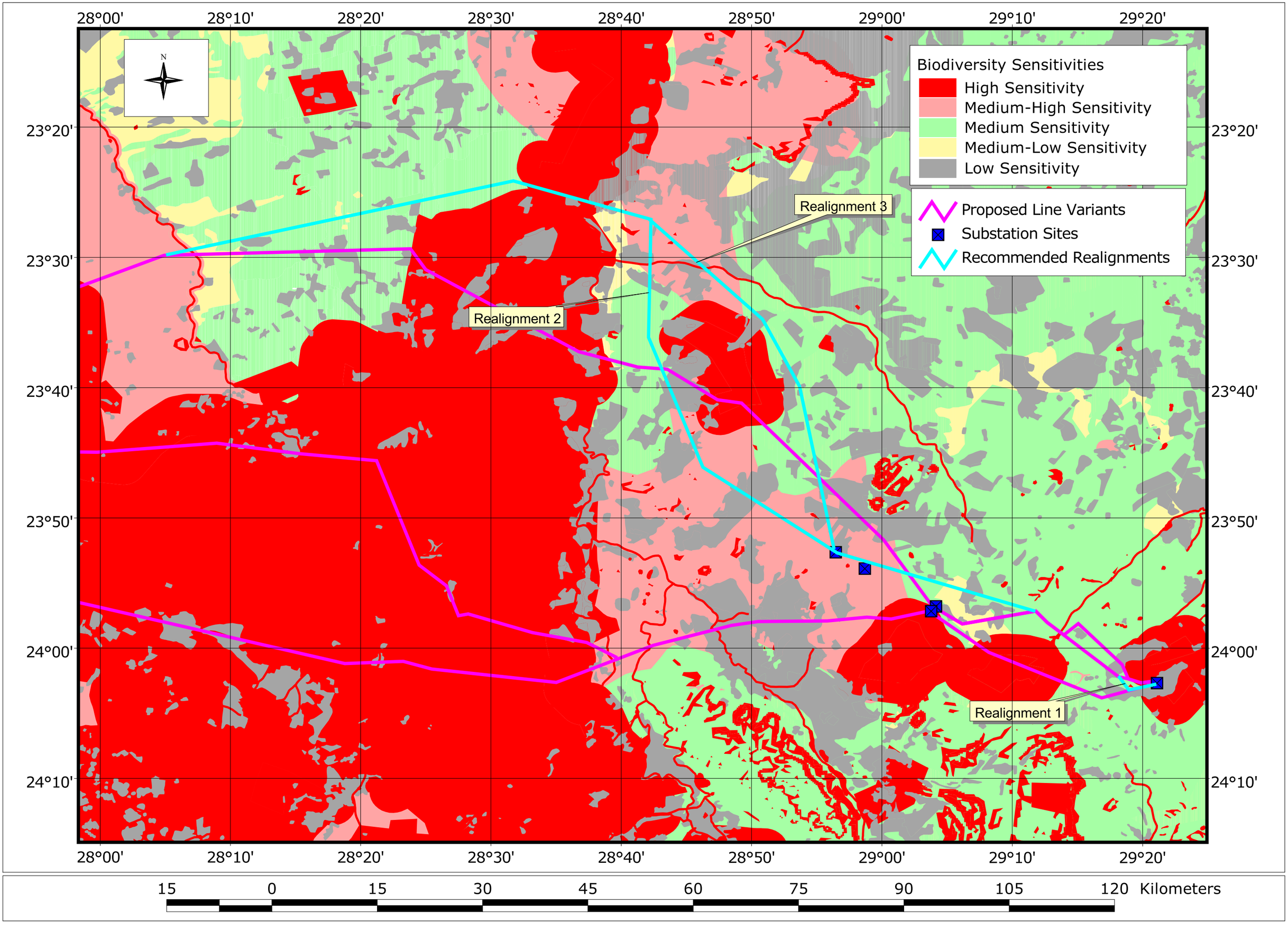
This site is regarded the second most preferable of the four options and, although situated within an area of medium-high biodiversity sensitivity, the turn-in lines from the existing Matimba-Witkop lines and potential lines from Medupi-Mokopane is expected to result in low impact on biodiversity attributes of the region.

6.11 Recommended Realignments

A realignment of the proposed line variation directly east of Witkop Sub station is recommended in order to avoid impacts on areas of high biodiversity sensitivities (Realignment 1, Figure 13).

It is recommended that the realignments to the recommended Medupi Mokopane 2 alternative be investigated in order to avoid impacts on areas of high biodiversity sensitivities, illustrated in Figure 13 (Realignments 2 & 3).

It should be noted that realignments are recommended purely on the basis of regional biodiversity sensitivities and does not take any other aspect or technical feasibility into consideration.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N
Biodiversity Sensitivities
High Sensitivity
Medium-High Sensitivity
Medium Sensitivity
Medium-Low Sensitivity
Low Sensitivity
Proposed Line Variants
Substation Sites
Recommended Realignments
Realignment 3
Realignment 2
Realignment 1
15 0 15 30 45 60 75 90 105 120 Kilometers

7 ANTICIPATED IMPACTS

Taking the nature of the development into consideration no impacts were identified that could potentially be beneficial to the biological environment of the study area since the proposed development is largely destructive. The following impacts were identified as being deleterious to the environment:

- Loss of Biodiversity - Destruction of threatened species and habitat;
- Loss of Biodiversity - Destruction of Protected Tree Species;
- Loss of Biodiversity - Changes to the local/ regional biodiversity;
- Habitat Degradation - Destruction of pristine/ sensitive habitat types; and
- Habitat Degradation - Impacts on species and habitat in the immediate surrounds.

7.1 Loss of Biodiversity - Destruction of Threatened Species & Habitat

The loss of threatened species or areas that are suitable for these species is a significant impact on the biodiversity on a local and regional scale. Threatened species, in most cases, do not contribute significantly to the biodiversity of an area in terms of sheer numbers since there are generally occur at low abundance values. However, they are extremely important in terms of the biodiversity of an area and high ecological value is placed on the presence of such species in an area.

Threatened species are particularly sensitive to changes in their environment, having adapted to specific habitat requirements. Habitat changes, mostly a result of human interferences and activities, are one of the greatest reasons for these species having a threatened status.

Surface impacts resulting from the proposed activity will lead to changes that will affect natural habitats adversely. Effects of this impact are generally permanent and recovery or mitigation is generally not perceived as possible, particularly in areas associated with pristine vegetation, high slopes, mountains, etc.

The likelihood of Red Data flora or fauna species occurring within the study area is regarded high; hence this impact is regarded extremely significant. The highest probability is associated with atypical habitat types such as rocky outcrops and riparian environments as well as pristine habitat types, which are abundantly present in the study area.

In order to avoid impacts on communities of Threatened species it is important to:

- Identify communities/ assemblages of Red Data species;
- Take cognisance of areas where Red Data species are known to occur; and
- Identify habitat that is particularly suitable for the occurrence of Red Data species, taking habitat preferences and requirements of these species into consideration.

7.2 Loss of Biodiversity - Destruction of Protected Tree Species

The National Forests Act, 1998 (No 84 of 1998) list certain tree species as being protected. While not being attributed a Red Data status the objective of this list is to provide strict protection to certain species while others require control of harvesting. In terms of the National Forests Act of 1998, these tree species may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold - except under licence granted by the Department of Water Affairs and Forestry (or a delegated authority).

It should be noted that these trees occur extensively in the greater region and populations of these species are not under any threat as a result of the proposed development. The likelihood of this impact happening is regarded definite, particularly in the natural regional vegetation; numerous protected tree species occur throughout the region. Obtaining relevant permits are therefore required and transplanting of some individuals could be considered in selected areas.

7.3 Loss of Biodiversity - Changes to the local / regional biodiversity

The transformation of natural habitat during the construction process and periodic maintenance operations during the operational phase will inevitably result in the establishment of habitat types that are not considered representative of the region. As a result of the severity of transformation, surrounding areas are frequently invaded by species not normally associated with the region while species that occurred abundantly in an area might be affected to a larger or smaller extent. It is expected that the local status of species might therefore be affected, while the regional status of species is not generally impacted on by a development of this nature, unless the area of impact is directly within an extremely limited distribution range and the species has a threatened status.

Furthermore, as a result of decreased habitat, increased competition and lower numbers of endemic biota, the genetic pool of species might eventually be influenced by the introduction of non-endemic species or the disappearance or change in abundance of other species. Different communities and assemblages have developed separate gene structures as a result of habitat selection and geographical separation and the introduction of animals of the same species that might be genetically dissimilar to the endemic species might lead to different genetic selection structures, eventually affecting the genetic structure of current populations.

7.4 Habitat Degradation - Destruction of Sensitive & Pristine Habitat Types

Sensitive and pristine habitat types represent centres of atypical habitat and contain biological attributes that are not frequently encountered in the greater surrounds. A high conservation value is attributed to the floristic communities and faunal assemblages of these areas as they contribute significantly to the biodiversity of a region. Impacts that

affect the untransformed and pristine nature of these habitat types result in increases in the fragmentation and isolation factors, affecting the migration potential of some fauna species adversely, pollinator species in particular.

While impacts within sensitive areas is inevitable, it is largely possible to mitigate significant impacts and limit the extent of ecological degradation by means of line selection, localised realignments and site specific mitigation measures. The status of habitat types will be determined on a local as well as regional scale.

7.5 Habitat Degradation - Impacts on species & habitat in the surrounds

Surrounding areas and species present in the direct vicinity of the development could be affected by impacts resulting from construction and operational activities. These impacts could include all of the above impacts, depending on the sensitivity and status of surrounding habitat and species as well as the extent of impact activities. While impacts from of construction and operational activities can in most cases not be prevented entirely, the severity of the impacts can be mitigated against.

8 EIA RECOMMENDATGIONS

In order to determine the impact of the proposed development on the biological environment, it is necessary to compiled baseline information of the area as follows:

- Survey environmentally sensitive areas in order to verify results of the GIS modelling and scoping assessment, preferably in the summer period;
- Survey representative areas in order to obtain a clear understanding of the nature of sensitivity in specific sites;
- Survey the area for general floristic and faunal diversity (common species, Red Data flora and fauna species, alien and invasive plant species);
- Assess the potential presence of Red List flora and fauna species;
- Describe the status and importance of any primary vegetation;
- Provide descriptions of ecological habitat types, plant communities and faunal assemblages; and
- Compile an ecological impact evaluation, taking the following aspects into consideration:
    - the relationship of potential impacts to temporal scales;
    - the relationship of potential impacts to spatial scales;
    - the severity of potential impacts;
    - the risk or likelihood of potential impacts occurring;
    - the degree of confidence placed in the assessment of potential impacts;
- Map all relevant aspects; and
- Recommend preferred route variants based on results of the ecological impact evaluation.