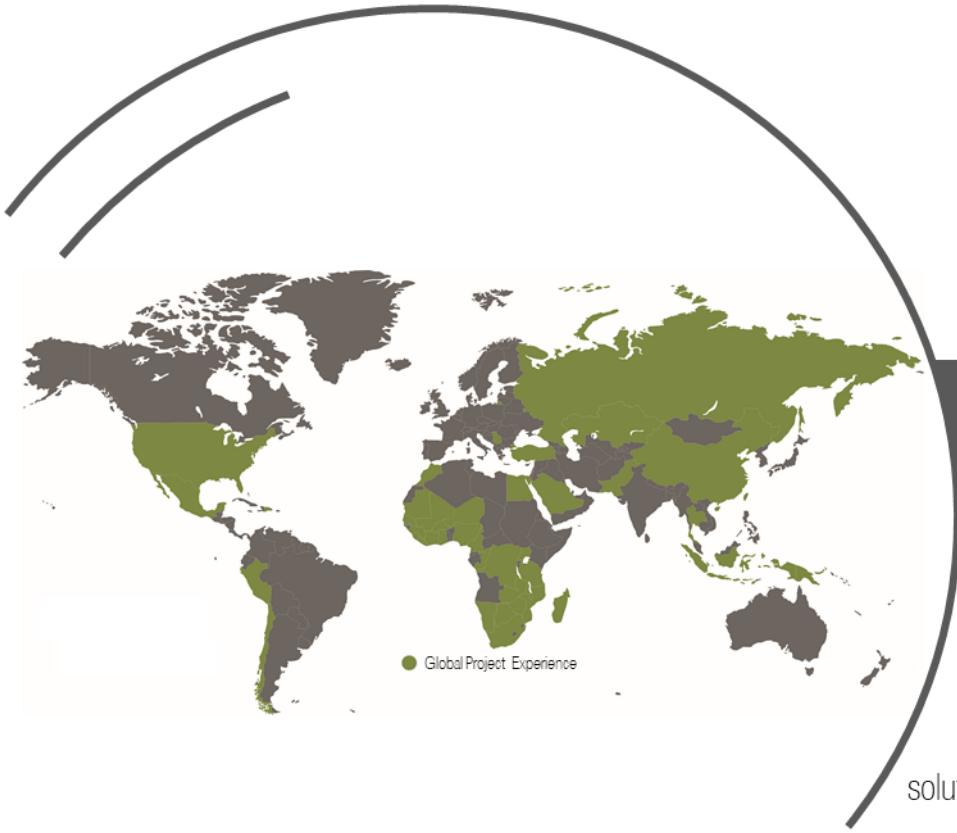

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Environmental Authorisation Process for the Lisbon Prospecting Right Application

Biodiversity Screening Assessment

Prepared for:
PalRho Exploration (Pty) Ltd

Project Number:
PAL6882

March 2021

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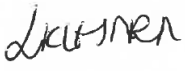
Lisa Hester	Fauna and Flora Specialist		March 2021
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ACRONYMS, ABBREVIATIONS AND DEFINITION

°C	Degree Celsius
AIP	Alien Invasive Plant
BA	Basic Assessment
CBA	Critical Biodiversity Area
CVB	Valley bottom wetlands with a channel
DWS	Department of Water and Sanitation
Digby Wells	Digby Wells Environmental
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
ESA	Ecological Support Area
GIS	Geographic Information System
HGM	Hydrogeomorphic
HS	Hillslope Seepage
km	Kilometre
LC	Least Concern
m	Metre
mm	Millimetre
MPRDA	Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEM:PAA	National Environmental Management: Protected Areas Act
NFEPA	National Freshwater Ecosystem Priority Area
NPAES	National Protected Areas Expansion Strategy
NSV	Nupen Stauded de Vries Incorporated
ONA	Other Natural Area
PA	Protected Areas
PalRho	PalRho Exploration Proprietary Limited
PRA	Prospecting Right Application
QDS	Quarter Degree Square

SABAP2	South African Bird Atlas Project
SANBI	South African National Biodiversity Institute
SARCA	South African Reptile Conservation Association
SCC	Species of Conservation Concern
SFI	Soil Form Indicator
TOPS	Threatened or Protected Species
TUI	Terrain Unit Indicator
UVB	Valley bottom wetlands without a channel

1. Introduction

PalRho Exploration Proprietary Limited (hereafter PalRho), a subsidiary of Ivanhoe Mines Limited, wishes to undertake prospecting activities on the farm Lisbon 288KR, which is located near Mokopane in the Limpopo Province. PalRho intends to obtain a Prospecting Right through the completion of a Prospecting Right Application (PRA) in terms of Section 16 of the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA).

The proposed project triggers Listed Activities in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 (GN R982 of 4 December 2014, as amended) (the "EIA Regulations, 2014") promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The project specifically triggers activities in Listing Notice 1, thus requiring a Basic Assessment (BA) process to be undertaken. This process requires a comprehensive public consultation process.

This document serves as the **Biodiversity Screening Assessment** in support of the Environmental Authorisation (EA) to be completed for the PRA.

2. Project Location

The Lisbon 288KR farm is in the Limpopo Province and falls under the Mokopane Magisterial District. The Lisbon 288KR Prospecting Right area is located approximately 10 km southwest of the town of Mokopane in the Limpopo Province. The project area amounts to a total area of 2543.1 hectare (ha). The PRA is applicable to the properties included in Table 2-1. The locality map and land tenure map has been included in Figure 2-1 and Figure 2-2, respectively.

Table 2-1: Lisbon PRA Properties

Farm	Portion	21 Digit Code
Lisbon 288KR	1	T0KR00000000028800001
Lisbon 288KR	4	T0KR00000000028800004
Lisbon 288KR	6	T0KR00000000028800006
Lisbon 288KR	7	T0KR00000000028800007
Lisbon 288KR	8	T0KR00000000028800008
Lisbon 288KR	9	T0KR00000000028800009
Lisbon 288KR	10	T0KR00000000028800010
Lisbon 288KR	11	T0KR00000000028800011
Lisbon 288KR	12	T0KR00000000028800012
Lisbon 288KR	13	T0KR00000000028800013
Lisbon 288KR	14	T0KR00000000028800014
Lisbon 288KR	15	T0KR00000000028800015

Farm	Portion	21 Digit Code
Lisbon 288KR	16	T0KR00000000028800016
Lisbon 288KR	17	T0KR00000000028800017
Lisbon 288KR	18	T0KR00000000028800018
Lisbon 288KR	19	T0KR00000000028800019

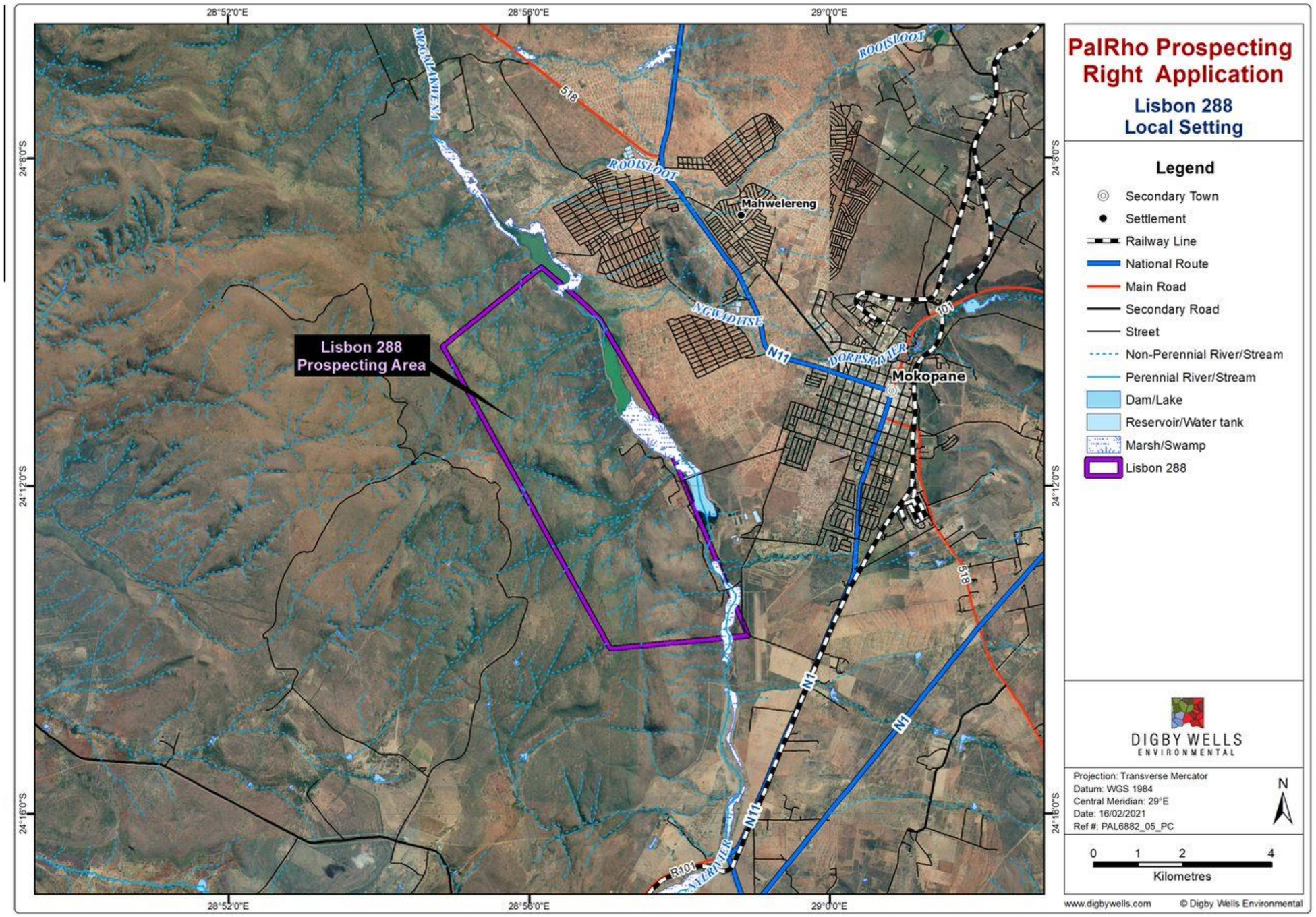

Figure 2-1: Locality Map

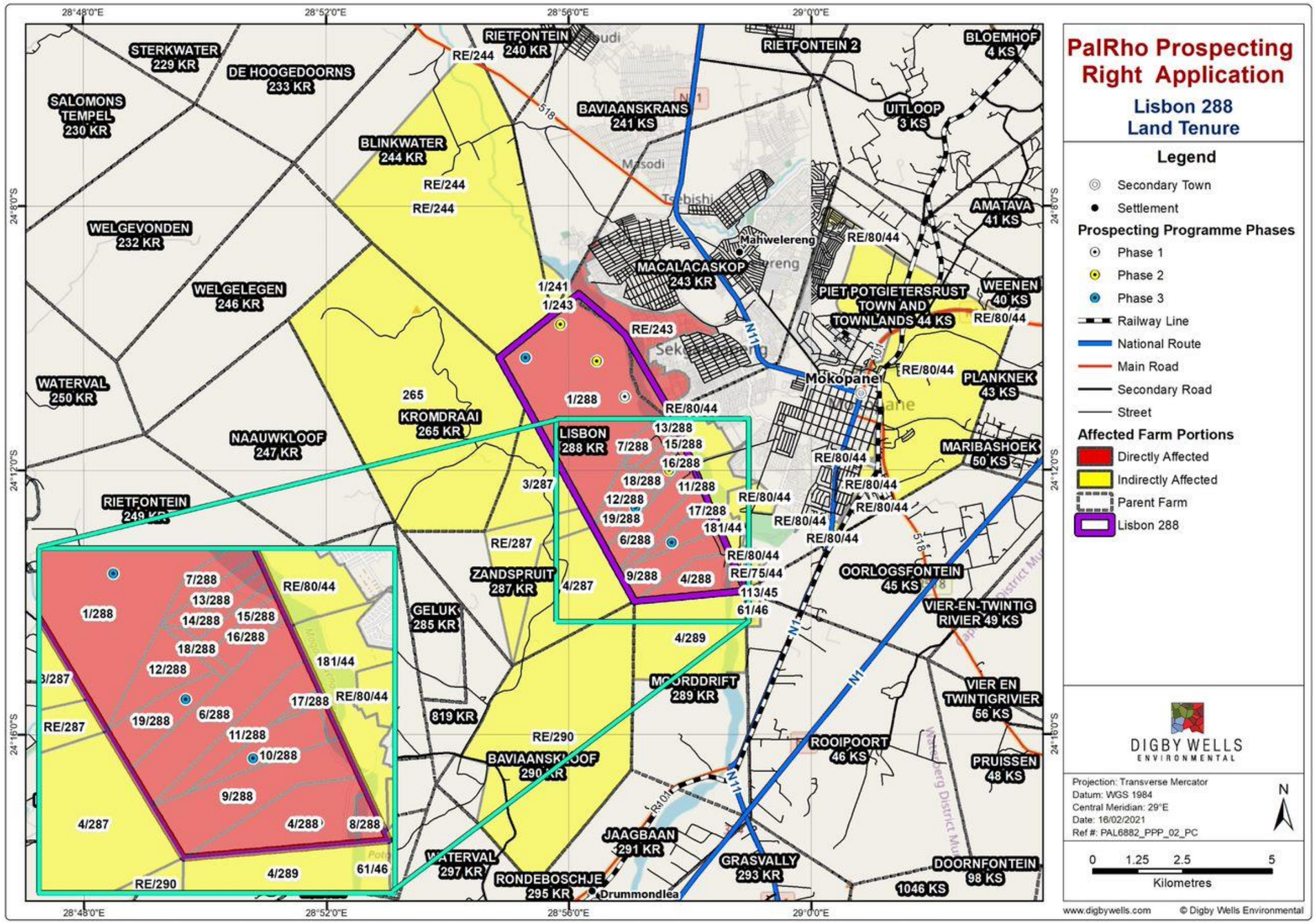

Figure 2-2: Land Tenure Map

3. Description of the Activities to be Undertaken

PalRho intends to apply for a Prospecting Right to conduct prospecting activities on the farm Lisbon 288KR. The minerals to be prospected includes Platinum, Palladium, Rhodium, Ruthenium, Iridium, Osmium, Platinum Group Elements, Gold, Copper, Cobalt, Nickel, Vanadium, Chromium, Iron, Phosphate Ore, Fluorspar, Tin Ore and Rare Earth Metals (including Scandium).

The project is located within an area dominated by sediments of the Transvaal Supergroup and intrusive rocks of the Bushveld Complex, namely the Northern or Potgietersrus Limb of the Bushveld Complex.

3.1. Prospecting Operations

Prospecting activities will include both invasive and non-invasive methods. Non-invasive methods include data capturing of all relevant geological data, a geophysical survey utilising digital data to confirm proposed drill locations and structures, as well as analytical work of the samples taken.

Invasive methods will include the core drilling (approximately ten holes) to ascertain the stratigraphy sequence and reef horizons of the ore body. These proposed location s are shown in Figure 3-1. It should however be noted that these boreholes are estimated locations and changes to the actual locations of boreholes may change based on information available at the time of prospecting.

3.2. Prospecting Infrastructure

No permanent infrastructure will be constructed as part of the prospecting activities. Activities associated with the prospecting operations include:

- The establishment of temporary access route / tracks, which will make use of the shortest distance from an existing road;
- The clearing of vegetation for the drill rig;
- The establishment of three sumps / trenches to separate and store oil, sludge and water; and
- Rehabilitation following the prospecting activities.

3.3. Prospecting Process

Should the Prospecting Right be granted, the following steps will be undertaken in line with the Prospecting Work Programme, including drilling activities:

- Permission to Drill;
- Drilling Process; and
- Rehabilitation Process.

3.3.1. Permission to Drill

A borehole drilling plan is first compiled by the project appointed geologist. Once completed, a stakeholder engagement process is followed by which the landowners/lawful occupiers are informed of the project. A lead negotiator is then appointed to negotiate with the stakeholders to obtain signed agreements to drill the boreholes. Once signed, the landowners/lawful occupiers will be given an opportunity to accompany the drill contractor to the site where drilling has been proposed.

The locations of the drill sites are dependent on the environmental and heritage sensitivities of the prospecting area. Once the parties have agreed on the location of the borehole, the drill contractor will complete a risk assessment prior to undertaking any drilling activities and determine suitable mitigation measures to minimise environmental damage and to avoid areas of sensitivity. Additionally, where possible, large trees will be avoided, and minimal vegetation removed.

3.3.2. Drilling Process

Once all approvals have been obtained, the vegetation is cleared, and the drill sites are constructed. Existing farm roads are utilised, where possible. Should new roads be required, these roads are firstly discussed with the landowners/lawful occupiers and incorporated within the signed agreement. Based on discussions with the landowners/lawful occupiers, these roads are usually left for them to use once the prospecting boreholes have been drilled. Should the roads not be required, they will be left to naturally revegetate. If no vegetation is established within three months after rehabilitation, then re-seeding needs to be completed.

During the drill process, waste is kept to a minimum and spillages are cleaned up should they occur. All waste is segregated and removed off site when waste bins are full. All hazardous waste will be removed by a hazardous waste collector, while general waste is disposed of at a municipal landfill site.

3.3.3. Rehabilitation Process

Once the boreholes have been drilled and the core samples taken, the boreholes will be capped and marked if PalRho wishes to access the boreholes again. All infrastructure is then removed. The prospecting areas are backfilled, taking care not to allow compaction of the soil. The vegetation is then allowed to naturally re-establish itself and blend into the original landscape. The rehabilitation of the site will be monitored by PalRho and the site will be vegetated with indigenous vegetation, if necessary.

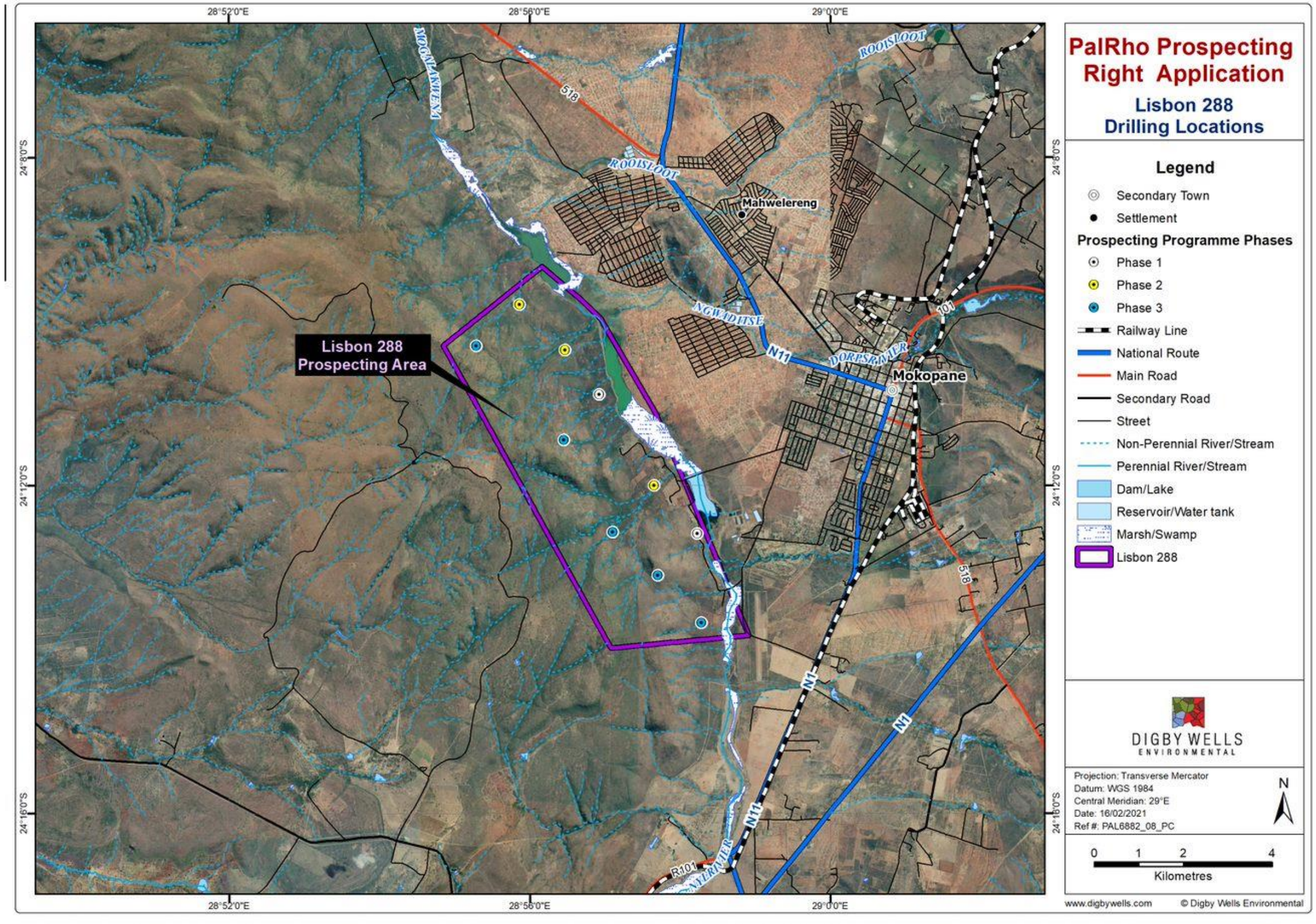

Figure 3-1: Location of Prospecting Boreholes

4. Assumptions and Limitations

The following assumptions were identified as part of the Biodiversity Screening Assessment:

- The Biodiversity Screening Assessment is based on documents provided by PalRho Exploration and supplemented by relevant further research. It is assumed that these are accurate;
- Due to increasing climate change events and the general non-perennial nature of the considered river systems associated with the project, the perceived aquatic biodiversity is assumed to be of low abundance and in poor ecological state. Ground-truthing is recommended to confirm the presence of desktop-defined conditions, specifically the expected aquatic biota.
- The report was consolidated using desktop information only, no site visits, ground truthing or field assessments were undertaken;
- Wetland delineations were done using aerial imagery, together with contour data and as a result, some discrepancies in terms of the extent of the delineated area might occur until verification can be undertaken through field survey;
- No wetland health, services and functionality assessments were conducted, all data provided in this report is purely based on the specialist opinion based on desktop information available;
- No impact assessments were conducted;
- This report must be considered as a dynamic document and will be updated as information becomes available; and
- The described aquatic biodiversity and sensitivity within the considered ecosystems was done solely from a desktop level. Data was supplemented with specialist experience, where possible. However, it is worth noting that inaccuracies in aquatic species diversity is to be expected to a marginal extent, especially considering the dynamic nature of aquatic ecosystems.

5. Scope of Work

The Scope of Work for the Biodiversity Assessment comprised:

- **Literature Review:** Review of historical reports, catchment data, regional background information and identifying additional freshwater resources within the Project Area. Specialist experience in the project area, specifically from an aquatic ecology perspective, was also utilised to supplement gathered data;
- **Wetland Delineation:** Identification and characterisation of wetlands and buffer zones within the Project Area at desktop level; and

- **Sensitivity Mapping:** Provide recommendations on buffer zones according to the guidelines set out in the 'Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries' (Macfarlane, et al., 2014).

6. Details of the Specialist

The following is a list of Digby Wells' staff who were involved in the Biodiversity Screening Assessment:

- **Byron Bester** has experience and a broad knowledge of various aspects of aquatic ecosystem assessment throughout South Africa and abroad (i.e. Botswana, Democratic Republic of Congo, Ghana, Namibia, and Zambia), including water quality assessment, sediment composition, fish biometric indices determination, histopathological fish health assessments and human health risk assessments via the consumptive pathway. He has completed numerous specialist aquatic biodiversity assessments in a wide range of sectors, including mining (e.g. coal, gold, platinum, titanium, etc.), industrial (e.g. smelters, brick-making projects, special economic zones, etc.), transport infrastructure upgrades (e.g. roads, airports, etc.), services infrastructure (e.g. powerline installations, bulk water pipelines, etc.), as well as mixed-use, residential and commercial developments.

  He attained his Master's degree in Aquatic Health from the University of Johannesburg by assessing the health status and edibility of selected fish species within various impoundments within the North West Province of South Africa. His passion for further research and exposure to water-related aspects of the natural system afforded him the opportunity to study at the renowned UNESCO-IHE Institute for Water Education in Delft, The Netherlands for a Special Programme in Environmental Science, for which he attained European Credit Transfer System points for the modules completed.

  He is currently registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (Reg. No. 400662/15) and is a member of the South African Society of Aquatic Scientists. Additionally, Byron has been accredited as a SASS5 River Health Programme practitioner with the Department of Water and Sanitation (previously Department of Water Affairs) since March 2012 and attended a number training sessions presented by the DWS for EcoStatus Determination and the River Ecosystem Monitoring Programme, describing the latest bioassessment tools in Present Ecological State (or Ecological Category) determination.

- **Willnerie Janse van Rensburg** is a Soil Scientist and Wetland Specialist in the Rehabilitation, Closure and Soils department at Digby Wells. She received her Bachelor of Science in Environmental Geography as well as her Honours degree in Soil Science from the University of the Free State. She has five years' experience in the fields of Soil Science and Environmental Science. She has experience in proposal compilation, completing soil and wetland baseline and impact assessments, soil and wetland delineations, biodiversity plans, wetland offsetting, soil and wetland

rehabilitation, land use and capability assessments, irrigation scheduling and provides recommendations on soil amelioration. She has undertaken work in Mali, Lesotho, Botswana and throughout South Africa. Willnerie is registered as a Candidate Natural Scientist with the South African Council for Natural Scientific Professionals.

- **Nathan Cook** is a certified SASS5 practitioner with a BSc in environmental sciences and is currently working towards a BSc honors degree in Aquatic Ecosystem Health through North West University. Nathan has completed numerous aquatic ecology assessments (e.g. aquatic baseline assessments; aquatic impact assessments; aquatic biomonitoring studies) in South Africa and has a good technical understanding of the variable conditions within South African rivers as well as their biological compositions. He has also been involved in aquatic assessments in numerous countries in West Africa, as well as in the Kibali and Nzoro rivers in the Democratic Republic of Congo and the Zambezi and Chobe rivers in Botswana, Zambia and Namibia.
- **Lisa Hester** currently holds the position of Ecologist at Digby Wells Environmental in South Africa. She obtained her BSc Honour's degree in Ecology and Conservation from the University of Witwatersrand in South Africa. Her dissertation topic involved an in-depth ecological survey of the Croc River Mountain Conservancy in Nelspruit.

  Since completion of her studies, Lisa has worked on numerous fauna and flora biomonitoring reports both locally and internationally (including Australia). Working on a multitude of surveys in various locations has allowed Lisa to engage upon a multi-faceted professional forum. Various scopes of work involving, ecological baseline assessments, ecological rehabilitation, wetland assessments, nest-box installations, environmental impact assessment, protected tree surveys, bat surveys, species relocation and vegetation reports consists of her repertoire of work.
- **Aamirah Dramat** is an Assistant Rehabilitation Consultant in the Rehabilitation, Closure and Soils Department at Digby Wells. She received her Bachelor of Science Degree in Applied Biology and Environmental and Geographical Science (EGS) as well as her Honours Degree in Biological Sciences from the University of Cape Town. She joined Digby Wells in 2020 as a Rehabilitation Intern and has since gained experience in the environmental services sector with specialised focus in Soils, Wetlands and Rehabilitation, both locally and internationally. She has been involved in the report compilation and undertaking of Baseline Assessments, Environmental Impact Assessments (EIAs), Rehabilitation and Closure Plans (RCPs), Rehabilitation Strategy and Implementation Plans (RSIPs), Alien Invasive Plant (AIP) Assessments, Re-vegetation Trial Studies and Monitoring Assessments.

7. Methodology

This section provides an overview of the methodology used in the compilation of the Biodiversity Screening Assessment (Figure 7-1). A detailed methodology is described in Appendix A.

National Freshwater Ecosystem Priority Areas

The NFEPA Project provided a collated, nationally consistent information source of wetland and river ecosystems for incorporating freshwater ecosystem and biodiversity goals into planning and decision-making processes.

Protected Areas

The South African Protected Areas Database (SAPAD) is a GIS inventory of all protected areas in South Africa (SAPAD, 2020). The database contains spatial data for the conservation estate of South Africa. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection.

National Biodiversity Assessment Terrestrial Threat Status and Protection Level

The National Biodiversity Assessment (NBA) aims to inform policy, planning and decision making in a range of sectors for the conservation and sustainable use of biodiversity. The NBA has four indicators, providing information on the threat status and protection level of ecosystems and species (SANBI, 2018).

Mining and Biodiversity Guidelines

The guideline provides us with a manual to integrate biodiversity into the planning process thereby encouraging informed decision-making around mining development and environmental authorisations.

Sensitivity Analysis

To mitigate against any potential diffuse impacts (e.g. runoff contamination, erosion and sedimentation, etc.) likely to originate from the prospecting activities, a desktop-based buffer distance was determined using the Preliminary Guidelines for Buffer Zone Tool (Macfarlane & Bredin, 2016a, Macfarlane & Bredin, 2016b).

Literature Review

Relevant literature was reviewed with respect to the historical biodiversity associated with the Project Area including habitats and vegetation types.

Limpopo Conservation Plan

The Limpopo Conservation Plan develops the spatial component of a bioregional plan. The purpose of a bioregional plan is to inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity (Desmet, Holness, Skowno, & Egan, 2013).

National Protected Area Expansion Strategy

The National Protected Area Expansion Strategy (NPAES) sets the national framework for consolidating and expanding the existing protected area network in the country (Department of Environmental Affairs, 2016).

Land Cover

Land cover was identified by aerial imagery during the desktop assessment. Land cover maps indicate delineated areas of similar land cover (Land Type Survey Staff, 1972 - 2006).

Desktop-based Delineation of Biodiversity Features

Based solely on any available contour data and high-resolution aerial imagery, the freshwater resources within the vicinity of the proposed project was delineated within 500 m of the proposed mining extents at a desktop-level. Based on the national land cover data, as well as the vegetation map of South Africa, broad-level terrestrial habitat types were also tentatively delineated and any habitat of significant potential concern (e.g. ridges) was flagged for further investigation.

Figure 7-1: Biodiversity Screening Assessment Methodology

8. Desktop Assessment

Table 8-1: Baseline Environment of the Project Area

Plant Species Characteristic of the Makhado Sweet Bushveld (Mucina & Rutherford, 2012) (Figure 8-1)		Plant Species Characteristic of the Waterberg Mountain Bushveld (Mucina & Rutherford, 2012) (Figure 8-1)		Plant Species Characteristic of the Waterberg-Magaliesberg Summit Sourveld (Mucina & Rutherford, 2012) (Figure 8-1)	
Small Trees	*Acacia erubescens, A. gerrardii, A. mellifera subsp. detinens, A. rehmanniana, Boscia albitrunca, Combretum apiculatum, Acacia tortilis subsp. heteracantha, Terminalia sericea.*	Tall and Small Trees	Tall Tree*: Acacia robusta.* Small Trees*: Acacia caffra, Burkea africana, Combretum apiculatum, Croton gratissimus, Cussonia transvaalensis, Faurea saligna, Heteropyxis natalensis, Ochna pulchra, Protea caffra, Albizia tanganyicensis, Combretum molle, Englerophytum magalismontanum, Ficus burkei, F. glumosa, Ochna pretoriensis, Pseudolachnostylis maprouneifolia, Rhus lancea, Terminalia sericea, Vangueria infausta, V. parvifolia.*	Small Trees	*Englerophytum magalismontanum, Protea caffra subsp. caffra, P. roupelliae subsp. roupelliae, Acacia caffra, Brachylaena rotundata, Combretum moggii, C. molle, Faurea saligna, Vangueria infausta, Zanthoxylum capense.*
Tall Shrubs	*Commiphora pyracanthoides, Dichrostachys cinerea, Grewia flava, Hibiscus calyphyllus, Lycium shawii, Rhigozum obovatum.*	Tall and Low Shrubs	Tall Shrubs: *Diplorhynchus condylocarpon, Elephantorrhiza burkei, Combretum moggii, C. nelsonii, Dichrostachys cinerea, Euclea crispa subsp. crispa, Gnidia kraussiana, Olea capensis subsp. enervis, O. europaea subsp. africana, Searsia pyroides var. pyroides, Strychnos pungens, Vitex rehmannii* Low Shrubs: *Anthospermum rigidum subsp. rigidum, Barleria affinis, Felicia muricata, Helichrysum kraussii, Protea welwitschii subsp. welwitschii, Rhus rigida var. dentata.*	Tall, Low and Succulent Shrubs	Tall Shrubs: *Elephantorrhiza burkei, Indigofera comosa, Protea gaguedi, Rhus dentata.* Low Shrubs: *Lopholaena coriifolia, Passerina montana, Rhus magalismontana, Acalypha angustata, Aeschynomene rehmannii, Anthospermum hispidulum, A. rigidum subsp. rigidum, Erica drakensbergensis, Euryops pedunculatus, Myrothamnus flabellifolius, Myrsine africana, Polygala hottentotta, Protea welwitschii, Rhynchosia nitens, Tephrosia longipes.* Succulent Shrubs: *Euphorbia clavarioides var. truncata, E. schinzii, Raphionacme burkei. Semiparasitic Shrubs: Thesium transvaalense, T. utile.*
Low Shrubs	*Barleria lancifolia, Hirpicium bechuanense, Indigofera poliotes, Melhania rehmannii, Pechuel-Loeschea leubnitziae.*	Geoxylic Suffrutices, Succulent Shrubs and Woody Climbers	Geoxylic Suffrutices*: Dichapetalum cymosum, Parinari capensis subsp. capensis.* Succulent Shrubs: *Aloe chabaudii, Lopholaena coriifolia.* Woody Climbers: *Ancylobotrys capensis, Rhoicissus revoilii.*	Woody Climber, Geoxylic Suffrutices and Herbaceous Climber	Woody Climber*: Ancylobotrys capensis.* Geoxylic Suffrutices: *Elephantorrhiza elephantina, Parinari capensis.* Herbaceous Climber: *Rhynchosia totta.*
Graminoids	*Anthephora pubescens, Aristida stipitata subsp. graciliflora, Cenchrus ciliaris, Enneapogon scoparius, Brachiaria nigropedata, Eragrostis trichophora, Panicum coloratum, P. maximum, Schmidtia pappophoroides, Urochloa mosambicensis.*	Graminoids	*Loudetia simplex, Schizachyrium sanguineum, Trachypogon spicatus, Brachiaria serrata, Digitaria eriantha subsp. eriantha, Elionurus muticus, Enneapogon scoparius, Setaria sphacelata, Themeda triandra, Tristachya leucothrix.*	Graminoids	*Aristida transvaalensis, Bulbostylis burchellii, Coleochloa setifera, Diheteropogon amplectens, Eragrostis nindensis, Loudetia simplex, Melinis nerviglumis, Schizachyrium sanguineum, Trachypogon spicatus, Tristachya biseriata, Andropogon schirensis, Aristida aequiglumis, Brachiaria serrata, Cymbopogon caesius, Cyperus rupestris, Digitaria brazzae, Eragrostis racemosa, E. stapfii, Microchloa caffra, Monocymbium ceresiiforme, Panicum natalense, Themeda triandra, Tristachya rehmannii.*

Herbs	*Chamaecrista absus, Corbichonia decumbens, Geigeria acaulis, Harpagophytum procumbens subsp. transvaalense, Heliotropium steudneri, Hemizygia elliottii, Hermbstaedtia odorata, Leucas sexdentata, Osteospermum muricatum, Tephrosia purpurea subsp. Leptostachya.*	Herbs and Geophytic Herb	Herbs*: Berkheya insignis, Chamaecrista mimosoides, Geigeria elongata, Hibiscus meyeri subsp. transvaalensis, Xerophyta retinervis.* Geophytic Herbs*: Haemanthus humilis subsp. humilis, Hypoxis rigidula.*	Herbs, Geophytic and Succulent Herbs	Herbs: *Selaginella dregei, Acalypha angustata, Commelina africana, C. erecta, Helichrysum nudifolium var. nudifolium, Indigofera hedyantha, I. melanadenia, Ipomoea ommaneyi, Nidorella hottentotica, Oldenlandia herbacea, Pseudognaphalium undulatum, Rhynchosia monophylla, Vernonia galpinii, Xerophyta retinervis.* Geophytic Herbs: *Albuca setosa, Lapeirousia sandersonii, Ledebouria marginata, Pellaea calomelanos.* Succulent Herb: *Crassula lanceolata subsp. transvaalensis.*
Status	Vulnerable	Status	Least Threatened	Status	Least Threatened

Bioregional Context (Köppen & Geiger, 1936; Kleynhans, Thirion, & Moolman, 2005; Darwell, Smith, Tweddle, & Skelton, 2009; Climate-data.org, n.d.)		**Limpopo Conservation Plan (Desmet, Holness, Skowno, & Egan, 2013) (Figure 8-3)**	
Ecoregion	Western Bankenveld and Bushveld Basin	The Project Area is classified as **CBA1** and **CBA2** with minor areas in the east classified as **ESA2**.	
WMA	Limpopo	**National Freshwater Ecosystem Priority Area (NFEPA) Wetland and River Freshwater Ecosystem Priority Area (FEPA) Classification** (Nel, et al., 2011) **(Figure 8-4 and Figure 8-5)**	
Sub-WMA	Mogalakwena	NFEPA Wetlands	A **Channelled Valley Bottom** NFEPA Wetland (Rank 6) and small **Un-channelled Valley Bottom** NFEPA Wetland (Rank 6) are located along the eastern section of the Project Area.
Quaternary Catchment (Figure 8-2)	A61F and A61J	River FEPA	The entire the Project Area is classified as an **Upstream Management Area.**
Altitude (m.a.m.s.l.)	1150	**Mining and Biodiversity Guideline Category (DEA, 2013) (Figure 8-6)**	
Mean Annual Precipitation (MAP) (mm) (Secondary)	495	The Project Area is predominantly classified as **B: Highest Biodiversity Importance – Highest Risk for Mining**, with a smaller areas classified as **C: High Biodiversity Importance – High Risk to Mining** and **D: Moderate Biodiversity Importance – Moderate Risk for Mining**.	
Rainfall Seasonality	Spring/Summer (November to March)	**Protected Areas (SAPAD, 2020) and National Protected Areas Expansion Strategy (NPAES) (Department of Environmental Affairs, 2016) (Figure 8-7)**	
Mean Annual Temp. (°C)	19.3	No Protected Areas or NPAES are located within the Project Area. However, several Nature Reserves (Protected Areas) are located within close proximity to the Project Area. A few NPAES are also located within 20 km of the Project Area.	
Köppen Climate Classification	Bsh	**Land Cover (Land Type Survey Staff, 1972 - 2006; GEOTERRAIMAGE (GTI), 2018) (Figure 8-8)**	
National Biodiversity Assessment (NBA) Terrestrial Threat Status and Protection Level (SANBI, 2018) (Figure 8-9)		The Project Area is predominantly made up of land classified as Open Woodland, Natural Grassland, Dense Forest and Woodland and Fallow Land and Old Fields. The remaining minor areas are classified as Sparsely Wooded Grassland, Commercial Annual Crops Rain-fed/Dryland, Herbaceous Wetlands, Residential Formal, Residential Informal, Artificial Dams, Other Bare and Subsistence/Small-Scale Annual Crops.	
The entire Project Area was identified to be of **Least Concern (LC).**			

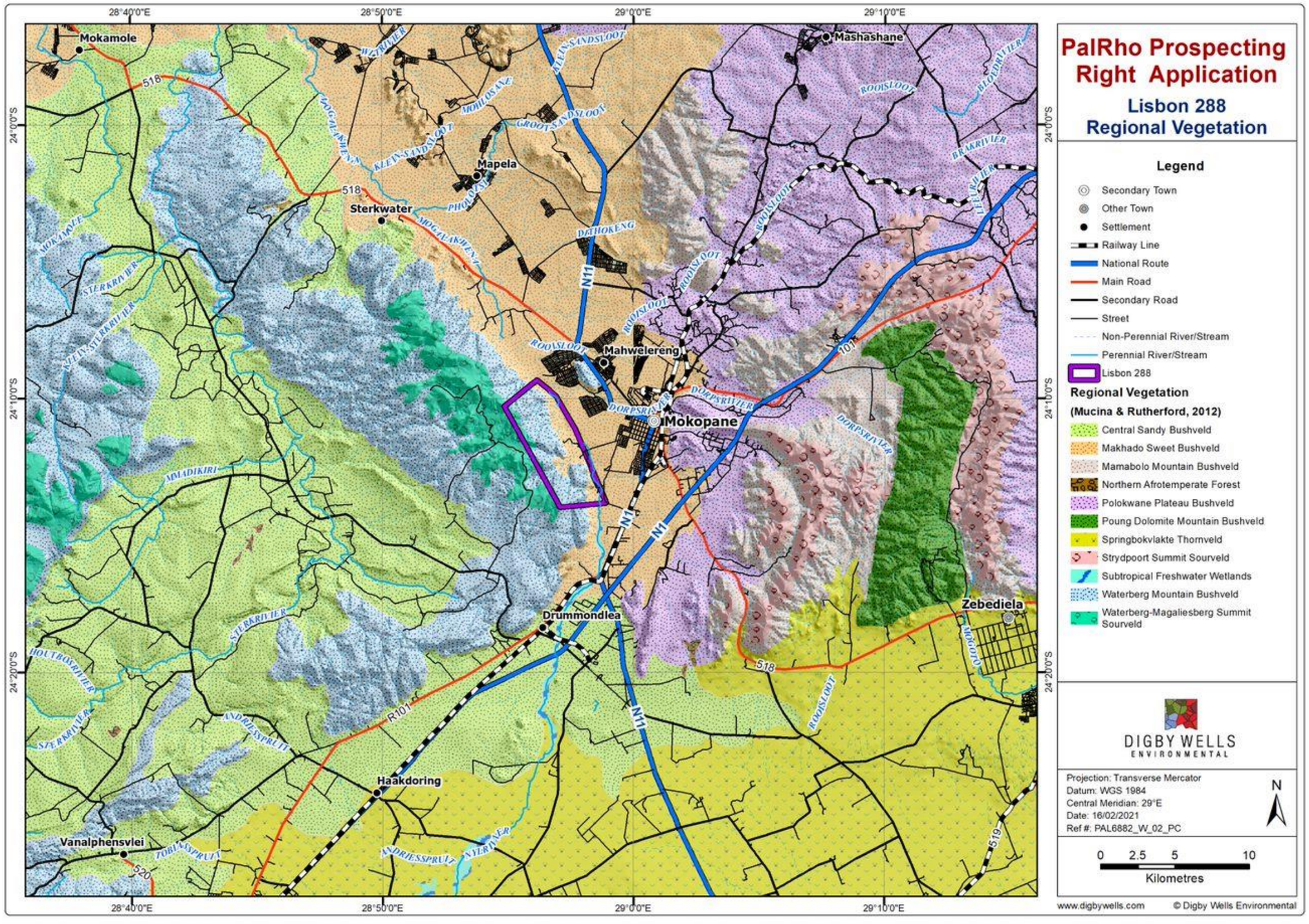

Figure 8-1: Regional Vegetation

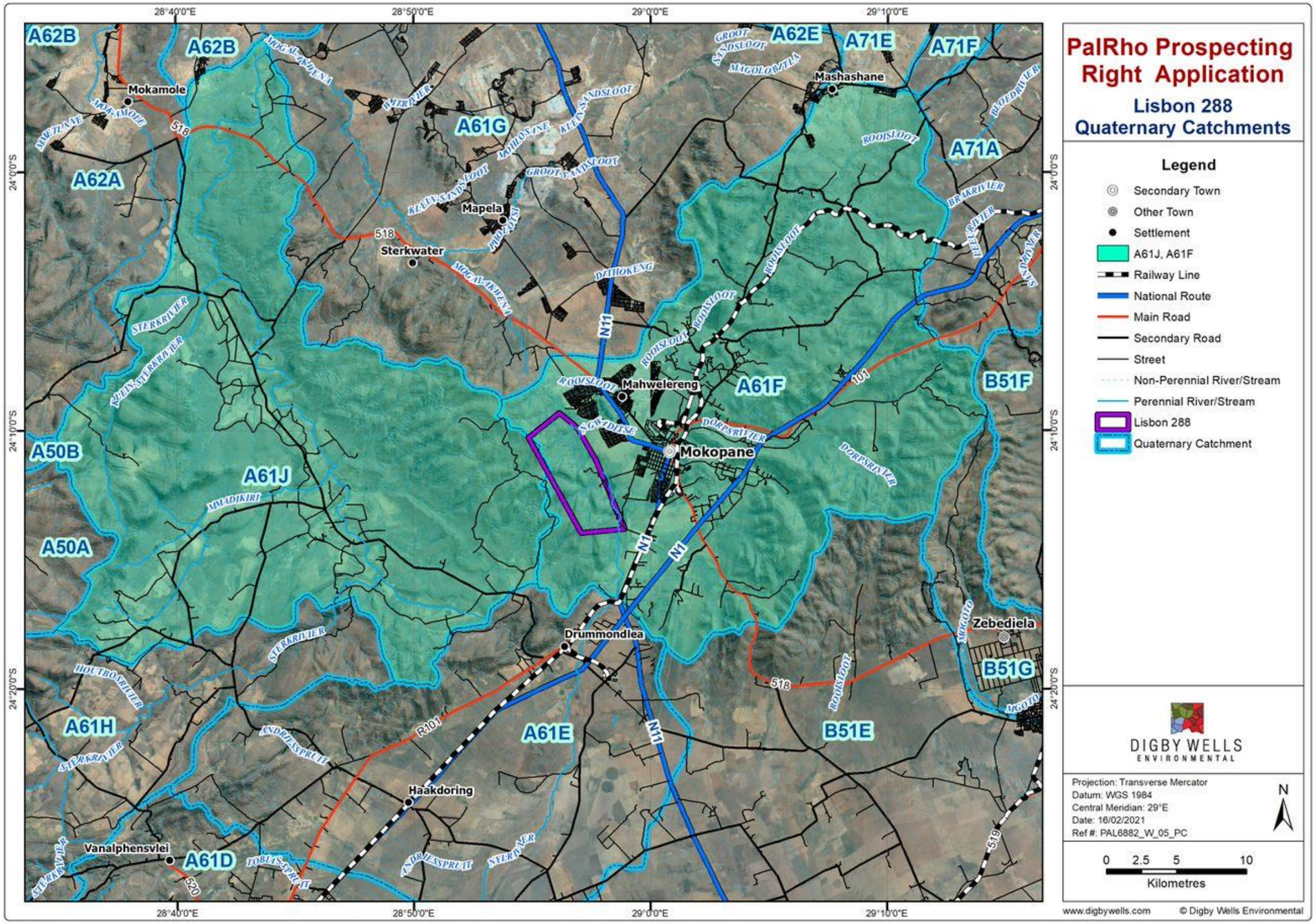

Figure 8-2: Quaternary Catchment

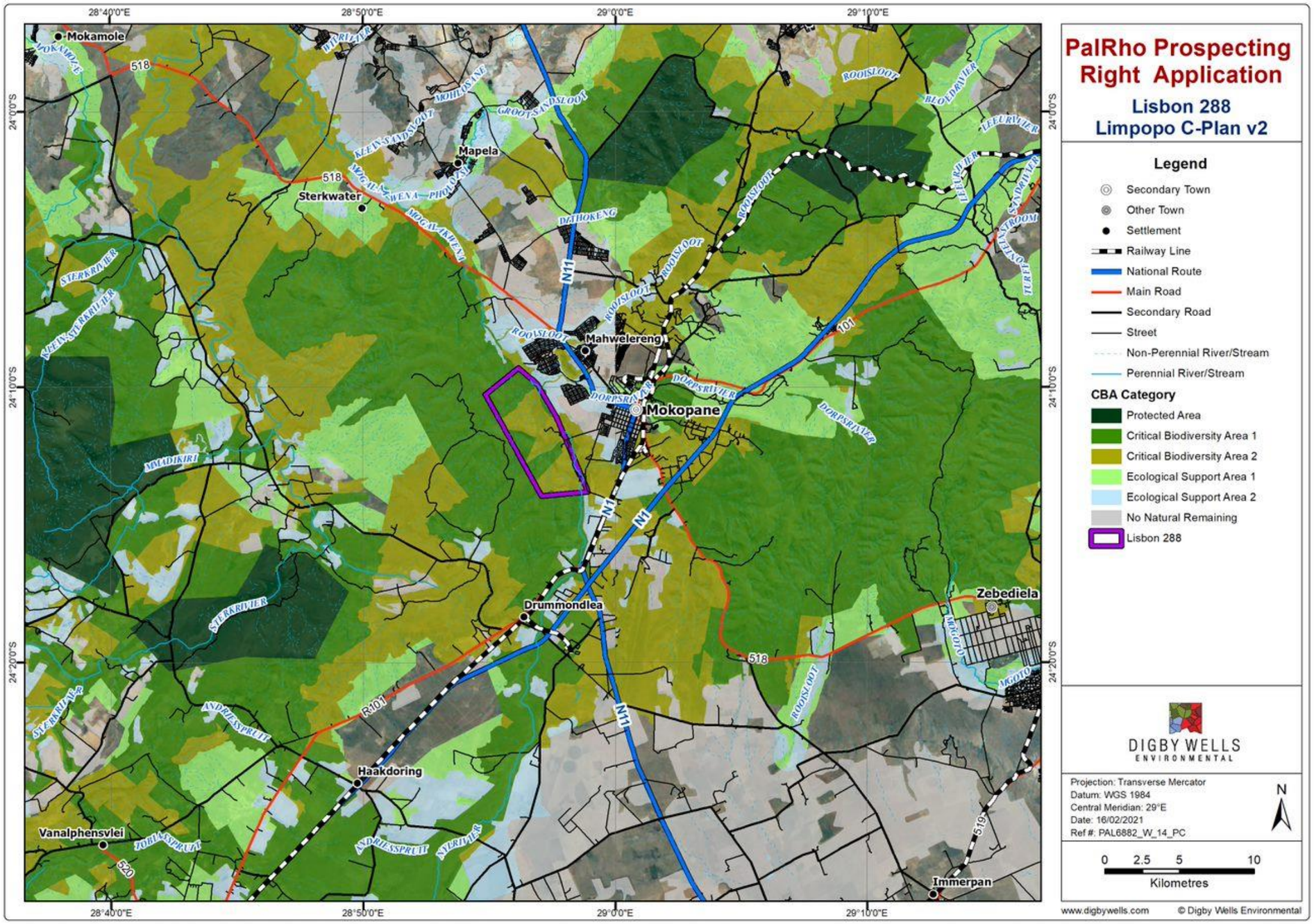

Figure 8-3: Limpopo Conservation Plan

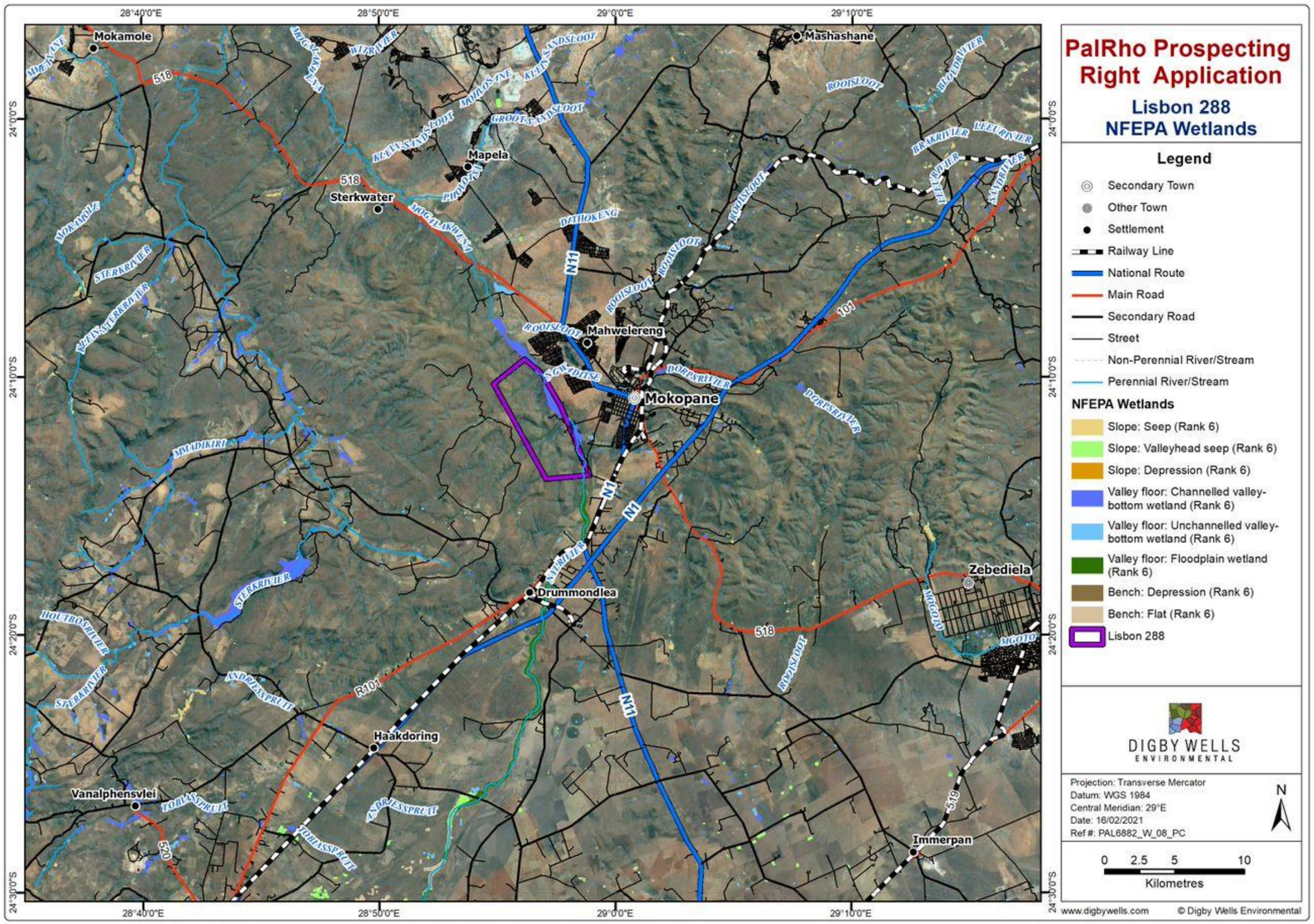

Figure 8-4: National Freshwater Ecosystem Priority Area (NFEPA) Wetlands

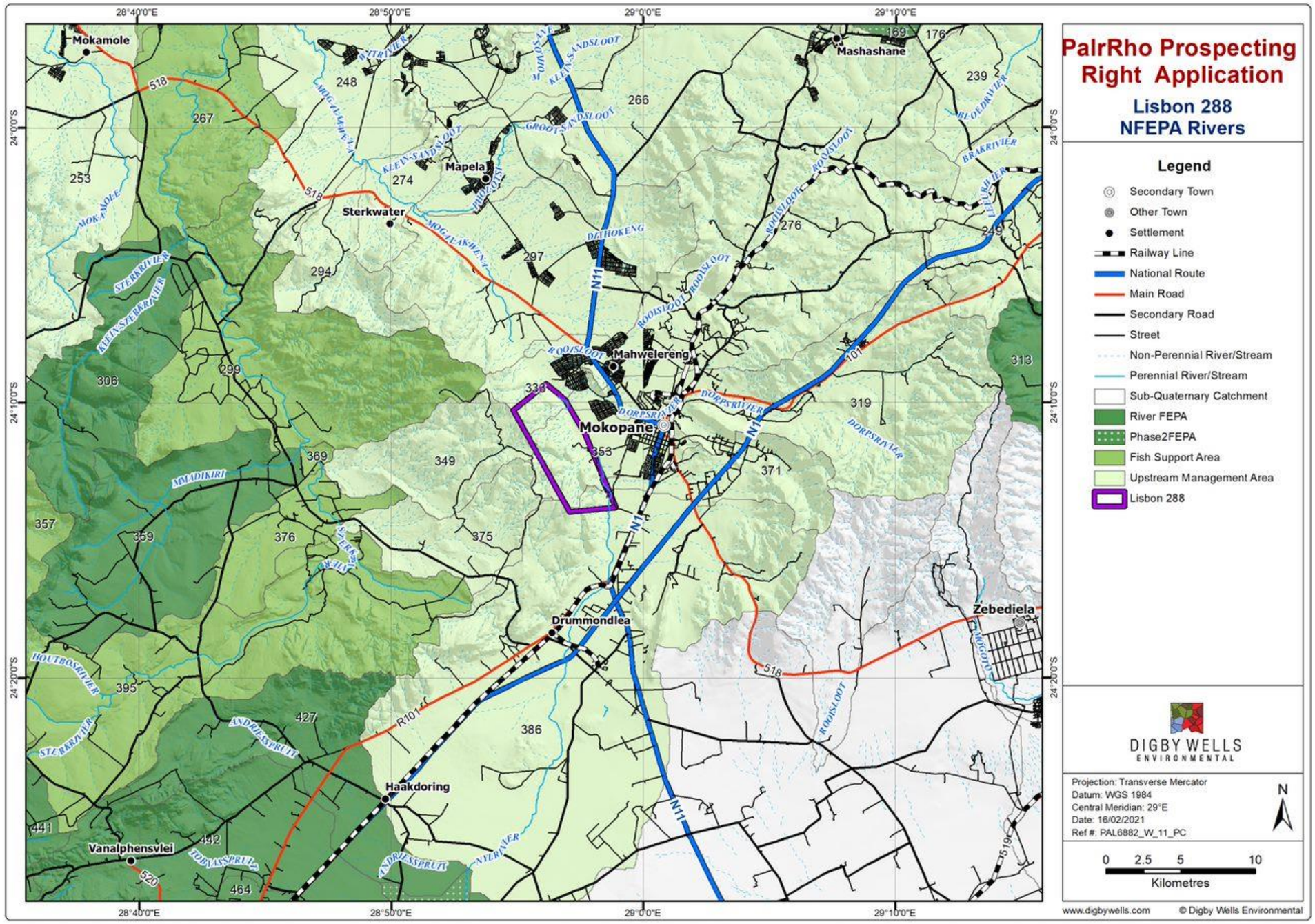

Figure 8-5: River National Freshwater Ecosystem Priority Areas (NFEPA)

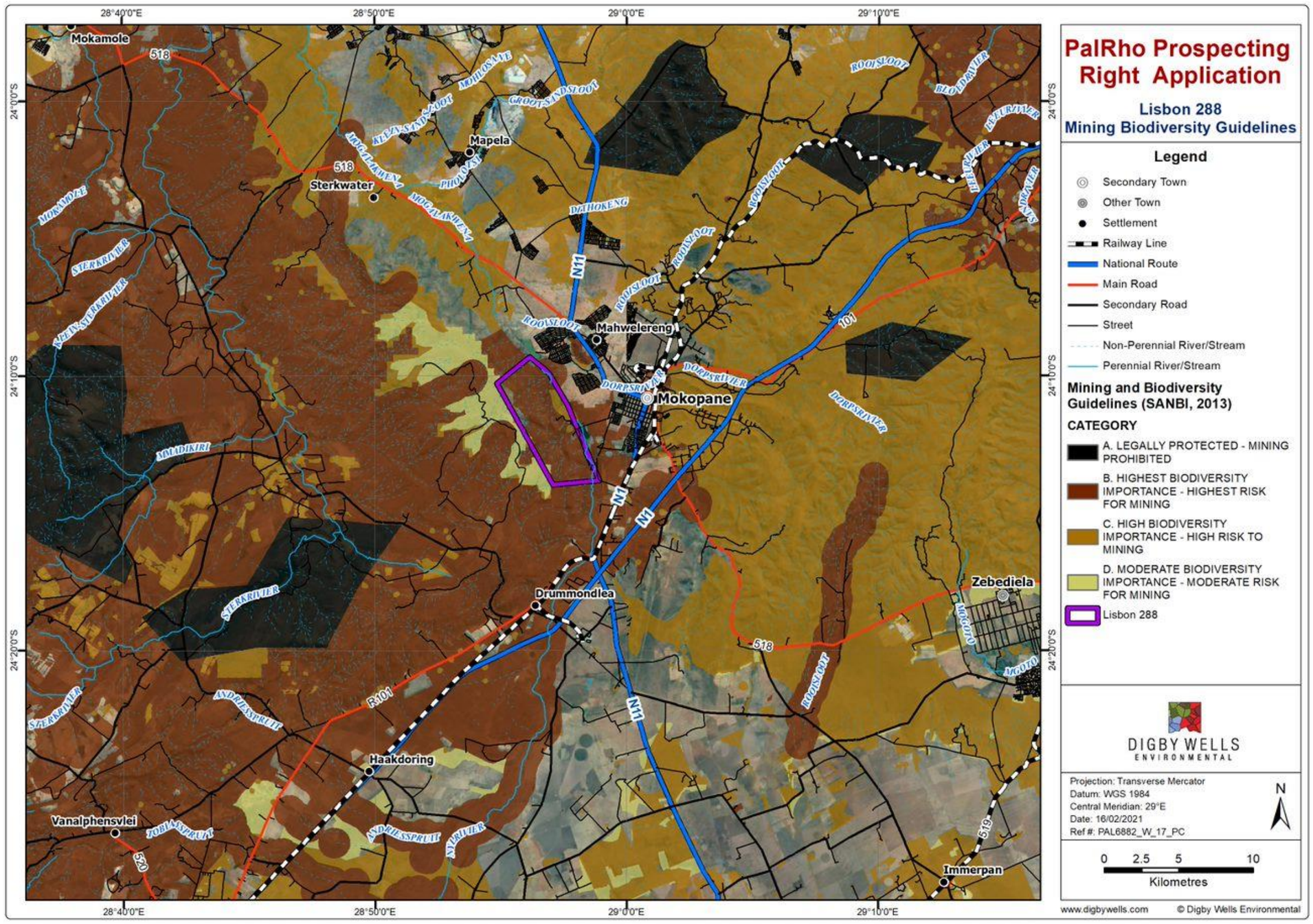

Figure 8-6: Mining and Biodiversity Guidelines

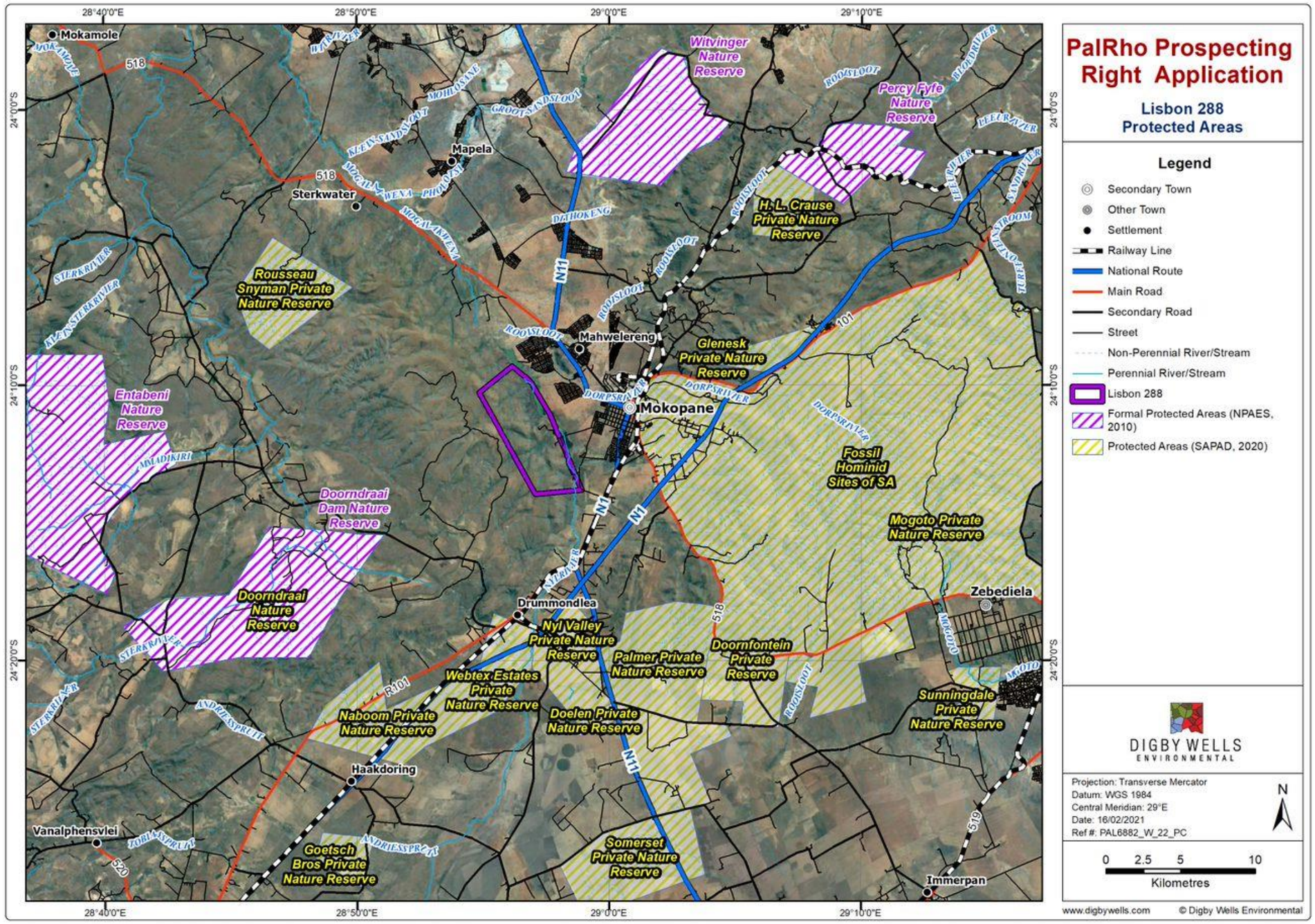

Figure 8-7: Protected Areas and National Protected Areas Expansion Strategy (NPAES)

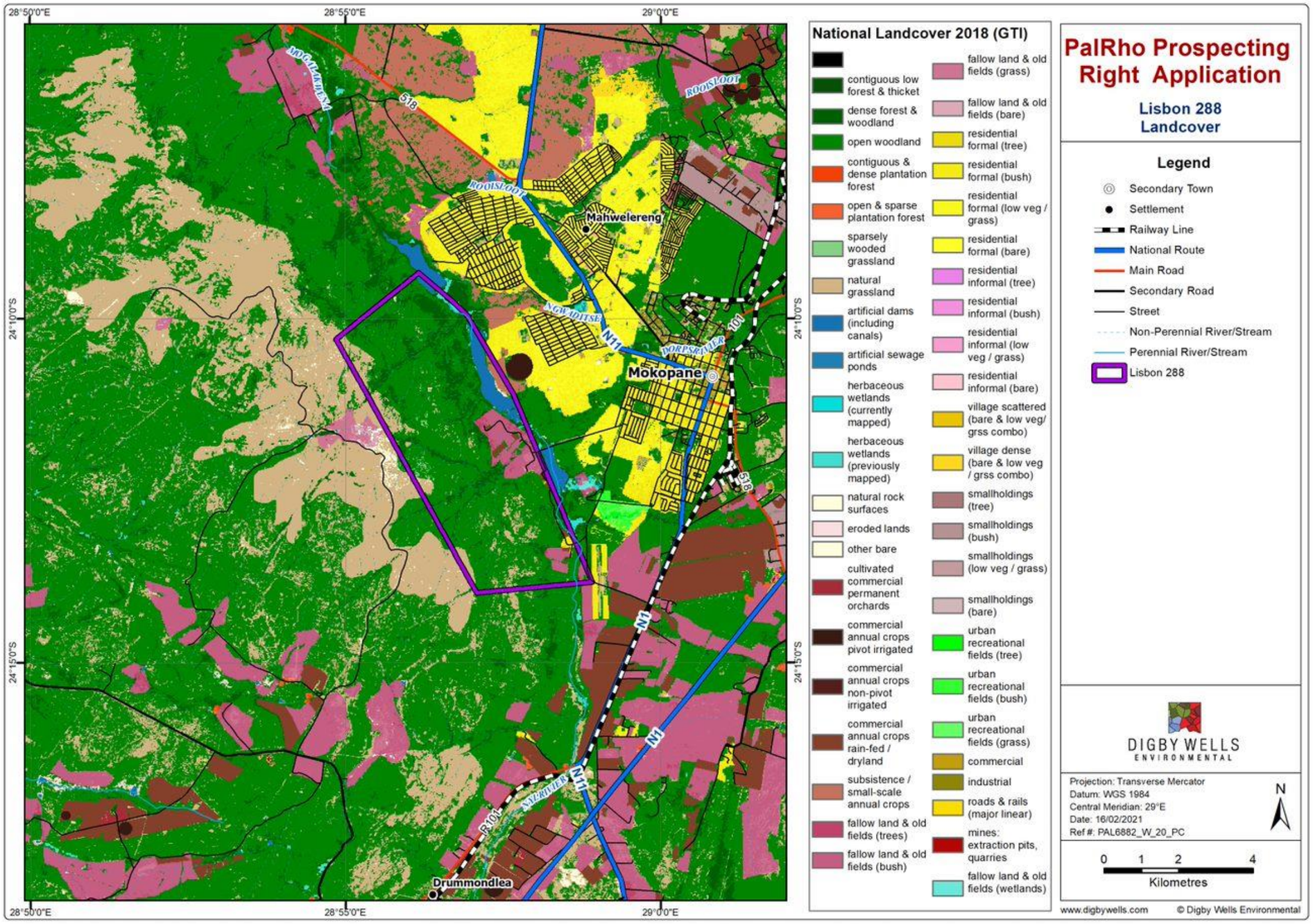

Figure 8-8: Land Cover

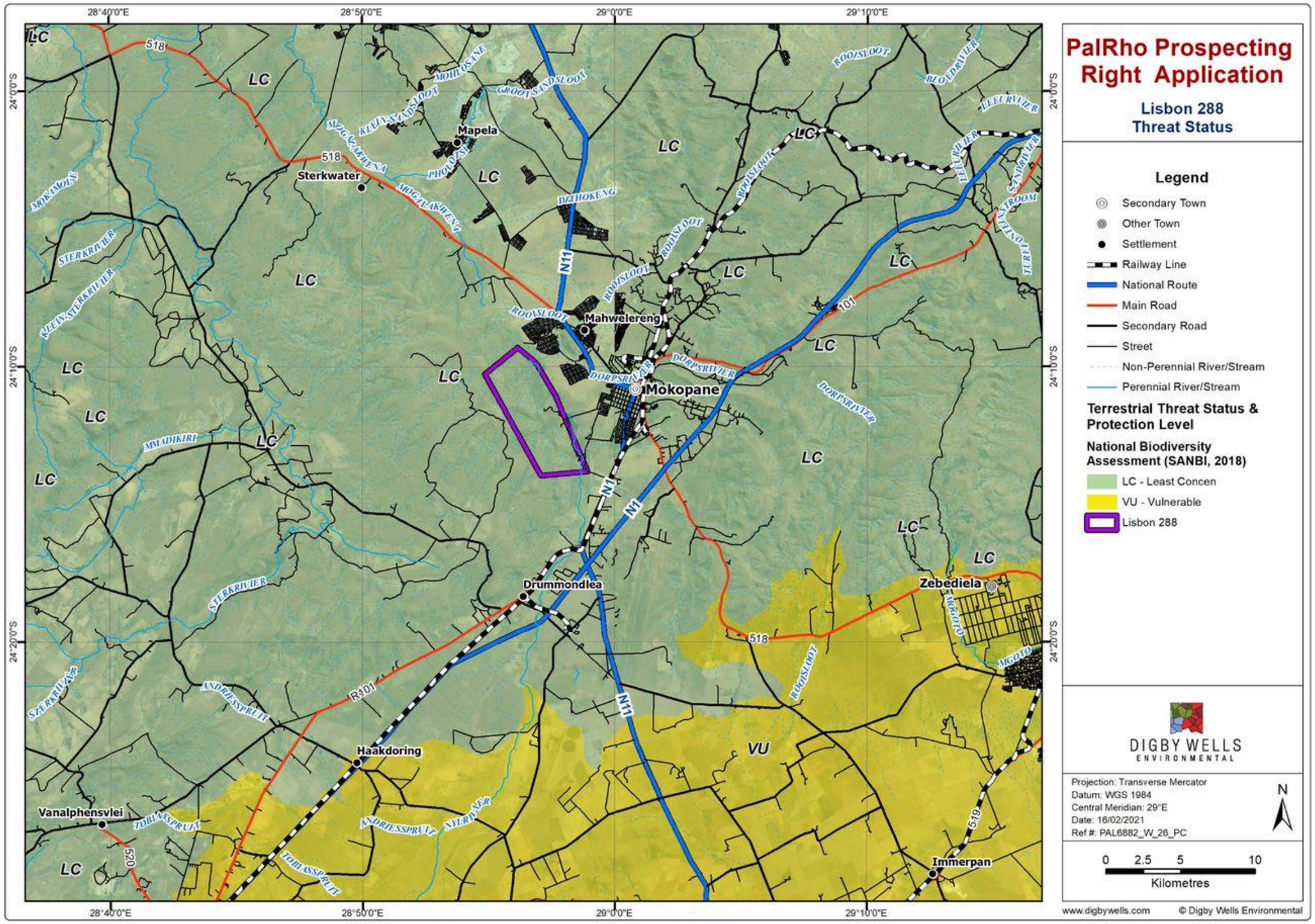

Figure 8-9: National Biodiversity Assessment (NBA) Terrestrial Threat Status and Protection Level

9. Biodiversity Screening Assessment Findings

9.1. Wetlands

The accepted methodology from the Department of Water and Sanitation (DWS) (Department of Water Affairs and Forestry, 2005) as well as the "Updated manual for identification and delineation of wetlands and riparian areas" (Department of Water Affairs and Forestry, 2008) states the four wetland indicators as Soil Wetness Indicators (SWI), Soil Form indicator (SFI), Vegetation and Terrain Unit Indicator (TUI). The wetland delineations were solely based on the TUI.

Terrain indicators help to identify areas in the landscape where wetlands are more likely to occur. The topography is typically the physical characteristics of an area with a variation of soils against the slope, each with its own characteristics because of its relative position in the landscape and terrain.

The topography of the Project Area is of the Highveld Lower Ecoregion with gentle, rolling grassland slopes and many valley systems. Detailed imagery and contours, allows the geomorphic setting of the wetland and catchments to be understood and the HGM to be determined. Terrain indicators are important for understanding the specific functionality of the wetland and determining the potential risks from anthropological activities on the wetland.

The topography of the Project Area consist of steep slopes on the west of the Floodplain, with ridges associated with these systems.

Based solely on any available contour data and high-resolution aerial imagery, the freshwater resources within the vicinity of the proposed project were delineated into the following hydrogeomorphic (HGM) units:

- Hillslope seepage wetlands connected to a watercourse (HS);
- Valley bottom wetlands with a channel (CVB);
- Valley bottom wetlands without a channel (UVB); and
- Floodplain.

Figure 9-1 illustrates the wetland delineations for the Project Area. The wetlands cover approximately 977.14 hectares (ha) which amounts to 38.4% of the total 2543.1 ha Project Area. The breakdown of the wetland types area is detailed in Table 9-1.

Table 9-1: Wetland HGM Units of the Project Area

HGM Unit	Area (ha)
Hillslope seepage wetlands connected to a watercourse (HS)	36.12
Valley bottom wetlands with a channel (CVB);	345.73
Valley bottom wetlands without a channel (UVB)	164.63
Floodplain	430.67
Total Wetlands (ha)	**977.14**

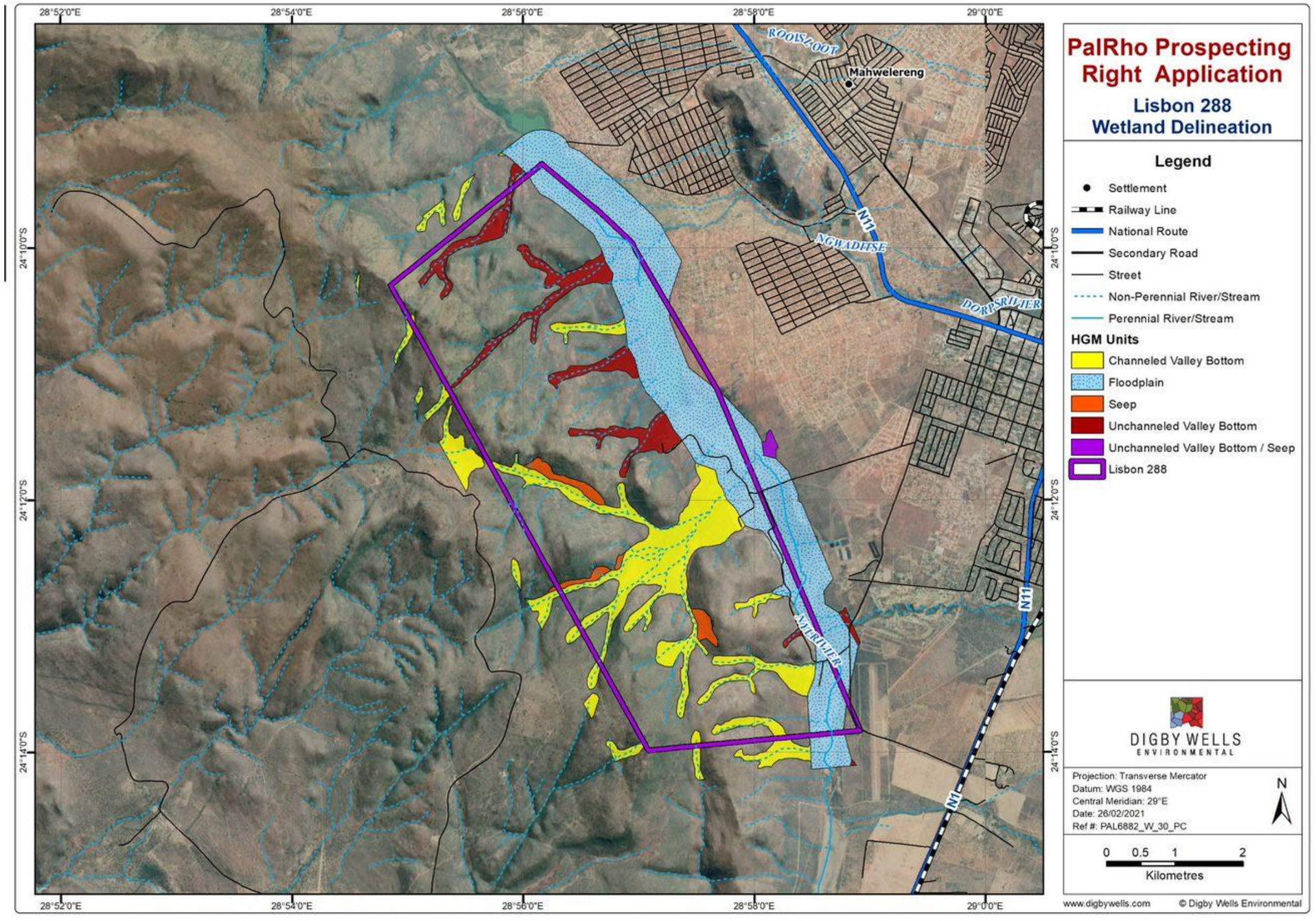

Figure 9-1: Wetland Delineation of Lisbon 288KR

9.2. Aquatic Ecology

The following sections aim to outline the biodiversity within the aquatic ecosystems associated with the proposed prospecting area. The presence of species of potential conservation importance and sensitive taxa was also identified.

9.2.1. Associated Aquatic Ecosystems

The proposed prospecting area is largely associated with the Mogalakwena River, specifically Sub-quaternary Reach (SQR) SQR A61G-00353, with a small portion of the area within the upper reaches of the A61F-000333 SQR and lower reaches encompassing a portion of the Nyl River (SQR A61E-00386). In addition, a small portion of the eastern boundary of the prospecting area intersects the Rooisloot River (i.e. SQR A61F00276).

9.2.1.1. Desktop Information

According to the gathered Present Ecological State (PES), Ecological Importance (EI) and Ecological Sensitivity (ES) for the associated river ecosystems (DWS, 2014), all systems are considered to be in a largely modified state (Ecological Category D) and of Moderate EI and ES (Table 9-2).

Table 9-2: PESEIS Information for the Considered Aquatic Ecosystems

Component	Mogalakwena River (SQRs A61F-00353 & A61F-00333)	Nyl River (A61E-00386SQR)
Present Ecological Status	**D**	**D**
Ecological Importance	Moderate	Moderate
Ecological Sensitivity	Moderate	Moderate
SQR Length (km)	4.48 & 13.90 respectively	33.49

The gathered information further highlights existing impacts contributing to the modified conditions of the rivers in the form of water quality, agricultural encroachment, bed and channel disturbance, sedimentation, abstraction, dam construction, erosion, alien vegetation encroachment, overgrazing/trampling, urban runoff and vegetation removal.

Important and taxa with relative sensitives are expected within the considered rivers (discussed in further detail below). However, due to the mostly dry nature of the project area, especially the Mogalakwena River (DWS, 2014), the probability of occurrence of said taxa is expected to be low, hence the Moderate EI and ES classifications.

9.2.2. Expected Aquatic Biodiversity

Focus was paid on the potential macroinvertebrate and ichthyofaunal compositions within the Mogalakwena River as part of the assessed/considered aquatic biodiversity.

With the inclusion of the Nyl River section, a total of 40 macroinvertebrate taxa are expected to be present within the considered aquatic ecosystems (DWS, 2014) (Table 9-3).

Table 9-3: Expected Macroinvertebrate Taxa in the Considered Aquatic Ecosystems

Family names		
Turbellaria	Belostomatidae	Haliplidae
Oligochaeta	Corixidae	Hydrophilidae
Hirudinea	Gerridae	Ceratopogonidae
Potamonautidae	Hydrometridae	Chironomidae
Atyidae	Naucoridae	Culicidae
Hydracarina	Nepidae	Dixidae
Baetidae	Notonectidae	Muscidae
Caenidae	Pleidae	Tabanidae
Chlorocyphidae	Veliidae	Tipulidae
Chlorolestidae	Leptoceridae	Lymnaeidae
Ceonagrionidae	Dytiscidae	Physidae
Aeshnidae	Elmidae	Planorbinae
Gomphidae	Gyrinidae	Thiaridae
Libellulidae		

According to the expected macroinvertebrate list, only a single taxa (Elmidae) with a preference/dependence on high flow velocities (> 0.6 m^3) is expected to occur within the aquatic ecosystems. No taxa that highly sensitive to physio-chemical (i.e. water quality) modifications are expected within the river. However, some taxa such as Atyidae, Hydracarina, Chlorocyphidae, Chlorolestidae, Aeshnidae, Elmidae and Dixidae are classified as moderately intolerant to water quality deterioration/changes.

In addition, and according to the gathered desktop information (DWS, 2014), a total of 14 fish species are expected within the considered Mogalakwena and Nyl reaches (Table 9-4). Each species sensitivity ratings towards physio-chemical and no-flow conditions have been provided for together with their conservation status according to the IUCN List of Threatened Species.

Table 9-4: Expected Fish Species in the Considered Aquatic Ecosystems

Fish Species	Common Name	Tolerance (1-2=tolerant; 2-3= moderately tolerant; >3-4 moderately intolerant; >4: intolerant)		Conservation Status
		Physio-chemical	No-flow	
Chetia flaviventris	Canary Kurper	2.0	1.3	LC
Clarias gariepinus	African Catfish	1.0	1.7	LC
Engraulicypris brevianalis	River Sardine	2.8	2.5	LC
Barbus bifrenatus	Hyphen Barb	3.0	1.1	LC
Enteromius paludinosus	Straightfin Barb	1.8	2.3	LC
Enteromius trimaculatus	Threespot Barb	1.8	2.7	LC
Enteromius unitaeniatus	Longbeard Barb	2.2	2.3	LC
Enteromius viviparus	Bowstripe Barb	3.0	2.3	LC
Labeobarbus marequensis	Lowveld Largescale Yellowfish	2.9	3.3	LC
Micropanchax johnstoni	Johnston's Topminnow	3.8	1.5	LC
Oreochromis mossambicus	Mozambique Tilapia	1.3	0.9	VU
Pseudocrenilabrus philander	Southern Mouthbrooder	1.4	1.0	LC
Tilapia rendalli	Red-breasted Tilapia	2.1	1.8	LC
Tilapia sparrmanii	Banded Tilapia	1.4	0.9	LC
LC=Least Concern; VU=Vulnerable				

Of the expected fish species, only a single species is moderately intolerant to physio-chemical modifications (i.e. *Micropanchax johnstoni*) and a single species moderately intolerant to no-flow conditions (i.e. *Labeobarbus marequensis*). Based on specialist experience within the project area, it is unlikely that all of these species are currently present within the considered aquatic ecosystems, especially in light of the non-perennial nature of the river compounded by the severe pollution sources observed from the associated urban areas.

On the contrary, a single species of conservation concern classified as Vulnerable (i.e. *Oreochromis mossambicus*) is expected within the systems and is known to be present within the lower portion of the Mogalakwena. This species and some of the other species of low probability of occurrence, such as *Micropanchax johnstoni* and *Labeobarbus marequensis*, have the potential to be utilising the large dams within the river as refuge areas from the dry conditions. However, ground truthing will be needed to accurately determine this.

9.3. Terrestrial Biodiversity

This section outlines the receiving terrestrial (fauna and flora) environment and highlights any sensitivities that may occur within the Project Area and its' surroundings. The proposed Project Areas lie within two Quarter Degree Square (QDS) 2428BB and 2428BD. Based on the following desktop findings below and due to the potential occurrence of Species of Conservation Concern (SCC), a pre-screening survey is recommended to locate such species and identify sensitive habitats that may support potentially threatened species.

9.3.1. Flora

9.3.1.1. Regional Vegetation

As described by Mucina & Rutherford (2012), the Lisbon 288KR Project Area falls within the Makhado Sweet Bushveld (SVcb 20), Waterberg Mountain Bushveld (SVcb 17) and Waterberg Magaliesberg Summit Sourveld (Gm 29) vegetation types. The vegetation types fall within two of the nine South African plant Biomes, namely the Savanna and Grassland. The Grassland Biome is situated primarily on the central plateau of South Africa, and the inland areas on Kwa-Zulu Natal and the Eastern Cape provinces. This biome is rich in fauna and flora but is under threat due to agricultural activities, expansion of mining and industrial activities. The Savanna Biome predominates in the northern regions of South Africa and almost encompasses the entire Grassland Biome.

Makhado Sweet Bushveld

It occurs on the plains south of the Soutpansberg, east of the Waterberg and on the apron surrounding the Blouberg and Lerataupje Mountains and extends into the Polokwane Plateau with an altitude of 850-1 200m. The landscape and vegetation are characterised by short and shrubby bushveld with a poorly developed grass layer. The conservation status is considered Vulnerable with only around 1 % statutorily conserved, mainly in the Bellevue Nature Reserve. Approximately 27% of the vegetation type has been transformed, primarily due to cultivation and urbanisation. The southwestern half of the unit has densely populated rural communities.

Waterberg Mountain Bushveld

This bushveld expands across the Waterberg Mountains and stretches to the north of Bela-Bela and west of Mokopane. The altitude sits at around 1 000-1 600m, which is slightly lower than the Waterberg-Magaliesberg Summit Sourveld (Gm 29). The rugged mountains are tasselled with vegetation such as *Faurea saligna* and *Protea caffra* on the higher slopes that grades into the Gm 29. The transition occurs through the broad-leaved deciduous bushveld

(*Diplorhynchus condylocarpon*) on rocky footslopes to *Burkea Africana-Terminalia sericea* in the lower-lying valleys. The grass layer is moderately well developed. The conservation status is Least Threatened.

Waterberg-Magaliesberg Summit Sourveld

This sourveld can be observed in isolated patches on the summits of the Waterberg with altitudes reaching up to 2 088m. the landscape features include summit positions such as crests with steep rocky scarps covered with wiry tussock grasslands. Patches of open *Protea caffra* savannoid vegetation and open shrubland *Englerophytum magalismontanum* are typical of this sourveld. Summits are characterised by high spatial heterogeneity influencing the soil profile, drainage and hydrological conditions. The varying aspects are generally associated as important predictors in biodiversity. The conservation status is listed as Least Threatened.

All list of floral species characterised by the discussed vegetation types is represented in Table 8-1. The location of the vegetation types in relation to the Project Areas is depicted in Figure 8-1.

9.3.2. Fauna

This section will cover various groups of animals including mammals, birds, reptiles, amphibians and invertebrates.

9.3.2.1. Mammals

Mammals form a vital component of ecosystems. Not only are they important for nutrient cycling, habitat modification, consumers of plants and seed dispersal but they're also a considerable component of predators in healthy ecosystems. Mammals expected to occur are listed in Appendix B.

9.3.2.2. Birds

Birds have been viewed as good ecological indicators, since their presence or absence tends to represent conditions pertaining to the proper functioning of an ecosystem. Bird communities and ecological condition are linked to land cover. As the land cover of an area changes, so do the types of birds in that area. Land cover is directly linked to habitats within the project area. The diversity of these habitats should support many different species.

According to the South African Bird Atlas Project (SABAP2), almost 290 species of birds have been identified in the designated QDS (see Appendix B).

9.3.2.3. Reptiles

Reptiles are ectothermic (cold-blooded) meaning their internal basal temperature is influenced by their surrounding external environment, as a result, reptiles are dependent on environmental heat sources. Thus, many reptiles regulate their body temperatures by basking in the sun, or warmer surfaces (or substrates). Substrates are an important determining factor for identifying which habitats are suitable for which species of reptile. Rocky outcrops and

suitable woody vegetation would increase habitat and intern diversity of reptiles within the Project Area. Reptiles expected to occur on site are listed in Appendix B.

9.3.2.4. Amphibians

Amphibians are viewed to be good indicators of changes to the whole ecosystem as they are sensitive to changes in the aquatic and terrestrial environments (Waddle, 2006). Most species of amphibians are dependent on the aquatic environment for reproduction. Additionally, amphibians are sensitive to water quality and ultraviolet radiation because of their permeable skin (Gerlanc, 2005).

18 species of amphibian have previously been recorded and are list in Appendix B.

9.3.2.5. Invertebrates

Butterflies are a good indication of the various habitats available in a specific area (Woodhall, 2005). Although many species are eurytropes (able to use a wide range of habitats) and are widespread and common, South Africa has many stenotrope (specific habitat requirements with populations concentrated in a small area) species which may be very specialised (Woodhall, 2005). Butterflies are useful indicators as they are relatively easy to locate and catch, and to identify. A list of expected and previously recorded Lepidoptera species within the Project Areas QDS is listed in Appendix B.

10. Sensitivity Analysis

10.1. Wetlands

Figure 10-1 illustrates that 8 of the 10 proposed drilling locations are located within desktop delineated wetlands, whereas the remaining 2 drilling locations are proposed to be within the 100 m and/ or 500 m zone of regulation. A Channelled Valley Bottom NFEPA Wetland (Rank 6) is also located within the Project Area (Figure 8-4). Therefore, as per Section 21 (c) and (i) of the Nation Water Act, 1998 (Act No. 36 of 1998) (NWA), the activities will require a full Water Use Licence (WUL) application or a General Notice (GN) application, depending on the outcome of the DWS risk assessment.

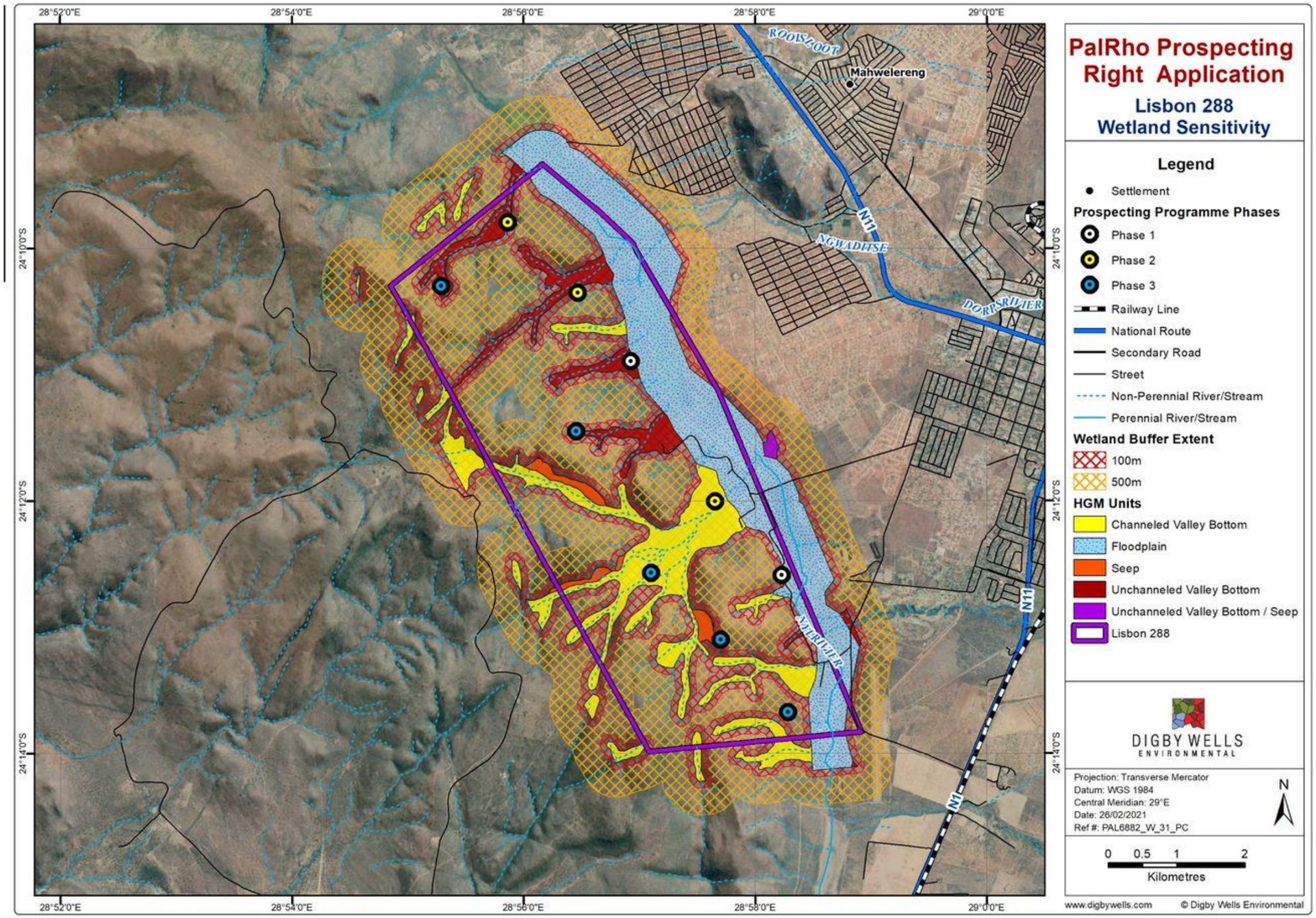

Figure 10-1: Wetland Sensitivity of Lisbon 288KR

10.2. Aquatics

Some species of varying sensitivities and habitat preferences are expected within the systems, including macroinvertebrate taxa moderately intolerant to water quality modifications and no-flow conditions, and a single fish species moderately intolerant to water quality modifications (i.e. *Micropanchax johnstoni*) and a single fish species moderately intolerant to no-flow conditions (i.e. *Labeobarbus marequensis*).

In addition, the Vulnerable fish species *Oreochromis mossambicus* is expected to occur within the considered aquatic ecosystems. Its presence is extant within the lower Mogalakwena River based on specialist experience within the project area.

10.3. Terrestrial Biodiversity

10.3.1. Flora Species of Conservation Concern

10.3.1.1. IUCN Red Data Species

The proposed Project Areas lie within two QDS 2428BB and 2428BD. According to PRECIS two Red Data listed species are expected to be present within the identified QDS and are listed in Table 10-1 with their respective status. A full list of expected plant species to occur is listed in Appendix B.

Table 10-1: Potentially Occurring Floral SCC

Family	Species Name	Conservation Status	
		SANBI Red List	Provincial[1]
Crassulaceae	*Kalanchoe longiflora*	VU (Criteria D2[2])	Not listed
Poaceae	*Oryza longistaminata*	VU (Criteria D2[1])	Not Listed

VU = Vulnerable

10.3.1.2. Protected Flora

The Plants of South Africa (NEWPOSA) species list was obtained from the South African National Biodiversity Institute (SANBI) (https://posa.sanbi.org/), it lists all the Red Data plant species officially recorded by SANBI for South African QDS grid. In order for a flora species to be included in this list, a specimen collected in this grid must be supplied to SANBI to be verified and recorded. This list is therefore not a comprehensive list representing only those species that may occur in the aforementioned grids, but rather a guideline as to what is to be expected. Generally, the sites sampled are small portions of the whole grid and habitats

[1] Limpopo Environmental Management Act (No. 7 of 2003)

[2] Criterion D: critically small population size or very restricted distribution

suitable for certain species. It is therefore not unusual for species in the POSA list to be absent from the sampling sites.

The flora species list obtained from the NEWPOSA indicate that two species are classified as Vulnerable (VU), might occur within in the Project Area. The species are considered Species of Conservation Concern (SCC) and are listed in Table 10-1 above.

10.3.2. Fauna Species of Conservation Concern

10.3.2.1. Mammals

Mammals expected to occur are listed in Appendix B. It has been noted that four of these potentially occurring species have been assigned a Red Data status. The protected species are tabulated below in Table 10-2 with their assigned SANBI Red List, Threatened or Protected Species (TOPS) (DEA, 2007), and Provincial Legislation (Limpopo Environmental Management Act (No. 7 of 2003) conservation statuses.

Table 10-2: Potentially Occurring Mammal SCC

Family	Species Name	Common Name	SANBI Red List (2016)	TOPS (2007)	Provincial
Felidae	*Leptailurus serval*	Serval	Near Threatened	Protected	Schedule 3
Felidae	*Panthera pardus*	Leopard	Vulnerable	Vulnerable	Schedule 3
Hyaenidae	*Hyaena brunnea*	Brown Hyena	Near Threatened	Protected	Schedule 3
Rhinolophidae	*Rhinolophus smithersi*	Smithers' Horseshoe Bat	Near Threatened	None	Not Listed

VU = Vulnerable, NT = Near Threatened

10.3.2.2. Birds

According to SABAP2, almost 290 species of birds have been identified in the designated QDS (see Appendix B). Of these species, seven have been assigned a Red Data status (Taylor MR, 2015) and are listed in Table 10-3 below.

Table 10-3: Potentially Occurring Bird SCC

Common Name	Species Name	NEMBA	Provincial
Verreaux's Eagle	*Aquila verreauxii*	VU	Schedule 8
Greater Flamingo	*Phoenicopterus ruber*	NT	Schedule 8
European Roller	*Coracias garrulus*	NT	Schedule 8
Secretarybird	*Sagittarius serpentarius*	VU	Schedule 8

Marabou Stork	*Leptoptilos crumeniferus*	NT	Schedule 8
Saddle-billed Stork	*Ephippiorhynchus senegalensis*	EN	Schedule 8
Yellow-billed Stork	*Mycteria ibis*	EN	Schedule 8

EN = Endangered, VU = Vulnerable, NT = Near Threatened

10.3.2.3. Reptiles

Reptiles expected to occur on site are listed in Appendix B. Of these species one has been assigned a Red Data status, namely the Northern Crag Lizard (*Pseudocorylus transvaalensis*). This lizard is listed as Near Threatened by the South African Reptile Conservation Association (SARCA, 2014) and Least Concern (Declining population) by SANBI Red List of South African Species (http://speciesstatus.sanbi.org/). This species is endemic to the Limpopo Province and has three allopatric (geographically isolated) subpopulations in: Thabazimbi, Mokopane and Woodbush/Haenertsburg area (Tolley, 2017). The rationale behind the conservation assessment for this species is due to the impacts of urbanisation and afforestation to the three isolated subpopulations, leading to its decline in numbers.

10.3.2.4. Amphibians

No Red Data listed amphibians have previously been recorded within the Project Areas' identified QDS. However, 18 species of amphibian have previously been recorded and are list in Appendix B.

10.3.2.5. Invertebrates

Lepidoptera (moths and butterflies) was used as the primary focus for invertebrate surveys. A Rear-horned Baboon Spider (*Ceratogyrus darlingi*) (Family Theraphosidae) was previously recorded with the Project Areas QDS. In South Africa, Theraphosidae species are the most threatened spiders, as they are targeted for the pet trade (SANBI, 2010). Therefore, all species of the Theraphosidae family are a TOPS listed species and are protected in South Africa. A list of expected and previously recorded Lepidoptera species within the Project Areas QDS is listed in Appendix B.

10.3.2.6. Overall Sensitivity Assessment

It is important to allow for detailed conservation planning to meet biodiversity targets in South Africa's variety of ecosystems. Guidelines are essential to consult for development projects, and form part of the sensitivity analysis. Areas reserved for meeting conservation and biodiversity targets should not be developed, and therefore hold a high sensitivity value. In addition, sensitivity analysis in the field based on much finer scale data can be used to verify the larger scale assessments and put it into a more localised context.

Protected Areas

Several designated NPAES (Department of Environmental Affairs, 2016) and SAPAD (2020) protected areas are within close proximity to the Project Area (Figure 8-7). Most notably, the Doorndraai Nature Reserve, a formally protected area (Department of Environmental Affairs, 2016) is situated approximately 11 km east of the Project Area. The 7 000 ha nature reserve boasts a wide variety of woodland, savanna, riverine and grassland habitats. The diverse range of habitats supports numerous faunal species such as Tsessebe, Sable Antelope, Mountain Reedbuck, Kudu, Bushbuck, Blue Wildebeest, Leopard, Aardvark, Brown Hyena, African Wild Cat, Black-footed Cat and Honey Badger.

Other formally protected areas within close proximity to the Project Areas include Witvinger, Entabeni and the Percy Fyfe Nature Reserves. Adjacent to the Project Areas, situated directly east, lies a conglomerate of Fossil Hominid Sites. Protected areas known in South Africa as the Cradle of Humankind, the region of Sterkfontein, Swartkrans, Kromdraai and environs has one of the world's richest concentrations of hominid fossils, evidence of human evolution over the last 3.5-million years and declared a UNESCO World Heritage Site.

11. Potential Impacts

The potential impacts to the biodiversity are described in Table 11-1 below.

Table 11-1: Potential Impacts to the Biodiversity of Lisbon

Activities	Potential Impacts	Mitigation Type	Prior to Mitigation
The establishment of temporary access route / tracks which will make use of the shortest distance from an existing road	• Fragmentation of the wetland resources as a result of road crossings; • Contamination of wetland resources; • Impacts to water quality as a result of spills; • Compaction of soils; • Loss of habitat and biodiversity; • Increased potential for sheet runoff from paved/cleared surfaces; and • Increased potential for erosion.	• Control through design, management, maintenance and mitigation; • Remedy through concurrent rehabilitation and monitoring; and • Remediate using commercially available emergency clean up kits.	Medium
The clearing of vegetation for the drill rig	• Habitat fragmentation; • Spread of alien and invasive species; • Soil disturbance and/or compaction; • Increased incidence of erosion; • Sedimentation from erosion;	• Control through design, management, maintenance and mitigation; and • Remedy through concurrent rehabilitation and monitoring.	High

Activities	Potential Impacts	Mitigation Type	Prior to Mitigation
	• Potential water quality deterioration; and • Disturbance to avifauna and other fauna utilising the freshwater resources thus resulting in an overall loss of biodiversity.		
The establishment of three sumps / trenches to separate and store oil, sludge and water	• Soil and water contamination; • Loss of wetland habitat; • Potential habitat fragmentation; • Increased erosion potential; • Potential impacts as a result of sedimentation; • Loss of water supply; • Impacts to natural flow regimes; • Potential loss of water quality further downstream; • Loss of biodiversity; • Alterations to natural river channels; and • Alterations to water distribution and volume.	• Control through design, management, maintenance and mitigation; • Remedy through concurrent rehabilitation and monitoring; and • Remediate using commercially available emergency clean up kits.	High
Rehabilitation following the prospecting activities	• Improper infilling and profiling, resulting in the creation of preferential flow paths and thus increasing the potential for erosion; • Improper rehabilitation of compacted soils, resulting in poor vegetation cover; and • Increased potential for the spread; and establishment of alien and invasive species.	• Control through design, management, maintenance and mitigation; • Remedy through concurrent rehabilitation and monitoring; and • Remediate using commercially available emergency clean up kits.	Medium
Rehabilitation Process	• Erosion onset; • Sedimentation; and • Establishment of alien plants.	• Control through design, management, maintenance and mitigation; • Remedy through concurrent rehabilitation and monitoring; and • Remediate using commercially available emergency clean up kits.	Low

12. Conclusion and Recommendations

Wetlands

Based solely on any available contour data and high-resolution aerial imagery, the freshwater resources within the vicinity of the proposed project were delineated into hillslope seepage wetlands connected to a watercourse, valley bottom wetlands with a channel, valley bottom wetlands without a channel and a floodplain.

All 10 of the proposed drilling locations are located within desktop delineated wetlands, and or within the 100 m and 500 m zone of regulations. A CVB, NFEPA Wetland (Rank 6) is also located within the Project Area. Therefore, as per Section 21 (c) and (i) of the Act 36 of 1998, the listed activities will require a full WUL application or a GN application, depending on the outcome of the DWS risk assessment.

It is therefore recommended to conduct a risk assessment (including a site visit confirming the wetland delineations and impacts) to identify the possible risks to these wetlands and to confirm whether a WULA or a GA is applicable to the Lisbon Project

Aquatics

Based on the gathered desktop information, the considered aquatic ecosystems appear to be in a largely modified state (Ecological Category D) (DWS, 2014). The EI and ES of all systems are further classified as Moderate due to the presence of mostly common aquatic biota that are largely tolerant.

Some species of varying sensitivities and habitat preferences are expected within the systems, including aquatic macroinvertebrate taxa moderately intolerant to water quality modifications and no-flow conditions, and a single fish species moderately intolerant to water quality modifications (i.e. *Micropanchax johnstoni*) and a single fish species moderately intolerant to no-flow conditions (i.e. *Labeobarbus marequensis*).

In addition, the Vulnerable fish species *Oreochromis mossambicus* is expected to occur within the considered aquatic ecosystems. Its presence is extant within the lower Mogalakwena River based on specialist experience within the project area. However, ground-truthing is recommended to confirm its presence, as well as the presence of the aforementioned moderately intolerant taxa, within the direct proposed prospecting area.

Terrestrial Biodiversity

Due to the location of the CBA 1, proximity of the Protected Areas, potential occurrence of certain SCC and numerous wetlands within the Project Area, an assessment will need to be conducted due to potential impacts such as habitat loss, habitat fragmentation, AIP proliferation and loss of faunal and floral SCC.

Field verification will focus on the proposed drilling locations, where impacts are expected to be greatest. It is therefore recommended to conduct an impact assessment to assess the expected losses of vegetation and flora along with associated faunal habitats. In combination

with and as part of the EIA the Mining and Biodiversity Guidelines 2013 and LCP v2 will be considered.

A strategic environmental management plan for the area should be developed and adhered to. This should include the conservation of CBAs and sensitive areas (identified during upcoming fieldwork) as well as provision of corridors for faunal migration.

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Appendix A: Methodology

METHODOLOGY

Literature Review

Relevant literature was reviewed with respect to the biodiversity associated with the Project Area. This was completed to obtain relevant information on the wetland, freshwater and fauna and flora ecology of the Project Area and its vicinity to acquire enough information to compile a Biodiversity Screening Assessment Report.

For the purpose of this assessment, wetland areas were identified, and preliminary wetland boundaries were delineated at the desktop level using detailed aerial imagery and wetland signatures, along with 5 m contours. Baseline and background information were researched and used to understand the area on a desktop level prior to fieldwork confirmation. This included but was not limited to:

- A practical field procedure for the identification and delineation of wetlands and riparian areas (Department of Water Affairs and Forestry, 2005);
- WET-RoadMap: A Guide to the Wetland Management Series (WRC, 2007);
- National Freshwater Ecological Priority Areas (NFEPA) (Driver, et al., 2011; Nel, et al., 2011);
- Mining and Biodiversity Guidelines, DEA et al. (2013);
- Limpopo Conservation Plan (Desmet, Holness, Skowno, & Egan, 2013);
- National Protected Area Expansion Strategy (NPAES) (Department of Environmental Affairs, 2016);
- National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity (SANBI, 2018); and
- South African Protected Areas Database (SAPAD, 2020).

Relevant and available historical studies conducted within, or surrounding the Project Area, the South African National Biodiversity Institute (SANBI), Water Management Areas (WMA) and Quaternary Catchments, the National Spatial Biodiversity Assessment, Vegetation types of South Africa (Mucina & Rutherford, 2012) and Fauna distribution and identification books of South Africa (Friedman & Daly, 2004; Skinner & Chimimba, 2005) were some of the platforms used to identify and create a background study of the area.

- ### National Freshwater Ecosystem Priority Areas

The NFEPA Project provides a collated, nationally consistent information source of wetland and river ecosystems for incorporating freshwater ecosystem and biodiversity goals into planning and decision-making processes (Nel, et al., 2011). The spatial layers (FEPAs) include the nationally delineated wetland areas that are classified into Hydro-geomorphic

(HGM) units and ranked in terms of their biodiversity importance. These layers were assessed to evaluate the importance of the wetlands.

The NFEPA Project represents a multi-partner Project between the CSIR, SANBI, WRC, DWS, DEA, WWF, SAIAB and SANParks. The NFEPA Project provides a collated, nationally consistent information source of wetland and river ecosystems for incorporating freshwater ecosystem and biodiversity goals into planning and decision-making processes (Nel, et al., 2011).

More specifically, the NFEPA Project aims to:

1. Identify FEPAs to meet national biodiversity goals for freshwater ecosystems; and
2. Develop a basis for enabling effective implementation of measures to protect FEPAs, including free-flowing rivers.

The first aim uses systematic biodiversity planning to identify priorities for conserving South Africa's freshwater biodiversity within the context of equitable social and economic development. The second aim is comprised of two separate components: the (i) national component aimed to align DWS and DEA policy mechanisms and tools for managing and conserving freshwater ecosystems, while the (ii) sub-national component is aimed to use three case studies to demonstrate how NFEPA products should be implemented to influence land and water resource decision-making processes. The Project further aimed to maximize synergies and alignment with other national level initiatives, including the National Biodiversity Assessment (NBA) and the Cross-Sector Policy Objectives for Inland Water Conservation (Driver, et al., 2011).

Based on a desktop-based modelled wetland condition and a combination of special features, including expert knowledge (e.g. intact peat wetlands, presence of rare plants and animals, etc.) and available spatial data on the occurrence of threatened frogs and wetland-dependent birds, each of the wetlands within the inventory were ranked in terms of their biodiversity importance and as such, Wetland FEPAs were identified in an effort to achieve biodiversity targets (Driver, et al., 2011). Table 1 below indicates the criteria that were considered for the ranking of each of these wetland areas. Whilst being a valuable tool, it is important to note that the FEPAs were delineated and studied at a desktop and relatively low-resolution level. Thus, the wetlands delineated via the desktop delineations and ground-truthing work done through this study may differ from the NFEPA data layers. The NFEPA assessment does, however, hold significance from a national perspective.

Table 1: NFEPA Wetland Classification Ranking Criteria (Nel et al., 2011)

Criteria	Rank
Wetlands that intersect with a Ramsar site.	1
• Wetlands within 500 m of an International Union for Conservation of Nature (IUCN) threatened frog point locality; • Wetlands within 500 m of a threatened water-bird point locality; • Wetlands (excluding dams) with most of their area within a sub-quaternary catchment that has sightings or breeding areas for threatened Wattled Cranes, Grey Crowned Cranes and Blue Cranes; • Wetlands (excluding dams) within a sub-quaternary catchment identified by experts at the regional review workshops as containing wetlands of exceptional Biodiversity importance, with valid reasons documented; and • Wetlands (excluding dams) within a sub-quaternary catchment identified by experts at the regional review workshops as containing wetlands that are good, intact examples from which to choose.	2
Wetlands (excluding dams) within a sub-quaternary catchment identified by experts at the regional review workshops as containing wetlands of biodiversity importance, but with no valid reasons documented.	3
Wetlands (excluding dams) in A or B condition AND associated with more than three other wetlands (both riverine and non-riverine wetlands were assessed for this criterion); and Wetlands in C condition AND associated with more than three other wetlands (both riverine and non-riverine wetlands were assessed for this criterion).	4
Wetlands (excluding dams) within a sub-quaternary catchment identified by experts at the regional review workshops as containing Impacted Working for Wetland sites.	5
Any other wetland (excluding dams).	6

- ## Limpopo Conservation Plan

The Limpopo Conservation Plan develops the spatial component of a bioregional plan (i.e. map of Critical Biodiversity Areas and associated land-use guidelines) (Desmet, Holness, Skowno, & Egan, 2013). Bioregional plans are one of a range of tools provided for in the Biodiversity Act that can be used to facilitate biodiversity conservation in priority areas outside the protected area network. The purpose of a bioregional plan is to inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity (Desmet, Holness, Skowno, & Egan, 2013).

The publication includes terrestrial and freshwater biodiversity areas that are mapped and classified in Protected Areas (PAs), Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs) or Other Natural Areas (ONAs) (Table 2).

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Table 2: Limpopo Conservation Plan Categories (Desmet, Holness, Skowno, & Egan, 2013)

Map Category	Definition	Land Management Objectives
PA	Formal Protected Areas and Protected Areas pending declaration under the National Environmental Management: Protected Areas Act (NEM:PAA).	Maintain in a natural state with limited or no biodiversity loss. Rehabilitate degraded areas to a natural or near natural state, and manage for no further degradation. Development subject to Protected Area objectives and zoning in a NEMPAA compliant and approved management plan.
CBA 1	Irreplaceable Sites. Areas required to meet biodiversity pattern and/or ecological processes targets. No alternative sites are available to meet targets.	Maintain In a natural state with limited or no biodiversity loss. Rehabilitate degraded areas to a natural or near natural state, and manage for no further degradation.
CBA 2	Best design selected sites. Areas selected to meet biodiversity pattern and/or ecological process targets. Alternative sites may be available to meet targets.	Maintain in a natural state with limited or no biodiversity loss. Maintain current agricultural activities. Ensure that land use is not intensified and that activities are managed to minimize impact on threatened species.
ESA 1	Natural, near natural and degraded areas supporting CBAs by maintaining ecological processes.	Maintain ecosystem functionality and connectivity allowing for limited loss of biodiversity pattern.
ESA 2	Areas with no natural habitat that is important for supporting ecological processes.	Avoid additional/new impacts on ecological processes.
ONA	Natural and intact but not required to meet targets, or identified as CBA or ESA.	No management objectives, land management recommendations or land-use guidelines are prescribed. These areas are nevertheless subject to all applicable town and regional planning guidelines and policy.
No Natural Habitat Remaining	Areas with no significant direct biodiversity value. Not natural or degraded natural areas that are not required as ESA, including intensive agriculture, urban, industry; and human infrastructure.	

- **Protected Areas**

The South African Protected Areas Database (SAPAD) is a GIS inventory of all protected areas in South Africa (SAPAD, 2020). The database contains spatial data for the conservation estate of South Africa. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection. Data is collected by parcels which are aggregated to protected area level and is updated on a continuous basis. It forms the basis for the Register of Protected Areas which is a legislative requirement under the National Environmental Management: Protected Areas Act, Act 57 of 2003.

The purposed of SAPAD is to produce and maintain a comprehensive spatial database on the conservation estate in South Africa. SAPAD is suitable for a wide range of planning, assessment, and analysis and display purposes.

- **National Protected Area Expansion Strategy for South Africa**

The National Protected Area Expansion Strategy (NPAES) sets the national framework for consolidating and expanding the existing protected area network in the country (Department of Environmental Affairs, 2016). Formally protected areas, either provincially or nationally, that occur within proximity to the project site could have consequences as far as impact on these areas is concerned. The NPAES are areas designated for future incorporation into existing protected areas (both National and Informal protected areas). These areas are large, mostly intact areas required to meet biodiversity targets, and suitable for protection. They may not necessarily be proclaimed as protected areas in the future and are a broad scale planning tool allowing for better development and conservation planning.

NPAES have been developed to coordinate the expansion of protected areas in order to ensure that a representative sample of all ecosystems as well as key ecological processes are included in the protected area network.

- **National Biodiversity Assessment (NBA) Terrestrial Threat Status and Protection Level**

The National Biodiversity Assessment (NBA) presents the best available science on South Africa's biodiversity (SANBI, 2018). It aims to inform policy, planning and decision making in a range of sectors for the conservation and sustainable use of biodiversity. The NBA 2018 builds on the National Spatial Biodiversity Assessment 2004 and 2011 thus providing a comprehensive picture of South Africa's biodiversity threat status and protection level over time (SANBI, 2018).

The NBA has four indicators, providing information on the threat status and protection level of ecosystems and species. The threat status indicators use the established IUCN Red List of Species and Red List of Ecosystems assessment frameworks. The risk of extinction (species) or collapse (ecosystems) is evaluated across all realms and for taxonomic groups

for which sufficient data exists. The protection level indicators reflect how well our species and ecosystem types are represented in the protected area network (SANBI, 2018).

- **Land Cover**

The current land cover was identified by aerial imagery during the desktop assessment. The maps indicate delineated areas of similar land use (Land Type Survey Staff, 1972 - 2006; GEOTERRAIMAGE (GTI), 2018). Land use categories are split into:

- Plantations;
- Natural;
- Waterbodies;
- Mines;
- Urban built-up; and
- Agriculture.

- **Mining and Biodiversity Guideline**

The Mining and Biodiversity Guideline was developed collaboratively by SANBI, the DEA, the Department of Mineral Resources (DMR), the Chamber of Mines and the South African Mining and Biodiversity Forum (2013). The purpose of the guideline was to provide the mining sector with a manual to integrate biodiversity into the planning process thereby encouraging informed decision-making around mining development and environmental authorisations. The aim of the guideline is to explain the value for mining companies to consider biodiversity management throughout the planning process. The guideline highlights the importance of biodiversity in managing the social, economic and environmental risk of the proposed mining Project. The country has been mapped into biodiversity priority areas including the four categories each with associated risks and implications (Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, & South African National Biodiversity Institute, 2013) (Table 3).

Table 3: Mining and Biodiversity Guideline Categories (DEA et al., 2013)

Category	Risk and Implications for Mining
Legally Protected	Mining prohibited; unless authorised by ministers of both the DEA and DMR.
Highest Biodiversity Importance	Highest Risk for Mining: the EIA process must confirm significance of the biodiversity features that may be a fatal flaw to the proposed Project. Specialists must provide site-specific recommendations for the application of the mitigation hierarchy that informs the decision-making processes of mining licences, water use licences and environmental authorisations. If granted, authorisations should set limits on allowed activities and specify biodiversity related management outcomes.

Category	Risk and Implications for Mining
High Biodiversity Importance	High Risk for Mining: the EIA process must confirm the significance of the biodiversity features for the conservation of biodiversity priority areas. Significance of impacts must be discussed as mining options are possible but must be limited. Authorisations may set limits and specify biodiversity related management outcomes.
Moderate Biodiversity Importance	Moderate Risk for Mining: the EIA process must confirm the significance of the biodiversity features and the potential impacts as mining options must be limited but are possible. Authorisations may set limits and specify biodiversity related management outcomes.

Desktop-based Delineation of Biodiversity Features

Wetlands

Based solely on any available contour data and high resolution aerial imagery, the freshwater resources within the vicinity of the proposed project was delineated within 500 m of the proposed mining extents at a desktop-level, and earmarked for verification in accordance with the South African Practical Field Procedure for Identification and Delineation of Wetlands and Riparian Areas (Department of Water Affairs and Forestry, 2005) as well as the "Updated manual for identification and delineation of wetlands and riparian areas" (Department of Water Affairs and Forestry, 2008). These methodologies use the:

- **Terrain Unit Indicator**: Identifies those parts of the landscape where wetlands are more likely to occur;
- **Soil Form Indicator**: Identifies the soil forms, which are associated with prolonged and frequent saturation;
- **Soil Wetness Indicator**: Identifies the morphological "signatures" developed in the soil profile as a result of prolonged and frequent saturation; and
- **Vegetation Indicator**: Identifies hydrophilic vegetation associated with frequently saturated soils.

Although it is recommended that a field survey is undertaken to verify the presence and extent of the wetland delineation, if the prospecting activities remain outside these desktop-based delineated areas, it is envisaged that the ground-truthing can be delayed until a Mining Right Application.

- #### Terrain Unit Indicator

Terrain Unit Indicator (TUI) areas include depressions and channels where water would be most likely to accumulate. These areas are determined with the aid of topographical maps, contour data, aerial photographs and engineering and town planning diagrams (Department

of Water Affairs and Forestry, 2005). In accordance with the guidelines provided by the DWS (Department of Water Affairs and Forestry, 2005) wetlands are identified and classified into various HGM units based on their individual characteristics and setting within the landscape. The HGM unit classification system focuses on the hydro-geomorphic setting/position of wetlands in a landscape which incorporates geomorphology; water movement into, through and out of the wetland. The HGM unit is dependent on various aspects, including whether the drainage is open or close, water is dominating the system or is sub-surface water, how the water flows from and into the wetlands and how water is contained within the wetland. Once wetlands have been identified, they are categorised into HGM units as shown in Table 4.

Table 4: Description of the Various HGM Units for Wetland Classification

Hydromorphic Wetland Type	Diagram	Description
Floodplain		Valley bottom areas with a well-defined stream channel stream channel, gently sloped and characterised by floodplain features such as oxbow depression and natural levees and the alluvial (by water) transport and deposition of sediment, usually leading to a net accumulation of sediment. Water inputs from main channel (when channel banks overspill) and from adjacent slopes.
Valley bottom with a channel		Valley bottom areas with a well-defined stream channel but lacking characteristic floodplain features. May be gently sloped and characterized by the net accumulation of alluvial deposits or may have steeper slopes and be characterised by the net loss of sediment. Water inputs from the main channel (when channel banks overspill) and from adjacent slopes.
Valley bottom without a channel		Valley bottom areas with no clearly defined stream channel usually gently sloped and characterised by alluvial sediment deposition, generally leading to a net accumulation of sediment. Water inputs mainly from the channel entering the wetland and also from adjacent slopes.
Hillslope seepage linked to a stream channel		Slopes on hillsides, which are characterised by colluvial (transported by gravity) movement of materials. Water inputs are mainly from sub-surface flow and outflow is usually via a well-defined stream channel connecting the area directly to a stream channel.

Hydromorphic Wetland Type	Diagram	Description
Isolated hillslope seepage		Slopes on hillsides that are characterised by colluvial transport (transported by gravity) movement of materials. Water inputs are from sub-surface flow and outflow either very limited or through diffuse sub-surface flow but with no direct link to a surface water channel.
Pan/Depression		A basin-shaped area with a closed elevation contour that allows for the accumulation of surface water (i.e. It is inward draining). It may also receive subsurface water. An outlet is usually absent and so this type of wetland is usually isolated from the stream network.

- ## Soil Indicators

Soil Form Indicators

Hydromorphic soils are characterized as soils that has undergone redox reactions because of the fluctuation of water and oxygen within the soil profile, creating segregations of iron (Fe) and manganese (Mn) particles. This fluctuation of water and oxygen in the soils can be attributed to the fluctuating ground water table, creating seasonal, temporary and permanent wet zones. Hydromorphic soils are thus Soil Form Indicators (SFI) which will display unique characteristics resulting from prolonged and repeated water saturation (Department of Water Affairs and Forestry, 2005). The permanent, as well as occasional saturation of soil results in anaerobic conditions of the soils causing a chemical, physical and biological change to the soil.

Hydromorphic soils are often identified by the colours of various soil components. The frequency and duration of the soil saturation periods strongly influences the colours of these components. Grey colours become more prominent in the soil matrix the higher the duration and frequency of saturation in a soil profile (Department of Water Affairs and Forestry, 2005). A feature of hydromorphic soils are coloured mottles (iron and manganese accumulation) which are usually absent in permanently saturated soils and are most prominent in seasonally saturated soils and are less abundant in temporarily saturated soils (Department of Water Affairs and Forestry, 2005). The hydromorphic soils must display signs of wetness within 50 cm of the soil surface, as this is necessary to support hydrophytic vegetation.

Soils that are commonly associated with wetlands are: Champagne, Rensburg, Arcadia, Katspruit, Kroonstad, Longlands, Fernwood and Westley soil forms. These soil forms are associated with high clay content and accumulation of clay, promoting water logging and

creating low drainage, thus water logging conditions. These soils are commonly associated with low-laying landscapes such as valley bottoms, foot-slopes and mid-slopes.

Soil Wetness Indicators

In practice, the Soil Wetness Indictor (SWI) is used as the primary indicator (Department of Water Affairs and Forestry, 2005). Iron and manganese accumulation in a soil profile, termed mottles, are some of the recognized 'wet-indicators'. These two elements are insoluble under aerobic (unsaturated) conditions and become soluble when the soil becomes anaerobic (saturated). The fluctuating water table creates these conditions by increasing and reducing the oxygen levels in the soil profile by increased and reduced water levels. Iron is one of the most abundant elements in soils and is responsible for the red and brown chroma of many soils.

During anaerobic (saturated) conditions, the iron and manganese in the soils are mobile and thus begin to leach out of the soil profile. Where oxidation takes place around for example roots, aggregate surfaces and pores, relatively insoluble ferric oxides is deposited leading to formation of red/green mottles and concretions. These soil profiles are commonly known as leached soils, gleysol, E-horizons or Albic horizons. Resulting from the prolonged anaerobic conditions, the soil matrix is left a grey, greenish or bluish colour, and is said to be "gleyed". Recurrence of the cycle of wetting and drying over many decades concentrates these insoluble iron compounds. Thus, soil that is gleyed and has mottles within the first 0.5 m of the surface are indicating a zone that is seasonally or temporarily saturated, interpreted and classified as a wetland (Department of Water Affairs and Forestry, 2005).

- **Vegetation Indicator**

Plant communities undergo distinct changes in species composition along the wetness gradient from the centre of the wetland to the edge, and into adjacent terrestrial areas. Valuable information for determining the wetland boundary and wetness zone is derived from the change in species composition. A supplementary method for employing vegetation as an indicator is to use the broad classification of the wetland plants according to their occurrence in the wetlands and wetness zones (Kotze & Marneweck, 1999; Department of Water Affairs and Forestry, 2005). This is summarised in Table below.

When using vegetation indicators for delineation, emphasis is placed on the group of species that dominate the plant community, rather than on individual indicator species (Department of Water Affairs and Forestry, 2005). Areas where soils are a poor indicator (black clay, vertic soils), vegetation (as well as topographical setting) is relied on to a greater extent and the use of the wetland species classification as per Table 5 becomes more important. If vegetation was to be used as a primary indicator, undisturbed conditions and expert knowledge are required (Department of Water Affairs and Forestry, 2005). Due to this uncertainty, greater emphasis is often placed on the SWI to delineate wetland areas.

Table 5: Classification of Plant Species According to Occurrence in Wetlands

Type	Description
Obligate Wetland Species (OW)	Almost always grow in wetlands: > 99% of occurrences.
Facultative Wetland Species (FW)	Usually grow in wetlands but occasionally are found in non-wetland areas: 67-99% of occurrences.
Facultative Species (F)	Are equally likely to grow in wetlands and non-wetland areas: 34-66% of occurrences.
Facultative Dry-land Species (FD)	Usually grow in non-wetland areas but sometimes grow in wetlands: 1-34% of occurrences.

(Source: (Department of Water Affairs and Forestry, 2005))

Based on the national land cover data, as well as the vegetation map of South Africa, broad-level terrestrial habitat types were also tentatively delineated and any habitat of significant potential concern (e.g. ridges) was flagged for further investigation.

Flora and Fauna

The following ecological databases were researched in line with the locality of the Project Area guided by the QDS (2428BB and 2428BD):

- The South African Bird Atlas Project 2 (SABAP2) database for expected bird species;
- The SANBI Plants of South Africa (NEWPOSA) for expected floral species to occur; and
- The Animal Demographic Unit Virtual Museum database (http://vmus.adu.org.za) for expected faunal species to occur.

Sensitivity Analysis

In an effort to mitigate against any potential diffuse impacts (e.g. runoff contamination, erosion and sedimentation, etc.) likely to originate from the prospecting activities, a desktop-based buffer distance was determined using the Preliminary Guidelines for Buffer Zone Tool (Macfarlane & Bredin, 2016a, Macfarlane & Bredin, 2016b). There are number of functions that these potential buffer zones are expected to fulfil when these delineations and/or demarcations are provided a standard measure of mitigation.

Similarly, the Conservation Plan applicable to the Limpopo Province helped inform the importance and sensitivity of the delineated habitat types and potential presence of species of conservation concern. All other publicly available databases was also reviewed in an effort to support the conservation of habitat of significant importance to ecological functionality and/or preservation of biodiversity.

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Appendix B: Expected Species

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Table 1: Expected Plant Species

Family	Genus	Sp1	Rank1	Sp2	Sp3	Ecology
Rubiaceae	*Afrocanthium*	*gilfillanii*				Indigenous
Fabaceae	*Albizia*	*tanganyicensis*	subsp.	*tanganyicensis*		Indigenous
Icacinaceae	*Apodytes*	*dimidiata*	subsp.	*dimidiata*		Indigenous
Scrophulariaceae	*Aptosimum*	*patulum*				Indigenous; Endemic
Asparagaceae	*Asparagus*	*cooperi*				Indigenous
Aspleniaceae	*Asplenium*	*aethiopicum*				Indigenous
Aspleniaceae	*Asplenium*	*cordatum*				Indigenous
Acanthaceae	*Barleria*	*mackenii*				Indigenous
Fabaceae	*Bauhinia*	*petersiana*	subsp.	*macrantha*		Indigenous
Rhamnaceae	*Berchemia*	*zeyheri*				Indigenous
Elatinaceae	*Bergia*	*salaria*				Indigenous
Asteraceae	*Berkheya*	*carlinopsis*	subsp.	*magalismontana*		Indigenous; Endemic
Acanthaceae	*Blepharis*	*breyeri*				Indigenous; Endemic
Acanthaceae	*Blepharis*	*diversispina*				Indigenous
Asteraceae	*Brachylaena*	*huillensis*				Indigenous
Asteraceae	*Brachylaena*	*ilicifolia*				Indigenous
Asteraceae	*Brachylaena*	*rotundata*				Indigenous
Phyllanthaceae	*Bridelia*	*mollis*				Indigenous
Fabaceae	*Burkea*	*africana*				Indigenous
Capparaceae	*Cadaba*	*aphylla*				Indigenous
Verbenaceae	*Chascanum*	*hederaceum*	var.	*hederaceum*		Indigenous
Verbenaceae	*Chascanum*	*incisum*				Indigenous
Cleomaceae	*Cleome*	*hirta*				Indigenous
Lamiaceae	*Clerodendrum*	*ternatum*				Indigenous
Cucurbitaceae	*Coccinia*	*sessilifolia*				Indigenous
Combretaceae	*Combretum*	*imberbe*				Indigenous
Combretaceae	*Combretum*	*molle*				Indigenous
Combretaceae	*Combretum*	*apiculatum*	subsp.	*apiculatum*		Indigenous
Combretaceae	*Combretum*	*zeyheri*				Indigenous

Family	Genus	Sp1	Rank1	Sp2	Sp3	Ecology
Combretaceae	*Combretum*	*hereroense*				Indigenous
Commelinaceae	*Commelina*	*africana*	var.	*krebsiana*		Indigenous
Burseraceae	*Commiphora*	*pyracanthoides*				Indigenous
Convolvulaceae	*Convolvulus*	*sagittatus*				Indigenous
Amaryllidaceae	*Crinum*	*lugardiae*				Indigenous
Cucurbitaceae	*Cucumis*	*cinereus*				Indigenous
Cyperaceae	*Cyperus*	*pseudokyllingioides*				Indigenous
Cyperaceae	*Cyperus*	*obtusiflorus*	var.	*obtusiflorus*		Indigenous
Cyperaceae	*Cyperus*	*rupestris*	var.	*rupestris*		Indigenous
Poaceae	*Dactyloctenium*	*aegyptium*				Indigenous
Asteraceae	*Denekia*	*capensis*				Indigenous
Pedaliaceae	*Dicerocaryum*	*senecioides*				Indigenous
Fabaceae	*Dichrostachys*	*cinerea*	subsp.	*africana*	africana	Indigenous
Malvaceae	*Dombeya*	*rotundifolia*	var.	*rotundifolia*		Indigenous
Poaceae	*Eleusine*	*indica*				Indigenous
Equisetaceae	*Equisetum*	*ramosissimum*	subsp.	*ramosissimum*		Indigenous
Loranthaceae	*Erianthemum*	*ngamicum*				Indigenous
Sapindaceae	*Erythrophysa*	*transvaalensis*				Indigenous
Myrtaceae	*Eucalyptus*	*camaldulensis*				Not indigenous; Cultivated; Naturalised; Invasive
Ebenaceae	*Euclea*	*natalensis*	subsp.	*angustifolia*		Indigenous
Ebenaceae	*Euclea*	*sp.*				
Ebenaceae	*Euclea*	*sekhukhuniensis*				Indigenous
Ebenaceae	*Euclea*	*undulata*				Indigenous
Euphorbiaceae	*Euphorbia*	*schinzii*				Indigenous
Euphorbiaceae	*Euphorbia*	*lugardiae*				Indigenous
Euphorbiaceae	*Euphorbia*	*limpopoana*				Indigenous
Euphorbiaceae	*Euphorbia*	*guerichiana*				Indigenous
Fabaceae	*Faidherbia*	*albida*				Indigenous
Asteraceae	*Felicia*	*mossamedensis*				Indigenous

Family	Genus	Sp1	Rank1	Sp2	Sp3	Ecology
Moraceae	*Ficus*	*tettensis*				Indigenous
Moraceae	*Ficus*	*abutilifolia*				Indigenous
Moraceae	*Ficus*	*thonningii*				Indigenous
Phyllanthaceae	*Flueggea*	*virosa*	subsp.	*virosa*		Indigenous
Scrophulariaceae	*Freylinia*	*tropica*				Indigenous
Iridaceae	*Gladiolus*	*dolomiticus*				Indigenous; Endemic
Malvaceae	*Gossypium*	*herbaceum*	subsp.	*africanum*		Indigenous
Malvaceae	*Grewia*	*vernicosa*				Indigenous; Endemic
Malvaceae	*Grewia*	*subspathulata*				Indigenous
Malvaceae	*Grewia*	*flava*				Indigenous
Malvaceae	*Grewia*	*flavescens*				Indigenous
Pedaliaceae	*Harpagophytum*	*zeyheri*	subsp.	*zeyheri*		Indigenous
Pedaliaceae	*Harpagophytum*	*sp.*				
Rhamnaceae	*Helinus*	*integrifolius*				Indigenous
Malvaceae	*Hermannia*	*boraginiflora*				Indigenous
Apiaceae	*Heteromorpha*	*arborescens*				Indigenous
Annonaceae	*Hexalobus*	*monopetalus*	var.	*monopetalus*		Indigenous
Sapindaceae	*Hippobromus*	*pauciflorus*				Indigenous
Asteraceae	*Hirpicium*	*bechuanense*				Indigenous
Apocynaceae	*Huernia*	*zebrina*	subsp.	*zebrina*		Indigenous
Hypoxidaceae	*Hypoxis*	*hemerocallidea*				Indigenous
Fabaceae	*Indigofera*	*enormis*				Indigenous
Fabaceae	*Indigofera*	*heterotricha*				Indigenous
Fabaceae	*Indigofera*	*subulata*				Indigenous
Fabaceae	*Indigofera*	*flavicans*				Indigenous
Fabaceae	*Indigofera*	*bainesii*				Indigenous
Convolvulaceae	*Ipomoea*	*bolusiana*				Indigenous
Convolvulaceae	*Ipomoea*	*sinensis*	subsp.	*blepharosepala*		Indigenous
Convolvulaceae	*Ipomoea*	*transvaalensis*				Indigenous
Convolvulaceae	*Ipomoea*	*crassipes*				Indigenous

Family	Genus	Sp1	Rank1	Sp2	Sp3	Ecology
Scrophulariaceae	*Jamesbrittenia*	*atropurpurea*	subsp.	*atropurpurea*		Indigenous
Euphorbiaceae	*Jatropha*	*zeyheri*				Indigenous
Juncaceae	*Juncus*	*rigidus*				Indigenous
Acanthaceae	*Justicia*	*divaricata*				Indigenous
Acanthaceae	*Justicia*	*flava*				Indigenous
Crassulaceae	***Kalanchoe***	***longiflora***				**Indigenous; Endemic**
Kirkiaceae	*Kirkia*	*wilmsii*				Indigenous
Cyperaceae	*Kyllinga*	*alba*				Indigenous
Fabaceae	*Leobordea*	*hirsuta*				Indigenous; Endemic
Limeaceae	*Limeum*	*sulcatum*	var.	*sulcatum*		Indigenous
Cyperaceae	*Lipocarpha*	*nana*				Indigenous
Verbenaceae	*Lippia*	*scaberrima*				Indigenous
Solanaceae	*Lycium*	*cinereum*				Indigenous
Maesaceae	*Maesa*	*lanceolata*				Indigenous
Celastraceae	*Maytenus*	*undata*				Indigenous
Malvaceae	*Melhania*	*rehmannii*				Indigenous
Sapotaceae	*Mimusops*	*zeyheri*				Indigenous
Cucurbitaceae	*Momordica*	*repens*				Indigenous
Cucurbitaceae	*Momordica*	*balsamina*				Indigenous
Geraniaceae	*Monsonia*	*glauca*				Indigenous
Lythraceae	*Nesaea*	*dinteri*	subsp.	*elata*		Indigenous
Stilbaceae	*Nuxia*	*gracilis*				Indigenous; Endemic
Lamiaceae	*Ocimum*	*pseudoserratum*				Indigenous; Endemic
Loranthaceae	*Oncocalyx*	*bolusii*				Indigenous
Fabaceae	*Ormocarpum*	*trichocarpum*				Indigenous
Colchicaceae	*Ornithoglossum*	*vulgare*				Indigenous
Lamiaceae	*Orthosiphon*	*suffrutescens*				Indigenous
Poaceae	***Oryza***	***longistaminata***				**Indigenous**
Fabaceae	*Otoptera*	*burchellii*				Indigenous
Anacardiaceae	*Ozoroa*	*paniculosa*	var.	*paniculosa*		Indigenous

Family	Genus	Sp1	Rank1	Sp2	Sp3	Ecology
Anacardiaceae	*Ozoroa*	*albicans*				Indigenous; Endemic
Asteraceae	*Parapolydora*	*fastigiata*				Indigenous
Malvaceae	*Pavonia*	*transvaalensis*				Indigenous; Endemic
Asteraceae	*Pentzia*	*calcarea*				Indigenous
Acanthaceae	*Petalidium*	*oblongifolium*				Indigenous; Endemic
Asteraceae	*Phymaspermum*	*athanasioides*				Indigenous
Lamiaceae	*Plectranthus*	*neochilus*				Indigenous
Polygalaceae	*Polygala*	*producta*				Indigenous
Asteraceae	*Printzia*	*auriculata*				Indigenous
Verbenaceae	*Priva*	*flabelliformis*				Indigenous
Verbenaceae	*Priva*	*adhaerens*				Indigenous
Molluginaceae	*Psammotropha*	*mucronata*	var.	*foliosa*		Indigenous
Pedaliaceae	*Pterodiscus*	*ngamicus*				Indigenous
Vitaceae	*Rhoicissus*	*revoilii*				Indigenous
Vitaceae	*Rhoicissus*	*tridentata*	subsp.	*cuneifolia*		Indigenous
Fabaceae	*Rhynchosia*	*densiflora*	subsp.	*chrysadenia*		Indigenous
Acanthaceae	*Ruellia*	*patula*				Indigenous
Salicaceae	*Salix*	*mucronata*	subsp.	*woodii*		Indigenous
Fabaceae	*Schotia*	*brachypetala*				Indigenous
Anacardiaceae	*Searsia*	*discolor*				Indigenous
Polygalaceae	*Securidaca*	*longepedunculata*	var.	*longepedunculata*		Indigenous
Fabaceae	*Senegalia*	*nigrescens*				Indigenous
Fabaceae	*Senegalia*	*caffra*				Indigenous
Fabaceae	*Senna*	*didymobotrya*				Not indigenous; Cultivated; Naturalised; Invasive
Malvaceae	*Sida*	*chrysantha*				Indigenous
Malvaceae	*Sida*	*ovata*				Indigenous
Solanaceae	*Solanum*	*campylacanthum*				Indigenous
Poaceae	*Sorghum*	*bicolor*	subsp.	*arundinaceum*		Indigenous
Asteraceae	*Sphaeranthus*	*peduncularis*	subsp.	*peduncularis*		Indigenous

Family	Genus	Sp1	Rank1	Sp2	Sp3	Ecology
Orobanchaceae	*Striga*	*gesnerioides*				Indigenous
Loganiaceae	*Strychnos*	*madagascariensis*				Indigenous
Loganiaceae	*Strychnos*	*cocculoides*				Indigenous
Lamiaceae	*Syncolostemon*	*petiolatus*				Indigenous
Myrtaceae	*Syzygium*	*cordatum*	subsp.	*cordatum*		Indigenous
Fabaceae	*Tephrosia*	*burchellii*				Indigenous
Combretaceae	*Terminalia*	*sericea*				Indigenous
Combretaceae	*Terminalia*	*prunioides*				Indigenous
Acanthaceae	*Thunbergia*	*neglecta*				Indigenous
Euphorbiaceae	*Tragia*	*dioica*				Indigenous
Malpighiaceae	*Triaspis*	*glaucophylla*				Indigenous; Endemic
Fabaceae	*Tylosema*	*fassoglense*				Indigenous
Typhaceae	*Typha*	*capensis*				Indigenous
Poaceae	*Urochloa*	*trichopus*				Indigenous
Poaceae	*Urochloa*	*panicoides*				Indigenous
Poaceae	*Urochloa*	*brachyura*				Indigenous
Poaceae	*Urochloa*	*mosambicensis*				Indigenous
Poaceae	*Urochloa*	*oligotricha*				Indigenous
Fabaceae	*Vachellia*	*erioloba*				Indigenous
Fabaceae	*Vachellia*	*grandicornuta*				Indigenous
Fabaceae	*Vachellia*	*tortilis*	subsp.	*heteracantha*		Indigenous
Rubiaceae	*Vangueria*	*triflora*				Indigenous; Endemic
Rubiaceae	*Vangueria*	*madagascariensis*				Indigenous
Lamiaceae	*Vitex*	*rehmannii*				Indigenous
Lamiaceae	*Volkameria*	*glabra*				Indigenous
Solanaceae	*Withania*	*somnifera*				Indigenous
Convolvulaceae	*Xenostegia*	*tridentata*	subsp.	*angustifolia*		Indigenous
Aizoaceae	*Zaleya*	*pentandra*				Indigenous

Table 2: Expected Mammals

Family	Scientific name	Common name	Conservation Status
Bathyergidae	*Cryptomys hottentotus*	Southern African Mole-rat	Least Concern (2016)
Bovidae	*Aepyceros melampus*	Impala	Least Concern
Bovidae	*Connochaetes taurinus*	Blue Wildebeest	Least Concern (ver 3.1, 2017)
Bovidae	*Connochaetes taurinus taurinus*		Least Concern (2016)
Bovidae	***Damaliscus lunatus lunatus***	**(Southern African) Tsessebe**	**Vulnerable (2016)**
Bovidae	***Hippotragus niger niger***		**Vulnerable (2016)**
Bovidae	*Kobus ellipsiprymnus ellipsiprymnus*		Least Concern (2016)
Bovidae	*Oreotragus oreotragus*	Klipspringer	Least Concern (2016)
Bovidae	*Raphicerus campestris*	Steenbok	Least Concern (2016)
Bovidae	*Redunca fulvorufula*	Mountain Reedbuck	Least Concern
Bovidae	*Sylvicapra grimmia*	Bush Duiker	Least Concern (2016)
Bovidae	*Tragelaphus angasii*	Nyala	Least Concern (2016)
Bovidae	*Tragelaphus scriptus*	Bushbuck	Least Concern
Bovidae	*Tragelaphus strepsiceros*	Greater Kudu	Least Concern (2016)
Canidae	*Canis mesomelas*	Black-backed Jackal	Least Concern (2016)
Equidae	*Equus quagga*	Plains Zebra	Least Concern (2016)
Felidae	*Caracal caracal*	Caracal	Least Concern (2016)
Felidae	***Leptailurus serval***	**Serval**	**Near Threatened (2016)**
Felidae	***Panthera pardus***	**Leopard**	**Vulnerable (2016)**
Galagidae	*Galago senegalensis*	Senegal Bushbaby	Least Concern (2016)
Giraffidae	*Giraffa giraffa giraffa*	South African Giraffe	Least Concern (2016)
Herpestidae	*Helogale parvula*	Common Dwarf Mongoose	Least Concern (2016)
Hyaenidae	***Hyaena brunnea***	**Brown Hyena**	**Near Threatened (2015)**
Hystricidae	*Hystrix africaeaustralis*	Cape Porcupine	Least Concern
Leporidae	*Lepus saxatilis*	Scrub Hare	Least Concern
Muridae	*Aethomys ineptus*	Tete Veld Aethomys	Least Concern (2016)
Muridae	*Aethomys namaquensis*	Namaqua Rock Mouse	Least Concern
Muridae	*Gerbilliscus leucogaster*	Bushveld Gerbil	Least Concern (2016)
Muridae	*Mastomys coucha*	Southern African Mastomys	Least Concern (2016)

Muridae	*Mastomys natalensis*	Natal Mastomys	Least Concern (2016)
Muridae	*Mus (Nannomys) minutoides*	Southern African Pygmy Mouse	Least Concern
Muridae	*Otomys angoniensis*	Angoni Vlei Rat	Least Concern (2016)
Muridae	*Rattus rattus*	Roof Rat	Least Concern
Muridae	*Thallomys paedulcus*	Acacia Thallomys	Least Concern (2016)
Mustelidae	*Mellivora capensis*	Honey Badger	Least Concern (2016)
Nesomyidae	*Saccostomus campestris*	Southern African Pouched Mouse	Least Concern (2016)
Orycteropodidae	*Orycteropus afer*	Aardvark	Least Concern (2016)
Pedetidae	*Pedetes capensis*	South African Spring Hare	Least Concern (2016)
Rhinolophidae	***Rhinolophus smithersi***	**Smithers' Horseshoe Bat**	**Near Threatened (2016)**
Sciuridae	*Paraxerus cepapi*	Smith's Bush Squirrel	Least Concern (2016)
Soricidae	*Crocidura hirta*	Lesser Red Musk Shrew	Least Concern (2016)
Suidae	*Phacochoerus africanus*	Common Warthog	Least Concern (2016)
Suidae	*Potamochoerus porcus*	Red River Hog	Least Concern (2016)
Viverridae	*Civettictis civetta*	African Civet	Least Concern (2016)

Table 3: Expected Birds

Group	Common Name	Genus	Species	Conservation Status
Apalis	Bar-throated	*Apalis*	*thoracica*	LC
Apalis	Yellow-breasted	*Apalis*	*flavida*	LC
Avocet	Pied	*Recurvirostra*	*avosetta*	LC
Babbler	Arrow-marked	*Turdoides*	*jardineii*	LC
Barbet	Acacia Pied	*Tricholaema*	*leucomelas*	LC
Barbet	Black-collared	*Lybius*	*torquatus*	LC
Barbet	Crested	*Trachyphonus*	*vaillantii*	LC
Batis	Chinspot	*Batis*	*molitor*	LC
Bee-eater	Blue-cheeked	*Merops*	*persicus*	LC
Bee-eater	European	*Merops*	*apiaster*	LC
Bee-eater	Little	*Merops*	*pusillus*	LC

Bee-eater	White-fronted	*Merops*	*bullockoides*	LC
Bee-eater	European	*Merops*	*apiaster*	LC
Bishop	Southern Red	*Euplectes*	*orix*	LC
Bishop	Yellow-crowned	*Euplectes*	*afer*	LC
Bittern	Little	*Ixobrychus*	*minutus*	LC
Boubou	Southern	*Laniarius*	*ferrugineus*	LC
Brownbul	Terrestrial	*Phyllastrephus*	*terrestris*	LC
Brubru	Brubru	*Nilaus*	*afer*	LC
Bulbul	Dark-capped	*Pycnonotus*	*tricolor*	LC
Bunting	Cinnamon-breasted	*Emberiza*	*tahapisi*	LC
Bunting	Golden-breasted	*Emberiza*	*flaviventris*	LC
Bush-shrike	Grey-headed	*Malaconotus*	*blanchoti*	LC
Bush-shrike	Orange-breasted	*Telophorus*	*sulfureopectus*	LC
Buttonquail	Kurrichane	*Turnix*	*sylvaticus*	LC
Buzzard	Steppe	*Buteo*	*vulpinus*	LC
Buzzard	Lizard	*Kaupifalco*	*monogrammicus*	LC
Canary	Black-throated	*Crithagra*	*atrogularis*	LC
Canary	Yellow	*Crithagra*	*flaviventris*	LC
Canary	Yellow-fronted	*Crithagra*	*mozambicus*	LC
Chat	Familiar	*Cercomela*	*familiaris*	LC
Cisticola	Lazy	*Cisticola*	*aberrans*	LC
Cisticola	Rattling	*Cisticola*	*chiniana*	LC
Cisticola	Zitting	*Cisticola*	*juncidis*	LC
Cisticola	Desert	*Cisticola*	*aridulus*	LC
Cisticola	Lazy	*Cisticola*	*aberrans*	LC
Cisticola	Levaillant's	*Cisticola*	*tinniens*	LC
Cliff-chat	Mocking	*Thamnolaea*	*cinnamomeiventris*	LC
Coot	Red-knobbed	*Fulica*	*cristata*	LC
Cormorant	Reed	*Phalacrocorax*	*africanus*	LC
Cormorant	White-breasted	*Phalacrocorax*	*carbo*	LC
Coucal	Burchell's	*Centropus*	*burchellii*	LC

Crake	Black	*Amaurornis*	*flavirostris*	LC
Crombec	Long-billed	*Sylvietta*	*rufescens*	LC
Crow	Pied	*Corvus*	*albus*	LC
Cuckoo	Black	*Cuculus*	*clamosus*	LC
Cuckoo	Diderick	*Chrysococcyx*	*caprius*	LC
Cuckoo	Jacobin	*Clamator*	*jacobinus*	LC
Cuckoo	Klaas's	*Chrysococcyx*	*klaas*	LC
Cuckoo	Levaillant's	*Clamator*	*levaillantii*	LC
Cuckoo	Red-chested	*Cuculus*	*solitarius*	LC
Cuckoo	Diderick	*Chrysococcyx*	*caprius*	LC
Cuckoo-shrike	Black	*Campephaga*	*flava*	LC
Darter	African	*Anhinga*	*rufa*	LC
Dove	Laughing	*Streptopelia*	*senegalensis*	LC
Dove	Namaqua	*Oena*	*capensis*	LC
Dove	Red-eyed	*Streptopelia*	*semitorquata*	LC
Dove	Rock	*Columba*	*livia*	LC
Drongo	Fork-tailed	*Dicrurus*	*adsimilis*	LC
Duck	African Black	*Anas*	*sparsa*	LC
Duck	Fulvous	*Dendrocygna*	*bicolor*	LC
Duck	Knob-billed	*Sarkidiornis*	*melanotos*	LC
Duck	Mallard	*Anas*	*platyrhynchos*	LC
Duck	White-backed	*Thalassornis*	*leuconotus*	LC
Duck	White-faced	*Dendrocygna*	*viduata*	LC
Duck	Yellow-billed	*Anas*	*undulata*	LC
Duck	Knob-billed	*Sarkidiornis*	*melanotos*	LC
Duck	Maccoa	*Oxyura*	*maccoa*	LC
Duck	Yellow-billed	*Anas*	*undulata*	LC
Eagle	Long-crested	*Lophaetus*	*occipitalis*	LC
Eagle	Tawny	*Aquila*	*rapax*	LC
Eagle	**Verreaux's**	***Aquila***	***verreauxii***	**VU**
Eagle	Wahlberg's	*Aquila*	*wahlbergi*	LC

Egret	Little	*Egretta*	*garzetta*	LC
Egret	Yellow-billed	*Egretta*	*intermedia*	LC
Egret	Cattle	*Bubulcus*	*ibis*	LC
Egret	Great	*Egretta*	*alba*	LC
Eremomela	Burnt-necked	*Eremomela*	*usticollis*	LC
Eremomela	Yellow-bellied	*Eremomela*	*icteropygialis*	LC
Eremomela	Burnt-necked	*Eremomela*	*usticollis*	LC
Falcon	Amur	*Falco*	*amurensis*	LC
Finch	Scaly-feathered	*Sporopipes*	*squamifrons*	LC
Finch	Cut-throat	*Amadina*	*fasciata*	LC
Finch	Red-headed	*Amadina*	*erythrocephala*	LC
Firefinch	Jameson's	*Lagonosticta*	*rhodopareia*	LC
Firefinch	Red-billed	*Lagonosticta*	*senegala*	LC
Firefinch	African	*Lagonosticta*	*rubricata*	LC
Fiscal	Common (Southern)	*Lanius*	*collaris*	LC
Fish-eagle	African	*Haliaeetus*	*vocifer*	LC
Flamingo	**Greater**	***Phoenicopterus***	***ruber***	**NT**
Flycatcher	Fiscal	*Sigelus*	*silens*	LC
Flycatcher	Marico	*Bradornis*	*mariquensis*	LC
Flycatcher	Pale	*Bradornis*	*pallidus*	LC
Flycatcher	Southern Black	*Melaenornis*	*pammelaina*	LC
Flycatcher	Spotted	*Muscicapa*	*striata*	LC
Francolin	Crested	*Dendroperdix*	*sephaena*	LC
Francolin	Coqui	*Peliperdix*	*coqui*	LC
Go-away-bird	Grey	*Corythaixoides*	*concolor*	LC
Goose	Egyptian	*Alopochen*	*aegyptiacus*	LC
Goose	Spur-winged	*Plectropterus*	*gambensis*	LC
Goshawk	African	*Accipiter*	*tachiro*	LC
Grebe	Great Crested	*Podiceps*	*cristatus*	LC
Grebe	Little	*Tachybaptus*	*ruficollis*	LC
Greenbul	Yellow-bellied	*Chlorocichla*	*flaviventris*	LC

Green-pigeon	African	*Treron*	*calvus*	LC
Greenshank	Common	*Tringa*	*nebularia*	LC
Guineafowl	Helmeted	*Numida*	*meleagris*	LC
Hamerkop	Hamerkop	*Scopus*	*umbretta*	LC
Harrier-Hawk	African	*Polyboroides*	*typus*	LC
Helmet-shrike	White-crested	*Prionops*	*plumatus*	LC
Heron	Black	*Egretta*	*ardesiaca*	LC
Heron	Black-headed	*Ardea*	*melanocephala*	LC
Heron	Goliath	*Ardea*	*goliath*	LC
Heron	Green-backed	*Butorides*	*striata*	LC
Heron	Grey	*Ardea*	*cinerea*	LC
Heron	Purple	*Ardea*	*purpurea*	LC
Heron	Squacco	*Ardeola*	*ralloides*	LC
Honeyguide	Greater	*Indicator*	*indicator*	LC
Honeyguide	Lesser	*Indicator*	*minor*	LC
Hoopoe	African	*Upupa*	*africana*	LC
Hornbill	Southern Red-billed	*Tockus*	*rufirostris*	LC
Hornbill	African Grey	*Tockus*	*nasutus*	LC
Hornbill	Southern Yellow-billed	*Tockus*	*leucomelas*	LC
House-martin	Common	*Delichon*	*urbicum*	LC
Ibis	African Sacred	*Threskiornis*	*aethiopicus*	LC
Ibis	Glossy	*Plegadis*	*falcinellus*	LC
Ibis	Hadeda	*Bostrychia*	*hagedash*	LC
Indigobird	Village	*Vidua*	*chalybeata*	LC
Jacana	African	*Actophilornis*	*africanus*	LC
Kestrel	Greater	*Falco*	*rupicoloides*	LC
Kestrel	Lesser	*Falco*	*naumanni*	LC
Kestrel	Rock	*Falco*	*rupicolus*	LC
Kingfisher	Brown-hooded	*Halcyon*	*albiventris*	LC
Kingfisher	Giant	*Megaceryle*	*maximus*	LC
Kingfisher	Malachite	*Alcedo*	*cristata*	LC

Kingfisher	Pied	*Ceryle*	*rudis*	LC
Kingfisher	Striped	*Halcyon*	*chelicuti*	LC
Kingfisher	Woodland	*Halcyon*	*senegalensis*	LC
Kite	Yellow-billed	*Milvus*	*aegyptius*	LC
Kite	Black-shouldered	*Elanus*	*caeruleus*	LC
Korhaan	Red-crested	*Lophotis*	*ruficrista*	LC
Lapwing	African Wattled	*Vanellus*	*senegallus*	LC
Lapwing	Blacksmith	*Vanellus*	*armatus*	LC
Lapwing	Crowned	*Vanellus*	*coronatus*	LC
Lark	Rufous-naped	*Mirafra*	*africana*	LC
Lark	Sabota	*Calendulauda*	*sabota*	LC
Lark	Red-capped	*Calandrella*	*cinerea*	LC
Mannikin	Bronze	*Spermestes*	*cucullatus*	LC
Martin	Brown-throated	*Riparia*	*paludicola*	LC
Martin	Banded	*Riparia*	*cincta*	LC
Martin	Rock	*Hirundo*	*fuligula*	LC
Masked-weaver	Lesser	*Ploceus*	*intermedius*	LC
Masked-weaver	Southern	*Ploceus*	*velatus*	LC
Moorhen	Common	*Gallinula*	*chloropus*	LC
Mousebird	Red-faced	*Urocolius*	*indicus*	LC
Mousebird	Speckled	*Colius*	*striatus*	LC
Myna	Common	*Acridotheres*	*tristis*	LC
Neddicky	Neddicky	*Cisticola*	*fulvicapilla*	LC
Night-Heron	Black-crowned	*Nycticorax*	*nycticorax*	LC
Nightjar	Freckled	*Caprimulgus*	*tristigma*	LC
Nightjar	Fiery-necked	*Caprimulgus*	*pectoralis*	LC
Nightjar	Freckled	*Caprimulgus*	*tristigma*	LC
Oriole	Black-headed	*Oriolus*	*larvatus*	LC
Osprey	Osprey	*Pandion*	*haliaetus*	LC
Ostrich	Common	*Struthio*	*camelus*	LC
Owl	Barn	*Tyto*	*alba*	LC

Owlet	Pearl-spotted	*Glaucidium*	*perlatum*	LC
Oxpecker	Red-billed	*Buphagus*	*erythrorhynchus*	LC
Paradise-flycatcher	African	*Terpsiphone*	*viridis*	LC
Paradise-whydah	Long-tailed	*Vidua*	*paradisaea*	LC
Penduline-tit	Cape	*Anthoscopus*	*minutus*	LC
Petronia	Yellow-throated	*Petronia*	*superciliaris*	LC
Pigeon	Speckled	*Columba*	*guinea*	LC
Pipit	African	*Anthus*	*cinnamomeus*	LC
Pipit	Buffy	*Anthus*	*vaalensis*	LC
Plover	Kittlitz's	*Charadrius*	*pecuarius*	LC
Plover	Three-banded	*Charadrius*	*tricollaris*	LC
Pochard	Southern	*Netta*	*erythrophthalma*	LC
Pratincole	Black-winged	*Glareola*	*nordmanni*	LC
Prinia	Black-chested	*Prinia*	*flavicans*	LC
Prinia	Tawny-flanked	*Prinia*	*subflava*	LC
Puffback	Black-backed	*Dryoscopus*	*cubla*	LC
Pytilia	Green-winged	*Pytilia*	*melba*	LC
Quailfinch	African	*Ortygospiza*	*atricollis*	LC
Quelea	Red-billed	*Quelea*	*quelea*	LC
Rail	African	*Rallus*	*caerulescens*	LC
Reed-warbler	Great	*Acrocephalus*	*arundinaceus*	LC
Reed-warbler	African	*Acrocephalus*	*baeticatus*	LC
Robin-chat	Cape	*Cossypha*	*caffra*	LC
Robin-chat	White-throated	*Cossypha*	*humeralis*	LC
Roller	**European**	*Coracias*	*garrulus*	NT
Roller	Lilac-breasted	*Coracias*	*caudatus*	LC
Roller	Purple	*Coracias*	*naevius*	LC
Ruff	Ruff	*Philomachus*	*pugnax*	LC
Rush-warbler	Little	*Bradypterus*	*baboecala*	LC
Sandpiper	Common	*Actitis*	*hypoleucos*	LC
Sandpiper	Wood	*Tringa*	*glareola*	LC

Sandpiper	Marsh	*Tringa*	*stagnatilis*	LC
Scimitarbill	Common	*Rhinopomastus*	*cyanomelas*	LC
Scrub-robin	Kalahari	*Cercotrichas*	*paena*	LC
Scrub-robin	White-browed	*Cercotrichas*	*leucophrys*	LC
Secretarybird	**Secretarybird**	*Sagittarius*	*serpentarius*	**VU**
Seedeater	Streaky-headed	*Crithagra*	*gularis*	LC
Shikra	Shikra	*Accipiter*	*badius*	LC
Shoveler	Cape	*Anas*	*smithii*	LC
Shrike	Crimson-breasted	*Laniarius*	*atrococcineus*	LC
Shrike	Lesser Grey	*Lanius*	*minor*	LC
Shrike	Magpie	*Urolestes*	*melanoleucus*	LC
Shrike	Red-backed	*Lanius*	*collurio*	LC
Shrike	Southern White-crowned	*Eurocephalus*	*anguitimens*	LC
Shrike	Magpie	*Urolestes*	*melanoleucus*	LC
Snake-eagle	Brown	*Circaetus*	*cinereus*	LC
Snake-eagle	Black-chested	*Circaetus*	*pectoralis*	LC
Snipe	African	*Gallinago*	*nigripennis*	LC
Sparrow	Cape	*Passer*	*melanurus*	LC
Sparrow	House	*Passer*	*domesticus*	LC
Sparrow	Southern Grey-headed	*Passer*	*diffusus*	LC
Sparrow-weaver	White-browed	*Plocepasser*	*mahali*	LC
Spoonbill	African	*Platalea*	*alba*	LC
Spurfowl	Natal	*Pternistis*	*natalensis*	LC
Spurfowl	Swainson's	*Pternistis*	*swainsonii*	LC
Starling	Cape Glossy	*Lamprotornis*	*nitens*	LC
Starling	Red-winged	*Onychognathus*	*morio*	LC
Starling	Violet-backed	*Cinnyricinclus*	*leucogaster*	LC
Starling	Wattled	*Creatophora*	*cinerea*	LC
Starling	Burchell's	*Lamprotornis*	*australis*	LC
Stilt	Black-winged	*Himantopus*	*himantopus*	LC
Stint	Little	*Calidris*	*minuta*	LC

Stonechat	African	*Saxicola*	*torquatus*	LC
Stork	**Marabou**	*Leptoptilos*	*crumeniferus*	**NT**
Stork	**Saddle-billed**	*Ephippiorhynchus*	*senegalensis*	**EN**
Stork	**Yellow-billed**	*Mycteria*	*ibis*	**EN**
Sunbird	Amethyst	*Chalcomitra*	*amethystina*	LC
Sunbird	Marico	*Cinnyris*	*mariquensis*	LC
Sunbird	White-bellied	*Cinnyris*	*talatala*	LC
Sunbird	Greater Double-collared	*Cinnyris*	*afer*	LC
Swallow	Barn	*Hirundo*	*rustica*	LC
Swallow	Greater Striped	*Hirundo*	*cucullata*	LC
Swallow	Lesser Striped	*Hirundo*	*abyssinica*	LC
Swallow	Pearl-breasted	*Hirundo*	*dimidiata*	LC
Swallow	Red-breasted	*Hirundo*	*semirufa*	LC
Swallow	White-throated	*Hirundo*	*albigularis*	LC
Swamphen	African Purple	*Porphyrio*	*madagascariensis*	LC
Swamp-warbler	Lesser	*Acrocephalus*	*gracilirostris*	LC
Swift	Little	*Apus*	*affinis*	LC
Swift	White-rumped	*Apus*	*caffer*	LC
Swift	Horus	*Apus*	*horus*	LC
Tchagra	Black-crowned	*Tchagra*	*senegalus*	LC
Tchagra	Brown-crowned	*Tchagra*	*australis*	LC
Teal	Hottentot	*Anas*	*hottentota*	LC
Teal	Red-billed	*Anas*	*erythrorhyncha*	LC
Tern	Whiskered	*Chlidonias*	*hybrida*	LC
Tern	White-winged	*Chlidonias*	*leucopterus*	LC
Thick-knee	Spotted	*Burhinus*	*capensis*	LC
Thrush	Groundscraper	*Psophocichla*	*litsipsirupa*	LC
Thrush	Karoo	*Turdus*	*smithi*	LC
Thrush	Kurrichane	*Turdus*	*libonyanus*	LC
Tinkerbird	Yellow-fronted	*Pogoniulus*	*chrysoconus*	LC
Tit	Ashy	*Parus*	*cinerascens*	LC

Tit	Southern Black	*Parus*	*niger*	LC
Tit-babbler	Chestnut-vented	*Parisoma*	*subcaeruleum*	LC
Tit-flycatcher	Grey	*Myioparus*	*plumbeus*	LC
Turtle-dove	Cape	*Streptopelia*	*capicola*	LC
Wagtail	African Pied	*Motacilla*	*aguimp*	LC
Warbler	Willow	*Phylloscopus*	*trochilus*	LC
Warbler	Icterine	*Hippolais*	*icterina*	LC
Warbler	Marsh	*Acrocephalus*	*palustris*	LC
Warbler	Olive-tree	*Hippolais*	*olivetorum*	LC
Warbler	Sedge	*Acrocephalus*	*schoenobaenus*	LC
Waxbill	Blue	*Uraeginthus*	*angolensis*	LC
Waxbill	Common	*Estrilda*	*astrild*	LC
Waxbill	Orange-breasted	*Amandava*	*subflava*	LC
Waxbill	Violet-eared	*Granatina*	*granatina*	LC
Waxbill	Black-faced	*Estrilda*	*erythronotos*	LC
Weaver	Spectacled	*Ploceus*	*ocularis*	LC
Weaver	Thick-billed	*Amblyospiza*	*albifrons*	LC
Weaver	Village	*Ploceus*	*cucullatus*	LC
Weaver	Cape	*Ploceus*	*capensis*	LC
Weaver	Red-headed	*Anaplectes*	*rubriceps*	LC
White-eye	Cape	*Zosterops*	*virens*	LC
Whydah	Pin-tailed	*Vidua*	*macroura*	LC
Whydah	Shaft-tailed	*Vidua*	*regia*	LC
Widowbird	White-winged	*Euplectes*	*albonotatus*	LC
Widowbird	Red-collared	*Euplectes*	*ardens*	LC
Wood-dove	Emerald-spotted	*Turtur*	*chalcospilos*	LC
Wood-hoopoe	Green	*Phoeniculus*	*purpureus*	LC
Woodpecker	Bearded	*Dendropicos*	*namaquus*	LC
Woodpecker	Cardinal	*Dendropicos*	*fuscescens*	LC
Woodpecker	Golden-tailed	*Campethera*	*abingoni*	LC
Wren-warbler	Barred	*Calamonastes*	*fasciolatus*	LC

Table 4: Expected Reptiles

Family	Species Name	Common Name	Conservation Status
Agamidae	*Acanthocercus atricollis*	Southern Tree Agama	Least Concern (SARCA 2014)
Agamidae	*Agama aculeata distanti*	Distant's Ground Agama	Least Concern (SARCA 2014)
Chamaeleonidae	*Chamaeleo dilepis*	Common Flap-neck Chameleon	Least Concern (SARCA 2014)
Colubridae	*Crotaphopeltis hotamboeia*	Red-lipped Snake	Least Concern (SARCA 2014)
Colubridae	*Dispholidus typus viridis*	Northern Boomslang	Not evaluated
Colubridae	*Telescopus semiannulatus semiannulatus*	Eastern Tiger Snake	Least Concern (SARCA 2014)
Cordylidae	*Cordylus jonesii*	Jones' Girdled Lizard	Least Concern (SARCA 2014)
Cordylidae	*Cordylus vittifer*	Common Girdled Lizard	Least Concern (SARCA 2014)
Cordylidae	*Platysaurus guttatus*	Dwarf Flat Lizard	Least Concern (SARCA 2014)
Cordylidae	***Pseudocordylus transvaalensis***	**Northern Crag Lizard**	**Near Threatened (SARCA 2014)**
Cordylidae	*Smaug breyeri*	Waterberg Girdled Lizard	Least Concern (SARCA 2014)
Elapidae	*Elapsoidea sundevallii media*	Highveld Garter Snake	
Elapidae	*Naja annulifera*	Snouted Cobra	Least Concern (SARCA 2014)
Elapidae	*Naja mossambica*	Mozambique Spitting Cobra	Least Concern (SARCA 2014)
Gekkonidae	*Chondrodactylus turneri*	Turner's Gecko	Least Concern (SARCA 2014)
Gekkonidae	*Lygodactylus capensis*	Common Dwarf Gecko	Least Concern (SARCA 2014)
Gekkonidae	*Pachydactylus affinis*	Transvaal Gecko	Least Concern (SARCA 2014)
Gekkonidae	*Pachydactylus capensis*	Cape Gecko	Least Concern (SARCA 2014)
Gekkonidae	*Pachydactylus vansoni*	Van Son's Gecko	Least Concern (SARCA 2014)
Gerrhosauridae	*Gerrhosaurus flavigularis*	Yellow-throated Plated Lizard	Least Concern (SARCA 2014)
Lacertidae	*Ichnotropis capensis*	Ornate Rough-scaled Lizard	Least Concern (SARCA 2014)
Lacertidae	*Meroles squamulosus*	Common Rough-scaled Lizard	Least Concern (SARCA 2014)
Lacertidae	*Nucras holubi*	Holub's Sandveld Lizard	Least Concern (SARCA 2014)
Lacertidae	*Pedioplanis lineoocellata lineoocellata*	Spotted Sand Lizard	Least Concern (SARCA 2014)
Lacertidae	*Pedioplanis lineoocellata pulchella*	Common Sand Lizard	Least Concern (SARCA 2014)
Lamprophiidae	*Amblyodipsas polylepis polylepis*	Common Purple-glossed Snake	Least Concern (SARCA 2014)
Lamprophiidae	*Aparallactus capensis*	Black-headed Centipede-eater	Least Concern (SARCA 2014)
Lamprophiidae	*Atractaspis duerdeni*	Duerden's Stiletto Snake	Least Concern (SARCA 2014)

Lamprophiidae	*Boaedon capensis*	Brown House Snake	Least Concern (SARCA 2014)
Lamprophiidae	*Lycophidion capense capense*	Cape Wolf Snake	Least Concern (SARCA 2014)
Lamprophiidae	*Lycophidion variegatum*	Variegated Wolf Snake	Least Concern (SARCA 2014)
Lamprophiidae	*Psammophis angolensis*	Dwarf Sand Snake	Least Concern (SARCA 2014)
Lamprophiidae	*Psammophis brevirostris*	Short-snouted Grass Snake	Least Concern (SARCA 2014)
Lamprophiidae	*Psammophylax tritaeniatus*	Striped Grass Snake	Least Concern (SARCA 2014)
Lamprophiidae	*Pseudaspis cana*	Mole Snake	Least Concern (SARCA 2014)
Leptotyphlopidae	*Leptotyphlops incognitus*	Incognito Thread Snake	Least Concern (SARCA 2014)
Pelomedusidae	*Pelomedusa galeata*	South African Marsh Terrapin	Not evaluated
Pythonidae	*Python natalensis*	Southern African Python	Least Concern (SARCA 2014)
Scincidae	*Trachylepis capensis*	Cape Skink	Least Concern (SARCA 2014)
Scincidae	*Trachylepis margaritifera*	Rainbow Skink	Least Concern (SARCA 2014)
Scincidae	*Trachylepis punctatissima*	Speckled Rock Skink	Least Concern (SARCA 2014)
Scincidae	*Trachylepis sp. (Transvaal varia)*	Skink sp. 1	
Scincidae	*Trachylepis striata*	Striped Skink	Least Concern (SARCA 2014)
Scincidae	*Trachylepis varia sensu lato*	Common Variable Skink Complex	Least Concern (SARCA 2014)
Testudinidae	*Kinixys lobatsiana*	Lobatse Hinged Tortoise	Least Concern (SARCA 2014)
Testudinidae	*Kinixys spekii*	Speke's Hinged Tortoise	Least Concern (SARCA 2014)
Typhlopidae	*Afrotyphlops schlegelii*	Schlegel's Beaked Blind Snake	Least Concern (SARCA 2014)
Varanidae	*Varanus albigularis albigularis*	Rock Monitor	Least Concern (SARCA 2014)

Table 5: Expected Amphibians

Family	Species Name	Common Name	Conservation Status
Brevicepitidae	*Breviceps adspersus*	Bushveld Rain Frog	Least Concern
Bufonidae	*Poyntonophrynus fenoulheti*	Northern Pygmy Toad	Least Concern
Bufonidae	*Schismaderma carens*	Red Toad	Least Concern
Bufonidae	*Sclerophrys garmani*	Olive Toad	Least Concern (IUCN, 2016)
Bufonidae	*Sclerophrys gutturalis*	Guttural Toad	Least Concern (IUCN, 2016)
Bufonidae	*Sclerophrys pusilla*	Flatbacked Toad	Least Concern (IUCN, 2016)
Hyperoliidae	*Hyperolius marmoratus*	Painted Reed Frog	Least Concern (IUCN, 2013)
Hyperoliidae	*Kassina senegalensis*	Bubbling Kassina	Least Concern
Microhylidae	*Phrynomantis bifasciatus*	Banded Rubber Frog	Least Concern
Phrynobatrachidae	*Phrynobatrachus natalensis*	Snoring Puddle Frog	Least Concern (IUCN, 2013)
Ptychadenidae	*Ptychadena anchietae*	Plain Grass Frog	Least Concern
Ptychadenidae	*Ptychadena mossambica*	Broadbanded Grass Frog	Least Concern
Pyxicephalidae	*Amietia delalandii*	Delalande's River Frog	Least Concern (2017)
Pyxicephalidae	*Amietia poyntoni*	Poynton's River Frog	Least Concern (2017)
Pyxicephalidae	*Cacosternum boettgeri*	Common Caco	Least Concern (2013)
Pyxicephalidae	*Tomopterna cryptotis*	Tremelo Sand Frog	Least Concern
Pyxicephalidae	*Tomopterna natalensis*	Natal Sand Frog	Least Concern
Rhacophoridae	*Chiromantis xerampelina*	Southern Foam Nest Frog	Least Concern (2013)

Table 6: Expected Lepidoptera Species and Arachnid SCC

Family	Species Name	Common Name	Conservation Status
Theraphosidae	***Ceratogyrus darlingi***	**Rear Horned Baboon Spider (Tarantula)**	**TOPS Listed**
COSSIDAE	*Azygophleps sp.*		
COSSIDAE	*Azygophleps asylas*		Not listed
CRAMBIDAE	*Pardomima sp.*		
CRAMBIDAE	*Pyrausta sp.*		
CRAMBIDAE	*Synclera traducalis*		Not listed
ELACHISTIDAE	*Ethmia sp.*		
EREBIDAE	*Acantholipes trimeni*		Not listed
EREBIDAE	*Amata atricornis*		Not listed
EREBIDAE	*Cyligramma latona*		Not listed
EREBIDAE	*Eublemma bolinia*		Not listed
EREBIDAE	*Eublemma staudingeri*		Not listed
EREBIDAE	*Grammodes euclidioides euclidioides*		Not listed
EREBIDAE	*Lithacodia sp.*		
EREBIDAE	*Pericyma mendax*		Not listed
EREBIDAE	*Plecoptera annexa*		Not listed
EREBIDAE	*Saenura flava*		Not listed
GEOMETRIDAE	*Isturgia arizeloides*		Not Threatened (NT) [not an IUCN category]
GEOMETRIDAE	*Lhommeia subapicata*		Not Threatened (NT) [not an IUCN category]
GEOMETRIDAE	*Microloxia ruficornis*		Not Threatened (NT) [not an IUCN category]
GEOMETRIDAE	*Rhodometra sacraria*		Not Threatened (NT) [not an IUCN category]
GEOMETRIDAE	*Scopula sp.*		
HESPERIIDAE	*Abantis tettensis*	Spotted velvet skipper	Least Concern (SABCA 2013)
HESPERIIDAE	*Coeliades forestan forestan*	Striped policeman	Least Concern (SABCA 2013)
HESPERIIDAE	*Coeliades pisistratus*	Two-pip policeman	Least Concern (SABCA 2013)
HESPERIIDAE	*Eretis umbra umbra*	Small marbled elf	Least Concern (SABCA 2013)
HESPERIIDAE	*Gegenes pumilio gambica*	Dark dodger	Least Concern (SABCA 2013)
HESPERIIDAE	*Kedestes callicles*	Pale ranger	Least Concern (SABCA 2013)

HESPERIIDAE	*Leucochitonea levubu*	White-cloaked skipper	Least Concern (SABCA 2013)
HESPERIIDAE	*Metisella willemi*	Netted sylph	Least Concern (SABCA 2013)
HESPERIIDAE	*Parosmodes morantii morantii*	Morant's orange	Least Concern (SABCA 2013)
HESPERIIDAE	*Platylesches ayresii*	Peppered hopper	Least Concern (SABCA 2013)
HESPERIIDAE	*Platylesches moritili*	Honey hopper	Least Concern (SABCA 2013)
HESPERIIDAE	*Pyrrhiades anchises anchises*	One-pip policeman	Least Concern (SABCA 2013)
HESPERIIDAE	*Spialia delagoae*	Delagoa sandman	Least Concern (SABCA 2013)
HESPERIIDAE	*Spialia dromus*	Forest sandman	Least Concern (SABCA 2013)
HESPERIIDAE	*Spialia ferax*	Striped sandman	Least Concern (SABCA 2013)
HESPERIIDAE	*Spialia mafa mafa*	Mafa sandman	Least Concern (SABCA 2013)
HESPERIIDAE	*Tsitana tsita*	Dismal sylph	Least Concern (SABCA 2013)
LASIOCAMPIDAE	*Anadiasa punctifascia*		Not listed
LASIOCAMPIDAE	*Eucraera salammbo*		Not listed
LYCAENIDAE	*Actizera lucida*	Rayed blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Alaena amazoula ochroma*	Yellow zulu	Least Concern (SABCA 2013)
LYCAENIDAE	*Aloeides taikosama*	Dusky russet	Least Concern (SABCA 2013)
LYCAENIDAE	*Aloeides trimeni trimeni*	Brown russet	Least Concern (SABCA 2013)
LYCAENIDAE	*Anthene amarah amarah*	Black-striped ciliate blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Anthene definita definita*	Steel-blue-ciliate blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Anthene livida livida*	Pale ciliate blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Axiocerses amanga amanga*	Bush scarlet	Least Concern (SABCA 2013)
LYCAENIDAE	*Axiocerses tjoane tjoane*	Eastern scarlet	Least Concern (SABCA 2013)
LYCAENIDAE	*Azanus jesous*	Topaz babul blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Azanus ubaldus*	Velvet-spotted babul blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Cacyreus lingeus*	Bush bronze	Least Concern (SABCA 2013)
LYCAENIDAE	*Capys disjunctus*	Russet protea	Least Concern (SABCA 2013)
LYCAENIDAE	*Chilades trochylus*	Grass jewel blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Cigaritis ella*	Ella's silverline	Least Concern (SABCA 2013)
LYCAENIDAE	*Cigaritis natalensis*	Natal silverline	Least Concern (SABCA 2013)
LYCAENIDAE	*Crudaria leroma*	Silver-spotted grey	Least Concern (SABCA 2013)
LYCAENIDAE	*Cupidopsis cissus cissus*	Meadow blue	Least Concern (SABCA 2013)

LYCAENIDAE	*Cupidopsis jobates jobates*	Tailed meadow blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Eicochrysops messapus mahallakoaena*	Cupreous ash blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Euchrysops dolorosa*	Sabie smoky blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Euchrysops malathana*	Grey smoky blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Euchrysops osiris*	Osiris smoky blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Hypolycaena philippus philippus*	Purple-brown hairstreak	Least Concern (SABCA 2013)
LYCAENIDAE	*Iolaus mimosae rhodosense*	Mimosa sapphire	Least Concern (SABCA 2013)
LYCAENIDAE	*Iolaus trimeni*	Protea sapphire	Least Concern (SABCA 2013)
LYCAENIDAE	*Lampides boeticus*	Pea blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Lepidochrysops patricia*	Patrician giant cupid	Least Concern (SABCA 2013)
LYCAENIDAE	*Lepidochrysops plebeia plebeia*	Twin-spot giant cupid	Least Concern (SABCA 2013)
LYCAENIDAE	*Leptomyrina henningi henningi*	Plain black-eye	Least Concern (SABCA 2013)
LYCAENIDAE	*Leptotes pirithous pirithous*	Common zebra blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Myrina silenus ficedula*	Common fig tree blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Pseudonacaduba sichela sichela*	Dusky line blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Stugeta bowkeri tearei*	Bowker's marbled sapphire	Least Concern (SABCA 2013)
LYCAENIDAE	*Tarucus sybaris sybaris*	Dotted pierrot	Least Concern (SABCA 2013)
LYCAENIDAE	*Tuxentius calice*	White pie	Least Concern (SABCA 2013)
LYCAENIDAE	*Tuxentius melaena melaena*	Black pie	Least Concern (SABCA 2013)
LYCAENIDAE	*Zintha hintza hintza*	Hintza pierrot	Least Concern (SABCA 2013)
LYCAENIDAE	*Zizeeria knysna knysna*	African grass blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Zizula hylax*	Tiny grass blue	Least Concern (SABCA 2013)
NOCTUIDAE	*Acontia sp.*		
NOCTUIDAE	*Acontia transfigurata*		Not listed
NOCTUIDAE	*Leucania sp.*		
NOCTUIDAE	*Mythimna tacuna*		
NOCTUIDAE	*Xanthodes albago*		Not listed
NOLIDAE	*Earias biplaga*		Not listed
NYMPHALIDAE	*Acraea acara acara*	Acara acraea	Least Concern (SABCA 2013)
NYMPHALIDAE	*Acraea aglaonice*	Clear-spotted acraea	Least Concern (SABCA 2013)
NYMPHALIDAE	*Acraea anemosa*	Broad-bordered acraea	Least Concern (SABCA 2013)

NYMPHALIDAE	*Acraea axina*	Little acraea	Least Concern (SABCA 2013)
NYMPHALIDAE	*Acraea caldarena caldarena*	Black-tipped acraea	Least Concern (SABCA 2013)
NYMPHALIDAE	*Acraea neobule neobule*	Wandering donkey acraea	Least Concern (SABCA 2013)
NYMPHALIDAE	*Brakefieldia perspicua perspicua*	Marsh patroller	Least Concern (SABCA 2013)
NYMPHALIDAE	*Byblia ilithyia*	Spotted joker	Least Concern (SABCA 2013)
NYMPHALIDAE	*Catacroptera cloanthe cloanthe*	Pirate	Least Concern (SABCA 2013)
NYMPHALIDAE	*Charaxes achaemenes achaemenes*	Bushveld charaxes	Least Concern (SABCA 2013)
NYMPHALIDAE	*Charaxes saturnus saturnus*	Foxy charaxes	Least Concern (SABCA 2013)
NYMPHALIDAE	*Charaxes vansoni*	Van Son's charaxes	Least Concern (SABCA 2013)
NYMPHALIDAE	*Charaxes varanes varanes*	Pearl charaxes	Least Concern (SABCA 2013)
NYMPHALIDAE	*Danaus chrysippus orientis*	African plain tiger	Least Concern (SABCA 2013)
NYMPHALIDAE	*Hamanumida daedalus*	Guineafowl	Least Concern (SABCA 2013)
NYMPHALIDAE	*Hypolimnas misippus*	Common diadem	Least Concern (SABCA 2013)
NYMPHALIDAE	*Junonia hierta cebrene*	Yellow pansy	Least Concern (SABCA 2013)
NYMPHALIDAE	*Junonia oenone oenone*	Dark blue pansy	Least Concern (SABCA 2013)
NYMPHALIDAE	*Phalanta phalantha aethiopica*	African leopard	Least Concern (SABCA 2013)
NYMPHALIDAE	*Physcaeneura panda*	Dark-webbed ringlet	Least Concern (SABCA 2013)
NYMPHALIDAE	*Precis archesia archesia*	Garden inspector	Least Concern (SABCA 2013)
NYMPHALIDAE	*Stygionympha wichgrafi wichgrafi*	Wichgraf's hillside brown	Least Concern (SABCA 2013)
NYMPHALIDAE	*Telchinia rahira rahira*	Marsh telchinia	Least Concern (SABCA 2013)
NYMPHALIDAE	*Telchinia serena*	Dancing telchinia	Least Concern (SABCA 2013)
NYMPHALIDAE	*Vanessa cardui*	Painted lady	Least Concern (SABCA 2013)
NYMPHALIDAE	*Ypthima impura paupera*	Impure three-ring	Least Concern (SABCA 2013)
PAPILIONIDAE	*Graphium antheus*	Large striped swordtail	Least Concern (SABCA 2013)
PAPILIONIDAE	*Graphium morania*	White lady	Least Concern (SABCA 2013)
PAPILIONIDAE	*Papilio demodocus demodocus*	Citrus swallowtail	Least Concern (SABCA 2013)
PAPILIONIDAE	*Papilio nireus lyaeus*	Narrow green-banded swallowtail	Least Concern (SABCA 2013)
PIERIDAE	*Belenois aurota*	Pioneer caper white	Least Concern (SABCA 2013)
PIERIDAE	*Belenois creona severina*	African caper white	Least Concern (SABCA 2013)
PIERIDAE	*Catopsilia florella*	African migrant	Least Concern (SABCA 2013)
PIERIDAE	*Colias electo electo*	African clouded yellow	Least Concern (SABCA 2013)

PIERIDAE	*Colotis antevippe gavisa*	Red tip	Least Concern (SABCA 2013)
PIERIDAE	*Colotis euippe omphale*	Southern round-winged orange tip	Least Concern (LC)
PIERIDAE	*Colotis evagore antigone*	Small orange tip	Least Concern (SABCA 2013)
PIERIDAE	*Colotis evenina evenina*	African orange tip	Least Concern (SABCA 2013)
PIERIDAE	*Colotis ione*	Bushveld purple tip	Least Concern (SABCA 2013)
PIERIDAE	*Colotis pallene*	Bushveld orange tip	Least Concern (SABCA 2013)
PIERIDAE	*Colotis regina*	Queen purple tip	Least Concern (SABCA 2013)
PIERIDAE	*Colotis vesta argillaceus*	Southern veined arab	Least Concern (SABCA 2013)
PIERIDAE	*Eurema brigitta brigitta*	Broad-bordered grass yellow	Least Concern (SABCA 2013)
PIERIDAE	*Mylothris agathina agathina*	Eastern dotted border	Least Concern (SABCA 2013)
PIERIDAE	*Mylothris rueppellii haemus*	Twin dotted border	Least Concern (SABCA 2013)
PIERIDAE	*Pinacopteryx eriphia eriphia*	Zebra white	Least Concern (SABCA 2013)
PIERIDAE	*Teracolus agoye agoye*	Speckled sulphur tip	Least Concern (SABCA 2013)
PIERIDAE	*Teracolus eris eris*	Banded gold tip	Least Concern (SABCA 2013)
PIERIDAE	*Teracolus subfasciatus*	Lemon traveller	Least Concern (SABCA 2013)
SPHINGIDAE	*Acherontia atropos*		Not listed
SPHINGIDAE	*Basiothia medea*		Not listed
SPHINGIDAE	*Rufoclanis numosae*		Not listed