NALEDZANI ENVIRONMENTAL SERVICES
Promoting sustainable use of our natural resources

ECOLOGICAL IMPACT ASSESSMENT REPORT

THE PROPOSED DEVELOPMENT OF TOWNSHIP KNOWN AS SEVILLE EXT. 1 ON PORTIONS 2 AND 3 OF THE FARM SEVILLE 224KU IN THE BUSHBUCKRIDGE LOCAL MUNICIPALITY OF THE ENHLAZENI DISTRIC IN THE MPUMALANGA PROVINCE

PREPARED FOR:

BUSHBUCKRIDGE LOCAL MUNICIPALITY

PREPARED BY:

NALEDZANI ENVIRONMENTAL SERVICES

DATE:

24 JANUARY 2023

078 901 4833
076 388 7203
ramalivhanam@gmail.com
ramalivhanam@naledzanies.co.za
www.naledzanies.co.za
Suite 211, Elephant House
107 Albertina Sisulu Street
Johannesburg
2107

PROJECT DETAILS	
Project Title	Seville Extension 1 township
Client	Bushbuckridge Local Municipality
Description	The proposed development of township known as Seville ext. 1 on portions 2 and 3 of the farm Seville 224ku in the Bushbuckridge Local Municipality of the Ehlanzeni District in the Mpumalanga Province
Document Status	Final
Prepared by	Mpho Ramalivhana
	Mpho Ramalivhana Pri Sci. Nat (Hons. Bot.; SAAB; SACNASP)
Approved by	
Date	24 January 2023

DECLARATION OF INDEPENDENCE

I, Mpho Ramalivhana, declare that I:

- I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP).
- At the time of conducting the study and compiling this report I did not have any interest, hidden or otherwise, in the proposed development that this study has reference to, except for financial compensation for work done in professional capacity.
- Work performed for this study was done in an objective manner. Even if this study results in views and findings that are not favourable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part, other than being a member of the general public.
- I declare that there are no circumstances that may compromise my objectivity in performing this specialist investigation. I do not necessarily object to or endorse the proposed development, but aim to present facts, findings and recommendations based on relevant professional experience and scientific data.
- I do not have any influence over decisions made by the governing authorities.
- I undertake to disclose all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by a competent authority to such a relevant authority and the applicant.
- I have expertise and experience in conducting specialist reports relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity.
- This document and all information contained herein is and will remain the intellectual property of Naledzani Environmental Services and the specialist investigator responsible for conducting the study. This document, in its entirety or any portion thereof, may not be altered in any manner or form, for any purpose without the specific and written consent of the specialist investigator.
- I will comply with the Act, regulations and all other applicable legislation.
- I realize that a false declaration is an offence in terms of Regulation 71 of NEMA and is punishable in terms of section 24F of the Act.

Mpho Ramalivhana Pri Sci. Nat (Hons. Bot.; SAAB; SACNASP)

SPECIALIST INFORMATION

Mpho Ramalivhana of Naledzani Environmental Consultant holds an Honours Degree in Botany from the University of Limpopo (Turfloop Campus) and has 11 years' professional experience in biodiversity assessment & management, and ecological research. He is a registered member for South African Council for Natural Scientist Professions (**400395/14**).

Table of Contents

List of Tables

List of Figures

1. INTRODUCTION

Naledzani Environmental Services has been appointed by Real Development Planning Company on behalf of Bushbuckridge Local Municipality to conduct a terrestrial ecological assessment for the proposed development of township known as Seville ext. 1 on portions 2 and 3 of the farm Seville 224 KU in the Bushbuckridge Local Municipality of the Ehlanzeni District in the Mpumalanga Province to determine the sensitivity of the site.

1.1 Scope of study

The terms of reference for this investigation are limited to a terrestrial ecological assessment with the following objectives:

- To assess the proposed development in order to determine the general ecological state of the proposed project area;
- To survey and delineate environmentally sensitive areas;
- To assess the proposed development in terms of faunal and floral taxa including the potential for species to occur;
- To provide mapping of the environmentally sensitive and critical areas with respect to the proposed development;
- To assess and identify the potential impacts that may arise from the proposed project on the fauna and flora taxa;
- To provide mitigation measures to prevent and/or mitigate identified environmental impacts that may occur due to the proposed project; and
- The provision of an assessment report, indicate findings, recommendations and maps indicating sensitivities and/or no-go areas.

1.2 Assumptions and limitations

Ecological studies should be conducted during the growing season of all plant species that may potentially occur. This may require more than one season's survey with two visits undertaken preferably from November to February. However, due to the EIA timeframes in relation to this project, this assessment was conducted in August 2022 before the rainfall and as such many plant species including grasses were still not yet in their growing period.

The entire site was walked on foot and sampled by the specialist. All species included in the plant species list were observed and recorded in the study area and any comments or observations made in this regard are based on observations, literature review, the expert knowledge and relevant professional experience of the specialist.

2. LEGISLATIVE REQUIREMENTS

A summary of the relevant sections of the acts that govern the activities and potential impacts to the environment associated with the development are listed below. It should be noted that these acts are listed below only with specific reference to biodiversity studies.

Table 1: Acts and regulations relating to the project

Legislation/Policy	Description
The Convention of Biological Diversity (Rio de Janeiro, 1992).	The purpose of the Convention on Biological Diversity is to conserve the variability among living organisms, at all levels (including diversity between species, within species and of ecosystems). Primary objectives include (i) conserving biological diversity, (ii) using biological diversity in a sustainable manner and (iii) sharing the benefits of biological diversity fairly and equitably.
South African Constitution 108 of 1996	The Constitution is the supreme law of the land and includes the Bill of rights which is the cornerstone of democracy in South Africa and enshrines the rights of people in the country. It includes the right to an environment which is not harmful to human health or well-being and to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures.
Strategic Framework for Sustainable Development in South Africa	The development of a broad framework for sustainable development was initiated to provide an overarching and guiding National Sustainable Development Strategy. The Draft Strategic Framework for Sustainable Development (SFSD) in South Africa (September 2006) is a goal orientated policy framework aimed at meeting the Millennium Development Goals. Biodiversity has been identified as one of the key crosscutting trends in the SFSD. The lack of sustainable practices in managing natural resources, climate change effects, loss of habitat and poor land management practices were raised as the main threats to biodiversity.
National Environmental Management Act 107 of 1998	This is a fundamentally important piece of legislation and effectively promotes sustainable development and entrenches principles such as the 'precautionary approach', 'polluter pays' principle, and requires responsibility for impacts to be taken throughout the life cycle of a project NEMA provides the legislative backing (Including Impact Assessment Regulations) for regulating development and ensuring that a risk-averse and cautious approach is taken when making decisions about activities.
Environmental Impact Assessment (EIA) regulations	New regulations have been promulgated in terms of Chapter 5 of NEMA and were published on 07 April 2017 in Government Notice No. R. 326. Development and land use activities which require Environmental Authorisation in terms of the NEMA EIA Regulations, 2017, are in Listing Notice 1 and 3 identified via geographic areas with the intention being that activities only require Environmental Authorisation when located within designated sensitive areas. These sensitive/geographic areas were identified and published for each of the nine (9) Provinces.

National Environmental Management: Biodiversity Act No 10 of 2004	The Biodiversity Act provides listing threatened or protected ecosystems, in one of four categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Protected (Government Gazette, 2011). The main purpose of listing threatened ecosystems is to reduce the rate of ecosystem and species extinction and includes the prevention of further degradation and loss of structure, function and composition of threatened ecosystems.
Conservation of Agricultural Resources Act 43 of 1967	The intention of this Act is to control the over-utilization of South Africa's natural agricultural resources, and to promote the conservation of soil and water resources and natural vegetation. The CARA has categorised a large number of invasive plants together with associated obligations of the land owner, including the requirement to remove categorised invasive plants and taking measures to prevent further spread of alien plants.
National Forest Act 84 of 1998	The protection, sustainable management and use of forests and trees within South Africa are provided for under the National Forests Act (Act 84 of 1998).
National Environmental Management: Protected Areas Act 57 of 2003	This Act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. It also seeks to provide for the sustainable utilization of protected areas and to promote participation of local communities in the management of protected areas.
The RAMSAR Convention	Emphasis is placed on protecting wetlands and implementing initiatives to maintain or improve the state of wetland resources.
Convention on Biological Diversity	Countries are to rehabilitate or restore degraded ecosystem through the formulation of appropriate strategies and plans;
United Nations Convention to Combat Desertification	South Africa has responded to the UN Convention to Combat Desertification by developing a National Action Plan. The aim of the NAP is to implement at current and future policies that affect natural resource management and rural development, and establish partnerships between government departments, overseas development agencies, the private sector and NGOs
Mpumalanga Nature Conservation Act (10 of 1998)	To consolidate and amend the laws relating to nature conservation within the Province and to provide for matter connected therewith

3. DESCRIPTION OF THE ENVIRONMENT

3.1. Project Location

The proposed are is situated north of the current Seville village and east of Hluvukani within portions 2 and 3 of the farm Seville 224 KU in the Bushbuckridge Local Municipality of the Ehlanzeni District in the Mpumalanga Province. The centre coordinates for the area of interest is as follows:

- Southing - 24° 39' 23.43"
- Easting - 31° 24' 30.30"

See **figures 1 and 2** below:

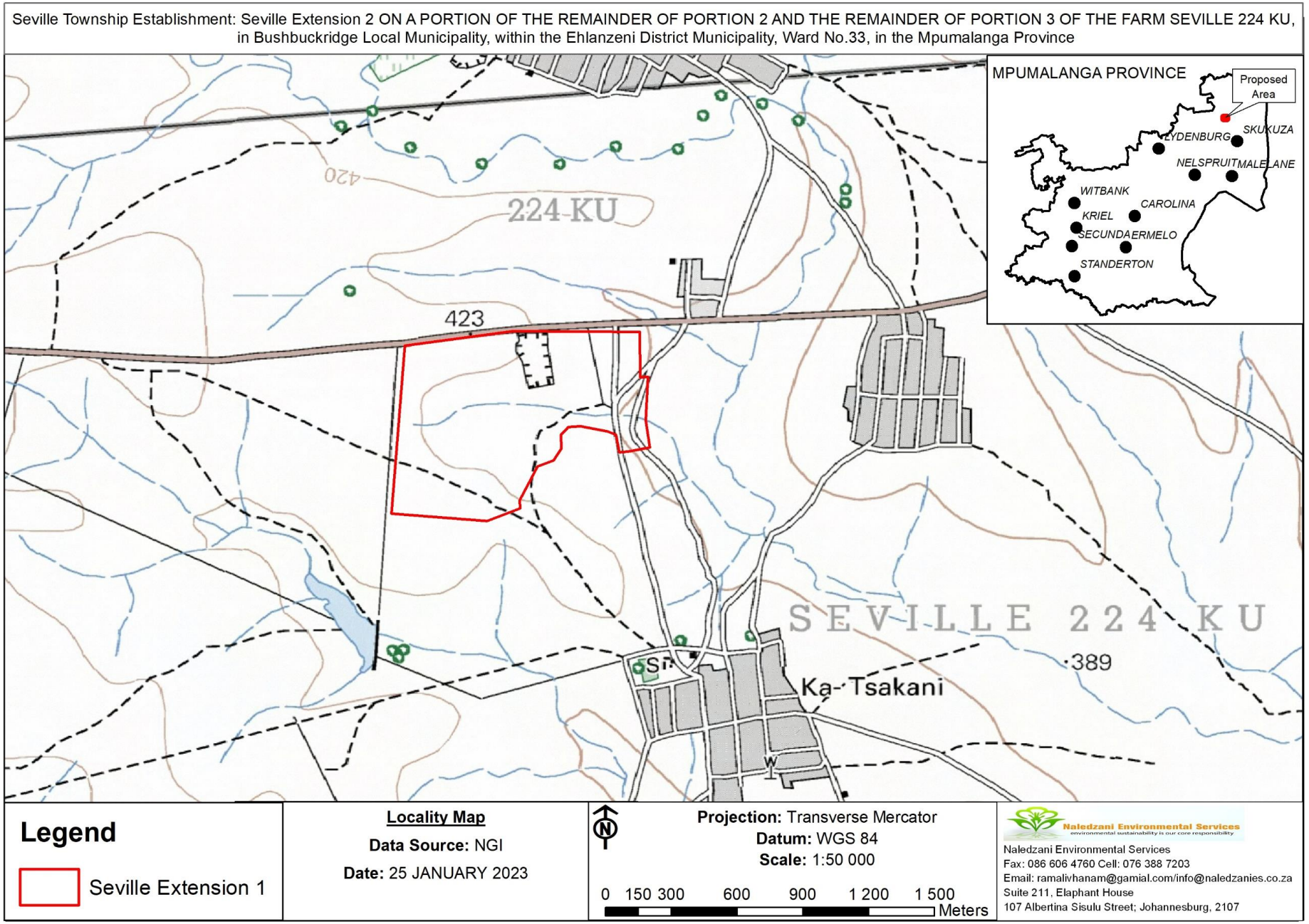

Figure 1: Site locality map

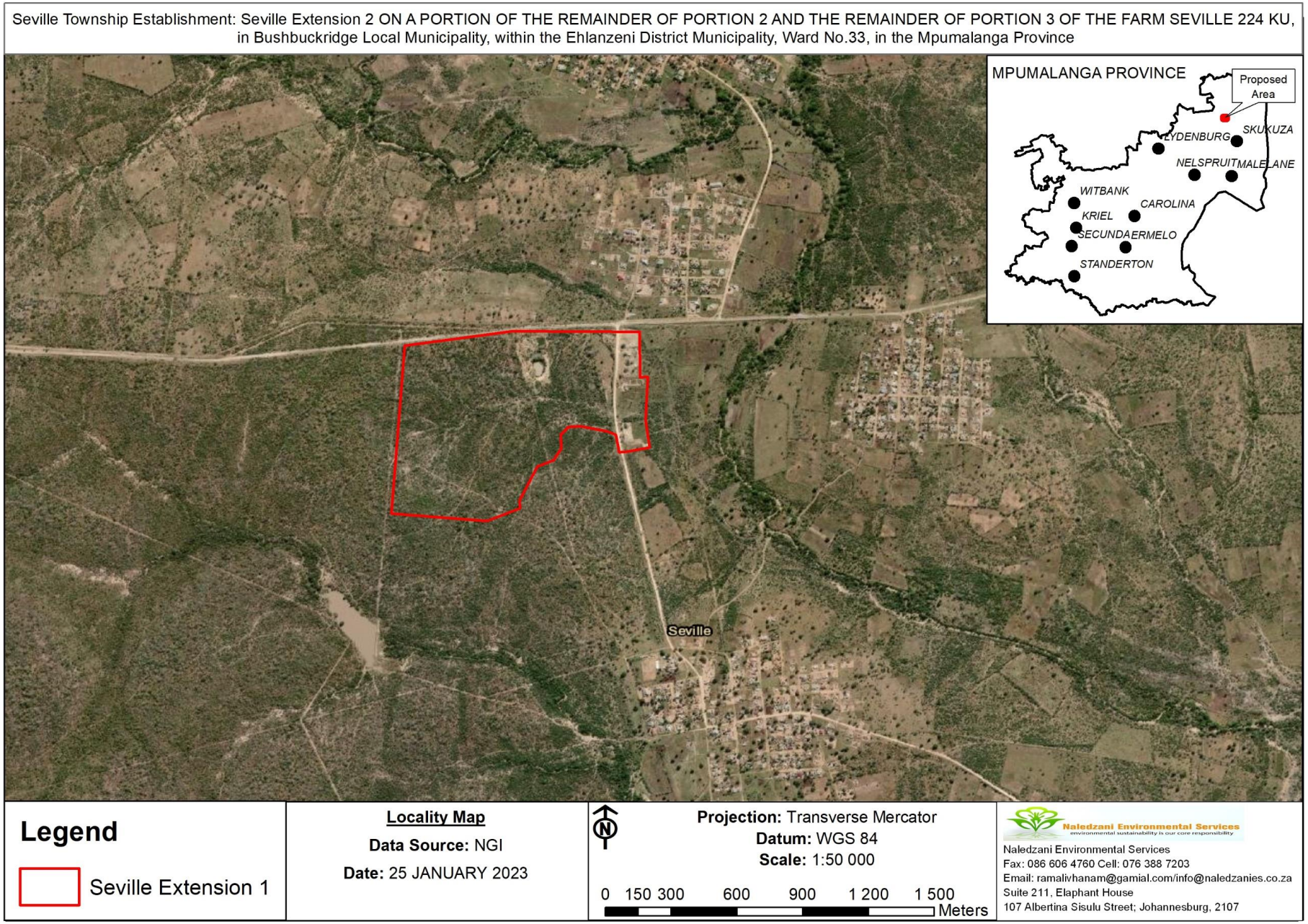

Figure 2: Goggle earth-view for the site

3.2. Biome type

Rutherford and Westfall (1994) described the project as falling within the Savanna Biome. The Savanna Biome is the largest Biome in southern Africa, occupying 46% of its area, and over one-third the area of South Africa. It is well developed over the lowveld and Kalahari region of South Africa and is also the dominant vegetation in neighbouring Botswana, Namibia and Zimbabwe. It is characterized by a grassy ground layer and a distinct upper layer of woody plants. Where this upper layer is near the ground vegetation may be referred to as Shrubveld, where it is dense as Woodland, and the intermediate stages are locally known as Bushveld.

The environmental factors delimiting the biome are complex: altitude ranges from sea level to 2000 m; rainfall varies from 235 to 1000 mm per year; frost may occur from 0 to 120 days per year; and almost every major geological and soil type occurs within the biome. A major factor delimiting the biome is the lack of sufficient rainfall which prevents the upper tree layer from dominating, coupled with fires and grazing, which keep the grass layer dominant. Summer rainfall is essential for grass dominance, which, with its fine material, fuels near-annual fires. In fact, almost all species are adapted to survive fires, usually with less than 10% of plants, both in the grass and tree layer, killed by fire. Even with severe burning, most species can re-sprout from the stem bases.

The grass layer is dominated by C 4-type grasses, which are at an advantage where the growing season is hot. But where rainfall has a stronger winter component, C 3-type grasses dominate. The shrub-tree layer may vary from 1 to 20 m in height, but in Bushveld typically varies from 3 to 7 m. The shrub-tree element may come to dominate the vegetation in areas which are being overgrazed.

Most of the Savanna vegetation types are used for grazing, mainly by cattle or game. In the southernmost Savanna types, goats are a major stock. In some areas crops and subtropical fruit are cultivated. These mainly include the Clay Thorn Bushveld, parts of Mixed Bushveld, and Sweet Lowveld Bushveld. Conservation status of Savanna is comparatively good, mainly due to the presence of the Kruger and Kalahari Gemsbok National Parks within the biome. However, the high area conserved in South Africa, belies the fact that half of Savanna vegetation types are inadequately conserved, in having less than 5% of their area in reserves and, much of the area is used for game-farming and can thus be considered effectively preserved, provided that sustainable stocking levels are maintained. The importance of tourism and big game hunting in the conservation of the area must not be underestimated.

3.3. Broad-Scale vegetation patterns

The study area falls within the within the **Granite Lowveld vegetation.** The vegetation is found mainly in Limpopo and Mpumalanga Provinces and Swaziland. It forms a north-south belt on the plains east of the escarpment from Thohoyandou in the north, interrupted in the Bolobedu area, continued in the Bitavi area, with an eastward extension

on the plains around the Murchison Range and southwards to Abel Erasmus Pass, Mica and Hoedspruit areas to the area east of Bushbuckridge. Substantial parts are found in the Kruger National Park spanning areas east of Orpen Camp southwards through Skukuza and Mkhulu. It is found at altitudes of 250 – 700 m.

Granite Lowveld comprises tall shrubland with few trees to moderately dense low woodland dominated by *Terminalia sericea, Combretum zeyheri* and *C. apiculatum* (small trees) and a ground layer consisting of *Pogonarthria squarrosa, Tricholaena monache* and *Eragrostis rigidior* (grasses). In the lowland areas dense thicket to open savanna with *Acacia nigrescens* (tall tree) and *Dichrostachys cinerea* and *Grewia bicolor* (tall shrubs) dominate theory layer. The dense herbaceous layer is mainly comprised of *Digitaria eriantha, Panicum maximum* and *Aristida congesta* (grasses) on fine-textured soils, while brackish bottomland soils support *Sporobolus nitens* (grass). A dense fringe of *T. sericea* and *Eragrostis gummiflua* occurs in areas where the topography changes from convex to concave.

This vegetation unit is considered ***vulnerable*** with the conservation target of 19%. Some 175 is currently conserved statutorily in the Kruger National Park. About the same amount conserved in private game reserves mainly the Selati, Klaseri, Timbavati, Mala, Sabi Sand and Manyeleti. More than 20% is already transformed, mainly by cultivation and by settlement development. Erosion is very low to moderate.

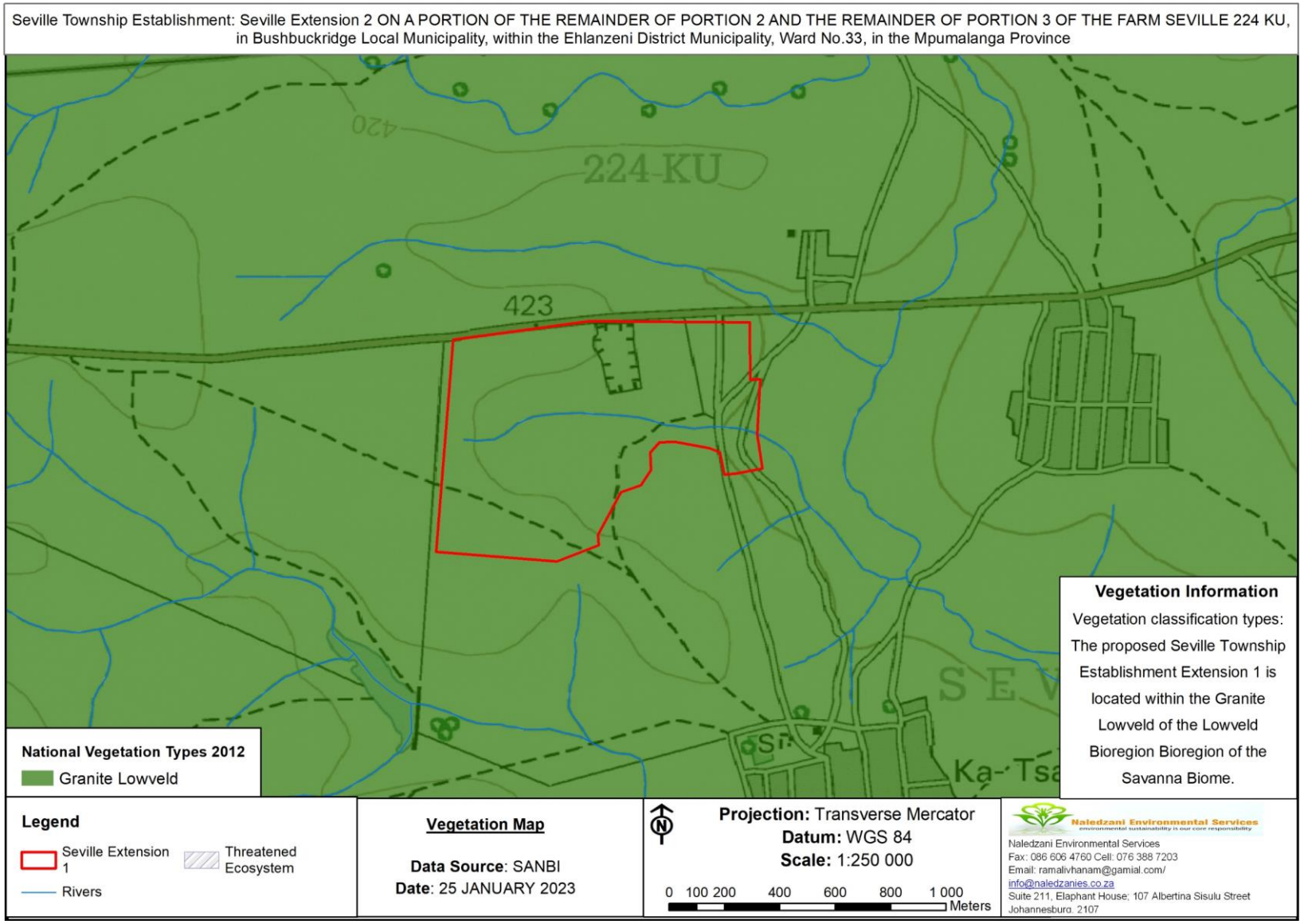

Figure 3: Broad vegetation map for the site

3.4. Climate

The project is situated in the lowveld region of Mpumalanga which has a subtropical climate strongly influenced by proximity to the Indian Ocean. It is in a summer rainfall region with rains season normally lasting from October to March. The average mean annual precipitation for the Ehlanzeni district varies between 750 and 860 mm (DWAF 2000) with winter rainfall considered rare (Robin, 2017). In terms of temperature, historically there has been a strong seasonality between the winter and summer months. The cooler winter season ranges between May and August with the warmer summer months occurring between December and February. The coolest and hottest months have historically been June and February respectively with records showing a very moderate temperature variation between winter and summer months (Robin, 2017).

3.5. Land use and existing impacts

Currently the bigger part of the site vacant with a small section have been used as a borrow-pit and another part is fallow lands.

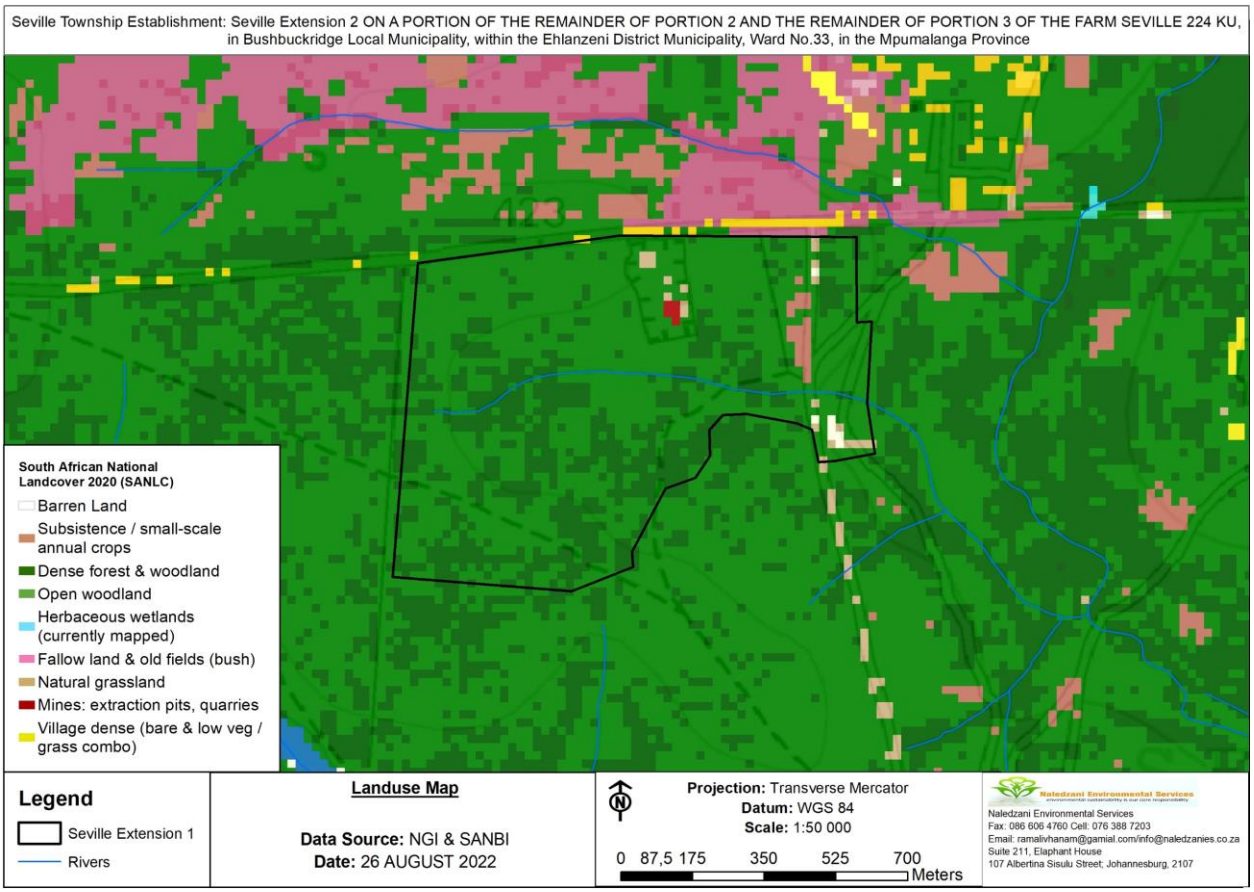

Figure 4:land-use map for the site

3.6. Terrestrial threatened ecosystem

The South African National Biodiversity Institute (SANBI), in conjunction with the Department of Environmental Affairs (DEA), released a draft report in 2009 entitled “Threatened Ecosystems in South Africa: Descriptions and Maps”, to provide background information on the List of Threatened Ecosystems (SANBI, 2009). The purpose of this report was to present a detailed description of each of South Africa’s ecosystems and to determine their status using a credible and practical set of criteria. The following criteria were used in determining the status of threatened ecosystems:

- Irreversible loss of natural habitat;
- Ecosystem degradation and loss of integrity;
- Limited extent and imminent threat;
- Threatened plant species associations;
- Threatened animal species associations; and

- Priority areas for meeting explicit biodiversity targets as defined in a systematic conservation plan.

In terms of section 52 (1) (a), of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), a new national list of ecosystems that are threatened and in need of protection was gazetted on 9 December 2012 (Government Notice 1002 (Driver *et. al.*, 2004). The list classified all threatened or protected ecosystems in South Africa in terms of four categories; *Critically Endangered* (CR), *Endangered* (EN), *Vulnerable* (VU), or *Protected*. The purpose of categorizing these ecosystems is to prioritize conservation areas in order to reduce the rates of ecosystem and species extinction, as well as preventing further degradation and loss of structure, function, and composition of these ecosystems. It is estimated that threatened ecosystems make up 9.5% of South Africa, with critically endangered and endangered ecosystems accounting for 2.7%, and vulnerable ecosystems 6.8% of the land area. It is therefore vital that Threatened Terrestrial Ecosystems inform proactive and reactive conservation and planning tools, such as Biodiversity Sector Plans, municipal Strategic Environmental Assessments (SEAs) and Environmental Management Frameworks (EMFs), Environmental Impact Assessments (EIAs) and other environmental applications (Mucina *et al.,* 2006*)*. According to data sourced from South African National Biodiversity Institute (SANBI), the site is located within the vulnerable Ecosystem (**Granite Lowveld)**.

4. METHODOLOGY AND REPORTING

The information provided in this terrestrial biodiversity report is based mainly on the observations that were made during the field survey and a review of the available reports that contain known and predicted biodiversity and ecological information regarding the site. A wide range of spatial data sets were interrogated and relevant information was extracted for the study site. A basic ecological sensitivity analysis was performed to identify areas of special interest or concern. The various approaches used and aspects taken into account are detailed below:

4.1. General

A desktop survey utilising aerial images and photography was undertaken to assemble background information regarding the different features and vegetation communities present within the proposed project footprint. The site was fully surveyed on the 25th August 2022 to ensure that the true floristic reflection of the site is recorded.

4.2. Vegetation

The PRECIS list of plants recorded in the 2431CB quarter degree grid square was obtained from SANBI. This list was consulted to verify the record of occurrence of the plant species seen on the site. A desk-top study of the habitats of the red-listed and orange-listed species known to occur in the area was done before the site visits. The rapid visual

assessment was used to assess the abundance of floral species. The vegetation units of Mucina & Rutherford (2006) were also used as reference but where necessary communities are named according to the recommendations for a standardized South African syntaxonomic nomenclature system. By combining the available literature with the survey results, stratification of vegetation communities was possible.

4.3. Fauna

The faunal assessment is based on desktop analysis and observations that were made during the site visit. During the time on site, no mammals were noticed and it was deemed necessary that a desktop analysis be done to explore all different kinds of animals to habit the area. The occurrence of some key bird species was verified according to the distribution record obtained during the Southern African Bird Atlas period from 1981 to 1993 (Harrison et al., 1997) as well as records from 1974 to 1987 according to Tarboton et al (1987).

4.4. Sensitivity Map

Following the site visit, an ecological sensitivity map of the site has been generated by integrating the information collected on-site with the available biodiversity information available in the literature and various spatial databases as described above. The ecological sensitivity of the different units identified in the mapping procedure was rated according to the following scale:

- **Low -** Units with a low sensitivity where there is likely to be a negligible impact on ecological processes and terrestrial biodiversity. This category is reserved specifically for areas where the natural vegetation has already been transformed, usually for intensive agricultural purposes such as cropping. Most types of development can proceed within these areas with little ecological impact.

- **Medium** - Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact such as erosion low. Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.

- **High -** Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area. Development within these areas is highly undesirable and should only proceed with caution as it may not be possible to mitigate all impacts appropriately.

- **Very High -** Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are essentially no-go areas from a developmental perspective and should be avoided at all costs.

4.5. Methodology Adapted in Assessing the Impacts

The significance of the impacts will be assessed considering the following descriptors:

Table 2: Impact assessment table

Nature of the impact		
Positive	+	Impact will be beneficial to the environment (a benefit).
Negative	-	Impact will not be beneficial to the environment (a cost).
Neutral	0	Where a negative impact is offset by a positive impact, or mitigation measures, to have no overall effect.
\Magnitude		
Minor	2	Negligible effects on biophysical or social functions / processes. Includes areas / environmental aspects which have already been altered significantly, and have little to no conservation importance (negligible sensitivity*).
Low	4	Minimal effects on biophysical or social functions / processes. Includes areas / environmental aspects which have been largely modified, and / or have a low conservation importance (low sensitivity*).

Moderate	6	Notable effects on biophysical or social functions / processes. Includes areas / environmental aspects which have already been moderately modified, and have a medium conservation importance (medium sensitivity*).
High	8	Considerable effects on biophysical or social functions / processes. Includes areas / environmental aspects which have been slightly modified and have a high conservation importance (high sensitivity*).
Very high	10	Severe effects on biophysical or social functions / processes. Includes areas / environmental aspects which have not previously been impacted upon and are pristine, thus of very high conservation importance (very high sensitivity*).
Extent		
Site only	1	Effect limited to the site and its immediate surroundings.
Local	2	Effect limited to within 3-5 km of the site.
Regional	3	Activity will have an impact on a regional scale.
National	4	Activity will have an impact on a national scale.
International	5	Activity will have an impact on an international scale.
Duration		
Immediate	1	Effect occurs periodically throughout the life of the activity.
Short term	2	Effect lasts for a period 0 to 5 years.

Medium term	3	Effect continues for a period between 5 and 15 years.
Long term	4	Effect will cease after the operational life of the activity either because of natural process or by human intervention.
Permanent	5	Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.
Probability of occurrence		
Improbable	1	Less than 30% chance of occurrence.
Low	2	Between 30 and 50% chance of occurrence.
Medium	3	Between 50 and 70% chance of occurrence.
High	4	Greater than 70% chance of occurrence.
Definite	5	Will occur, or where applicable has occurred, regardless or in spite of any mitigation measures.

Once the impact criteria have been ranked for each impact, the significance of the impacts will be calculated using the following formula:

Significance Points (SP) = (Magnitude + Duration + Extent) x Probability

The significance of the heritage impact is therefore calculated by multiplying the severity rating with the probability rating. The maximum value that can be reached through this impact evaluation process is 100 SP (points). The

significance for each impact is rated as High (SP≥60), Medium (SP = 31-60) and Low (SP<30) significance as shown in the Table 3 below.

Table 3: Definition of significance rating

Significance of predicted NEGATIVE impacts		
Low	0-30	Where the impact will have a relatively small effect on the environment and will require minimum or no mitigation and as such have a limited influence on the decision
Medium	31-60	Where the impact can have an influence on the environment and should be mitigated and as such could have an influence on the decision unless it is mitigated.
High	61-100	Where the impact will definitely have an influence on the environment and must be mitigated, where possible. This impact will influence the decision regardless of any possible mitigation.
Significance of predicted POSITIVE impacts		
Low	0-30	Where the impact will have a relatively small positive effect on the environment.
Medium	31-60	Where the positive impact will counteract an existing negative impact and result in an overall neutral effect on the environment.
High	61-100	Where the positive impact will improve the environment relative to baseline conditions.

5. RESULTS OF THE ASSESSMENT

5.1. Vegetation Survey

The grass layer along this vegetation unit was found to be dry with few grasses species confirmed to the species level. These include *Melinis repens, Panicum maximum, Perotis patens, Tricholaena monachne, Pogonarthria squarrosa, Brachiaria nigropedata, Eragrostis curvula, Brachiaria serrata, Digitaria eriantha* and *Eragrostis rigidior.*

Figure 5: Dry grass layer on site

The shrub and tree layer consists mainly of *Vachellia nilotica, Sclerocarya birrea, Senagalia. Nigrescens, Dichrostachys cinerea, Ziziphus mucronata, Peltophorum africanum, Terminalia sericea, Combretum imberbe, Combretum apiculatum, Combretum zeyheri, Terminalia sericea, Ficus Stuhlmannii, Pterocarpus rotundifolius, Schotia brachypetala, Diospyros lycioides, Gymnosporia buxifolia, Englerophytum magalismontanum, Acacia sieberiana, Acacia caffra, Ximenia caffra, and Strychnos madagascariensis.*

Herbs and forbs recorded include *Gerbera viridifolia, Waltheria indica, Hypoxis rigidula, Xerophyta retinervis, Vahlia capensis, Hibiscus praeteritus, commelina africana, Aspilia mossambicensis and Indigofera filipes.*

Figure 6: Overview of the tree and shrub layer

5.2. Nationally Protected Trees

The National Forest Act, 1998 (Act No. 84 of 1998) enforces the protection of several indigenous trees. This national list of protected trees was developed through the application of objective scientific criteria which was supported by a computerised scoring system.

Criteria for listing the trees as protected included:

- The rarity of the species;
- Importance of the species in the maintenance of an ecosystem, also known as keystone species;
- The utilization pressure on a species;
- Cultural or spiritual value (including landscaping) of the species; and
- The degree to which a species is already protected under provincial legislation.

The recorded nationally protected trees area *Combretum imberbe and Sclerocarya birrea.*

Figure 7: One of the Marula trees recorded as a national protected tree

5.3. Alien invasive plants

Declared weeds and invaders have the tendency to dominate or replace the herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of natural ecosystems. Therefore, it is important that all these transformers be eradicated and controlled by means of an eradication and monitoring programme. Some invader

plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species (Henderson, 2001).

According to the published Alien and Invasive Species regulations in terms of section 97(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) four categories of problem plants are identified as:

- **Category 1a** plants are high-priority emerging species requiring compulsory control. All breeding, growing, moving and selling are banned.
- **Category 1b** plants are widespread invasive species controlled by a management programme.
- **Category 2** plants are invasive species controlled by area. Can be grown under permit conditions in demarcated areas. All breeding, growing, moving, and selling are banned without a permit.
- **Category 3** plants are ornamental and other species that are permitted on a property but may no longer be planted or sold.

Numerous alien plant species were recorded in the study area at the time of the survey; most notably the extensive invasions by species such as *Opuntia ficus* have the potential to form dense stands. Table 4 lists the alien species as well as the various NEMBA categories for the alien species recorded during the survey.

Table 4: Alien species recorded in the study area.

Scientific name	Common name	NEMBA Category
Amaranthus hybridus	Red amaranth	1b
Opuntia ficus-indica	Prickly pear	1b
Ricinus communis	Castor oil plant	2
Solanum mariantanum	Bug weed	1b
Lantana camara	Bird's brandy; cherry pie; tick-berry	1b
Argemone Mexicana	Mexican prickly poppy	1b

5.4. Description of the CBAs

Critical Biodiversity Areas (CBA's) are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services (SANBI, 2007). These form the key output of a systematic conservation assessment and are the biodiversity sectors inputs into multi-sectoral planning and decision making tools.

The primary purpose of CBA's is to inform land-use planning and the land-use guidelines attached to CBA's aim to promote sustainable development by avoiding loss or degradation of important natural habitat and landscapes in these areas and the landscape as a whole. CBA's can also be used to inform protected area expansion and development plans. The use of CBA's here follows the definition laid out in the guideline for publishing bioregional plans (Anon, 2008):

- "**Critical biodiversity areas** (CBAs) are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses".
- "**Ecological support areas** (ESA's) are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resource use in these areas may be lower than that recommended for critical biodiversity areas."

The guideline for bioregional plans defines three basic CBA categories based on three high-level land management objectives.

Table 5: A framework for linking spatial planning categories (CBAs) to land-use planning and decision-making guidelines based on a set of high-level land biodiversity management objectives.

CBA category	Land Management Objective
PA & CBA 1	**Natural landscapes**: • Ecosystems and species fully intact and undisturbed

CBA category	Land Management Objective
	• These are areas with high irreplaceability or low flexibility in terms of meeting biodiversity pattern targets. If the biodiversity features targeted in these areas are lost, then targets will not be met. • These are landscapes that are at or past their limits of acceptable change.
CBA 2	**Near-natural landscapes**: • Ecosystems and species largely intact and undisturbed. • Areas with intermediate irreplaceability or some flexibility in terms of area required to meet biodiversity targets. There are options for loss of some components of biodiversity in these landscapes without compromising our ability to achieve targets. • These are landscapes that are approaching but have not passed their limits of acceptable change.
Ecological Support Areas (ESA)	**Functional landscapes**: • Ecosystems moderately to significantly disturbed but still able to maintain basic functionality. • Individual species or other biodiversity indicators may be severely disturbed or reduced. • These are areas with low irreplaceability with respect to biodiversity pattern targets only.
Other Natural Areas (ONA) and Transformed	**Production landscapes**: manage land to optimize sustainable utilization of natural resources.

According to the Mpumalanga Conservation plan, the site is situated within an Ecological Support Area, Other natural area as well as heavily degraded area. The heavily degraded area is an old borrow-pit area. Although the bigger part of the site is within other natural area, it must be noted that there protected plant species scattered within the area.

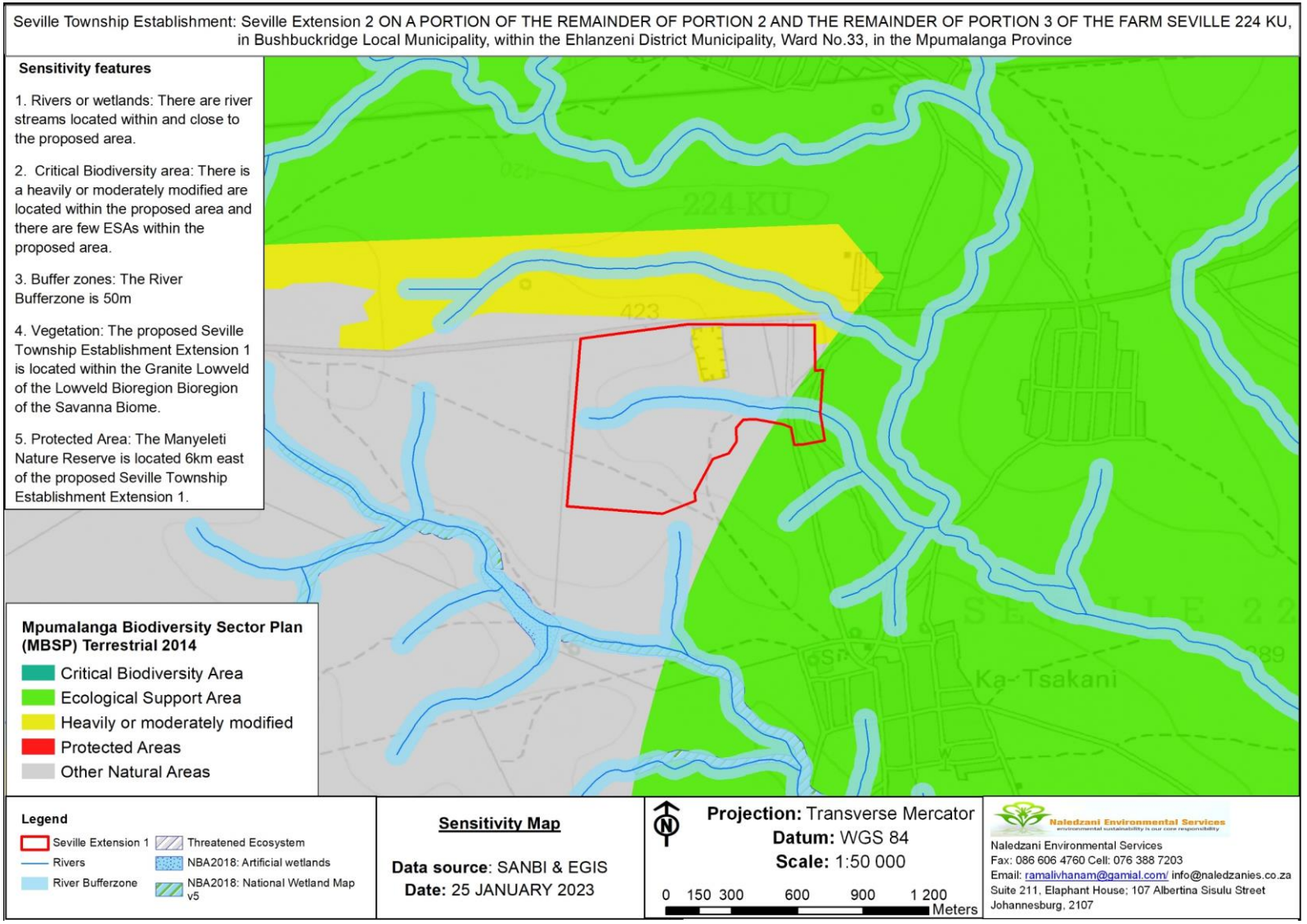

Figure 8: CBA map of the site

5.5. Fauna

According to MammalMap (Animal Demographic Unit) a total of 13 species have been recorded within the 2431CB quarter degree square (QDS). However, it must be noted that approximately 85% of these species are largely restricted to nature reserves/privately owned conservation areas. The remaining species diversity is low and is likely attributed to a lack of sampling effort coupled with anthropogenic habitat modification and associated pressures within the QDS.

Terrestrial and arboreal habitats were the dominant niches from a spatial perspective associated with the project area. The project area represents a relatively large tract of remaining habitat within the Ladysmith urban landscape. Therefore, although not pristine, the area provides refuge as well as some degree of connectivity to surrounding micro-habitats characterised by unique ecological features including unique floral assemblages and specific micro-climate conditions. As such these habitats provide elevated niche heterogeneity and subsequently higher species richness than adjacent anthropogenically modified areas. During the August 2022 site investigation, *Rattus rattus, Bos Taurus, Pronolagus crassicaudatus and Capra aegagrus hircus* were identified within the project area based on direct and indirect signs.

6. ASSESSMENT OF IMPACTS

6.1. Introduction

The Regulations in terms of Chapter 5 of the National Environmental Management, Act No. 107 of 1998 requires that a description must be given of the potential impacts the proposed development will have on the environment. The details indicated the identified impacts for the area and their proposed mitigation measures.

Table 6: Environmental Impacts assessed by combining the consequences (extent, duration, intensity) with the probability of occurrence before and after mitigation for the proposed project

Impacts and Mitigation measures relating to the proposed project										
Activity/Aspect	**Impact**	**Stage**	**Nature**	**Magnitude**	**Extent**	**Duration**	**Probability**	**Significance before mitigation**	**Mitigation measures**	**Significance after mitigation**
Vegetation Clearing for the construction of houses	Destruction of protected plant species	Construction	Negative	Low (4)	Site only (1)	Long term (4)	Definite (5)	Medium (45)	• A permit to disturb cut or remove any protected plant species (Sclerocarya birrea and Combretum imberbe) on the area to be disturbed should be acquired from the relevant provincial authority prior to such disturbance taking place. • All rescued plants should be bagged translocated to a suitable area, preferably planted closer to where they were removed. Replanting should only occur in springs or early summer (September to November), once the first rains have fallen, in order to facilitate establishment. Supervision by an ecologist to ensure success of the rescue operation	Low
	Removal of the natural vegetation	Construction	Negative	Moderate (6)	Site only (1)	Long term (4)	Definite (5)	Medium (55)	• An independent Ecological Control Officer (ECO) should be appointed to oversee construction. • Areas designated for vegetation clearing should be identified and visibly marked off. • Vegetation clearing in natural areas should be kept to a minimum and restricted to the proposed development footprint only. • A temporary fence or demarcation must be erected around the construction area (include the servitude, construction camps, areas where material is stored and the actual footprint of the development) to prevent access to sensitive environs. • No open fires are permitted within naturally vegetated areas.	Low
	Disturbance to animals on site	Construction	Negative	Moderate (6)	Local (2)	Short term (3)	High (4)	Medium (44)	• Do not disturb nests, breeding sites or young ones. Do not attempt to kill or capture snakes unless directly threatening the safety of employees. • Dogs or other pets are not allowed to the worksite as they are threats to the natural wild animal	Low

									• A low speed limit (30km/h) should be enforced on site to reduce wild animal-vehicle collisions • No animals should be intentionally killed or destroyed and poaching and hunting should not be permitted on the site. • Severe contractual fines must be imposed and immediate dismissal on any contract employee who is found attempting to snare or otherwise harms remaining faunal species. • Hunting weapons are prohibited on site. • Contract employees must be educated about the value of wild animals and the importance of their conservation. • The ECO must conduct regular site inspections of removing any snares or traps that have been erected. • Employees and contractors should be made aware of the presence of, and rules regarding, flora and fauna through suitable induction training and on-site signage. • Ensure that the colours used to paint the buildings including the roof are blending to the environment	
	Increased soil erosion, increase in silt loads and sedimentation	Construction	Negative	Low (4)	Local (2)	Long term (4)	Definite (5)	Medium (50)	• Avoid areas with sensitive soils, steep slopes during rain or windy season. • Ensure that roads are not paved but well maintained (as gravel) to reduce the speed of water by promoting infiltration.	Low
	Establishment and spread of declared weeds	Construction	Negative	High (8)	Site (1)	Long term (4)	Definite (5)	High (65)	• The best mitigation measure for alien and invasive species is the early detection and eradication of these species which will be ensured with the use of a monitoring programme. • An alien invasive management programme should be developed and implemented in order to control alien invasive species	Low

Waste generation	Pollution due to oil and fuel spills, erosion, and ablution facilities.	construction	Negative	Moderate (6)	Local (2)	Long term (4)	Definite (5)	High (60)	• Proper ablution facilities on site must be provided. • Constant rehabilitation of erosion problems. • Proper storage facilities of construction materials. • Waste management is very important. Proper storage and removal strategy must be in place. • Proper Standard Operating Procedures in place regulating refuelling and other potential polluting activities. • Must have rehabilitation strategy as part of EMP such as a clean-up plan/strategy if spills occur and proper facilities (ablution) to ensure no sewerage spills into drainage lines and streams.	Low

6.2. Cumulative impacts

Section 2 of the NEMA requires the consideration of cumulative impacts as part of any environmental assessment process. EIAs have traditionally, however, failed to come to terms with such impacts, largely as a result of the following considerations:

- Cumulative effects may be local, regional or global in scale and dealing with such impacts requires coordinated institutional arrangements; and
- EIA's or floral assessments are typically carried out on specific development area, whereas cumulative impacts result from broader biophysical, social and economic considerations, which typically cannot be addressed at the project level.

. In terms of this study, cumulative impacts that may arise are:

- The development will contribute towards the increases of alien plants if not controlled properly. As there are already subsistence farming as well as other projects happening and contributing to the invasion of invader plants
- The removal of vegetation will also lead to medicinal plants being removed within the area.
- However, cumulative impacts on the vegetation can be prevented if mitigation measures as set out in this report are adhered to as a minimum.

7. IMPACT STATEMENT & RECOMMENDATIONS

From a biodiversity perspective, the proposed development will lead to a localised change and/or loss of natural habitat and none of species of conservation concern will be affected as they do not occur on site. Further, this particular section is under pressure due to being 'cut off' to some degree from adjacent areas by roads and residential, the high disturbance levels and high presence of alien invasive species from adjacent areas, and as such the area is already subject to degradation due to the edge effect resulting in invasion of alien species, especially from the road reserves and urban edges. Consequently, from an ecological perspective, the area may no longer qualify as 'optimal' for the conservation of species or of high conservation value as there are no species of concern. Once the development has been built this area will lose its qualification as ESA entirely due to fragmentation and the edge effect. However, this reduction and fragmentation of natural habitats, should, if mitigation measures as recommended are implemented, not result in a change of conservation status of Granite Lowveld overall or of any species of conservation concern present on or occasionally visiting the area.

8. CONCLUSION AND RECOMMENDATIONS

Based on the impact assessment, the impact on the floral and faunal ecology arising from the construction activities will range from high to medium significance prior to the implementation of mitigation measures. With mitigation as stipulated in this report effectively implemented, all impacts can be reduced, ranging from moderately low to very low. Field survey was undertaken in August 2022 to ascertain the ecological state of proposed project area. Based on the data presented in this report as well as observations made during the survey, specific conclusions and recommendations are listed below:

- A permit to disturb cut or remove any protected plant species (*Sclerocarya birrea)* should be acquired from the relevant provincial authority prior to such disturbance taking place should the pits, structure or infrastructure related to the proposed township disturb such plants;
- An alien and invasive management plan must be adhered to at all times; and
- Exposed areas must be rehabilitated with indigenous plants to the project area as soon as construction is finished.

Important mitigation recommendations associated with the proposed development would include ensuring that the disturbed footprint is kept to a minimum, and ensuring compliance to the recommended mitigation measures by any contractors (project proponent) used on the project. It is recommended that the management measures stipulated in this report be included into the proposed projects official EMP and that these are assessed for efficacy during all phases of the project and adapted accordingly to ensure minimal disturbance of the study areas' ecology.

Provided that the mitigation measures as suggested can be implemented, Naledzani Environmental Services including the author of the report **does support** the proposed development as the overall impact of the development components would be of low overall significance

REFERENCES

Brown, L.R., Du Preez, P.J., Bezuidenhout, H., Bredenkamp, G.J., Mostert, T.H.C., and Collins, N.B. 2013. Guidelines for phytosociological classifications and descriptions of vegetation in southern Africa. Koedoe 55(1), Art. #1103, 10pp

Department of Environmental Affairs and Tourism, 2007. National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004): Publication of lists of Critically Endangered, Endangered, Vulnerable and Protected Species. Government Gazette, Republic of South Africa.

Henderson, L. (2001). Alien Weeds and Invasive plants: A complete guide to declared weeds and invaders in South Africa. Agricultural Research Council, Pretoria.

Hilton-Taylor, C. (1996). Red Data List of Southern African Plants. Conservation Biology Research unit, National Botanical Institute, Pretoria.

http://invasives.org.za/

http://posa.sanbi.org/searchspp.php

http://sabap2.adu.org.za/

http://vmus.adu.org.za/

http://www.dwaf.gov.za/wfw/Control

Mucina L. & Rutherford M.C. (eds) 2010. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

Rutherford, M. C. and Westfall, R. H. (1994). Biomes of Southern Africa: an objective categorisation, Pretoria: National Botanical Institute.

APPENDIX A: SPECIES RECORDED ON SITE

Acacia caffra

Acacia sieberiana

Amaranthus hybridus

Argemone Mexicana

Aspilia mossambicensis

Brachiaria nigropedata

Brachiaria serrata

Combretum apiculatum

Combretum imberbe

Combretum zeyheri

Commelina africana

Dichrostachys cinerea

Digitaria eriantha

Diospyros lycioides

Englerophytum magalismontanum

Eragrostis curvula

Eragrostis rigidior

Eragrostis rigidior

Ficus Stuhlmannii

Gerbera viridifolia

Gymnosporia buxifolia

Hibiscus praeteritus

Hypoxis rigidula

Indigofera filipes

Lantana camara

Melinis repens

Opuntia ficus-indica

Panicum maximum

Peltophorum africanum

Perotis patens

Pogonarthria squarrosa

Pterocarpus rotundifolius

Ricinus communis

Schotia brachypetala

Sclerocarya birrea

Senagalia Nigrescens

Solanum mariantanum

Strychnos madagascariensis.

Terminalia sericea

Terminalia sericea

Tricholaena monachne

Vachellia nilotica

Vahlia capensis

Waltheria indica

Xerophyta retinervis

Ximenia caffra

Ziziphus mucronata

APPENDIX B: BIRD SPECIES LIKELY TO INHABIT THE SITE

Common species	Genus	Species
Bateleur	*Terathopius*	*ecaudatus*
Brubru	*Nilaus*	*afer*
Neddicky	*Cisticola*	*fulvicapilla*
Shikra	*Accipiter*	*badius*
Yellow-breasted	*Apalis*	*flavida*
Arrow-marked	*Turdoides*	*jardineii*
Acacia Pied	*Tricholaema*	*leucomelas*
Black-collared	*Lybius*	*torquatus*
Crested	*Trachyphonus*	*vaillantii*
Chinspot	*Batis*	*molitor*
European	*Merops*	*apiaster*
Little	*Merops*	*pusillus*
White-fronted	*Merops*	*bullockoides*
Southern	*Laniarius*	*ferrugineus*
Terrestrial	*Phyllastrephus*	*terrestris*
Dark-capped	*Pycnonotus*	*tricolor*
Cinnamon-breasted	*Emberiza*	*tahapisi*
Golden-breasted	*Emberiza*	*flaviventris*
Grey-headed	*Malaconotus*	*blanchoti*
Orange-breasted	*Chlorophoneus*	*sulfureopectus*
Lizard	*Kaupifalco*	*monogrammicus*
Green-backed	*Camaroptera*	*brachyura*
Yellow-fronted	*Crithagra*	*mozambica*
Rattling	*Cisticola*	*chiniana*
Red-faced	*Cisticola*	*erythrops*
Burchell's	*Centropus*	*burchellii*
Long-billed	*Sylvietta*	*rufescens*

Common species	Genus	Species
Pied	*Corvus*	*albus*
African	*Cuculus*	*gularis*
Diederik	*Chrysococcyx*	*caprius*
Klaas's	*Chrysococcyx*	*klaas*
Levaillant's	*Clamator*	*levaillantii*
Red-chested	*Cuculus*	*solitarius*
Black	*Campephaga*	*flava*
Cape Turtle	*Streptopelia*	*capicola*
Emerald-spotted Wood	*Turtur*	*chalcospilos*
Laughing	*Spilopelia*	*senegalensis*
Namaqua	*Oena*	*capensis*
Red-eyed	*Streptopelia*	*semitorquata*
Rock	*Columba*	*livia*
Fork-tailed	*Dicrurus*	*adsimilis*
White-faced Whistling	*Dendrocygna*	*viduata*
Black-chested Snake	*Circaetus*	*pectoralis*
Brown Snake	*Circaetus*	*cinereus*
Western Cattle	*Bubulcus*	*ibis*
Yellow-bellied	*Eremomela*	*icteropygialis*
African	*Lagonosticta*	*rubricata*
Red-billed	*Lagonosticta*	*senegala*
Southern	*Lanius*	*collaris*
Ashy	*Muscicapa*	*caerulescens*
Pale	*Melaenornis*	*pallidus*
Southern Black	*Melaenornis*	*pammelaina*
Crested	*Dendroperdix*	*sephaena*
Grey	*Crinifer*	*concolor*
Egyptian	*Alopochen*	*aegyptiaca*

Common species	Genus	Species
Dark Chanting	*Melierax*	*metabates*
Little	*Tachybaptus*	*ruficollis*
Sombre	*Andropadus*	*importunus*
Helmeted	*Numida*	*meleagris*
White-crested	*Prionops*	*plumatus*
Grey	*Ardea*	*cinerea*
Lesser	*Indicator*	*minor*
African	*Upupa*	*africana*
African Grey	*Lophoceros*	*nasutus*
Southern Ground	*Bucorvus*	*leadbeateri*
Southern Red-billed	*Tockus*	*rufirostris*
Southern Yellow-billed	*Tockus*	*leucomelas*
Hadada	*Bostrychia*	*hagedash*
African	*Actophilornis*	*africanus*
Brown-hooded	*Halcyon*	*albiventris*
Malachite	*Corythornis*	*cristatus*
Striped	*Halcyon*	*chelicuti*
Red-crested	*Lophotis*	*ruficrista*
Blacksmith	*Vanellus*	*armatus*
Crowned	*Vanellus*	*coronatus*
Rufous-naped	*Mirafra*	*africana*
Sabota	*Calendulauda*	*sabota*
Lesser	*Ploceus*	*intermedius*
Lesser	*Paragallinula*	*angulata*
Red-faced	*Urocolius*	*indicus*
Speckled	*Colius*	*striatus*
Common	*Acridotheres*	*tristis*
Black-headed	*Oriolus*	*larvatus*

Common species	Genus	Species
Western Barn	*Tyto*	*alba*
African Barred	*Glaucidium*	*capense*
Pearl-spotted	*Glaucidium*	*perlatum*
Red-billed	*Buphagus*	*erythrorynchus*
Yellow-billed	*Buphagus*	*africanus*
Brown-headed	*Poicephalus*	*cryptoxanthus*
African Green	*Treron*	*calvus*
African	*Anthus*	*cinnamomeus*
Three-banded	*Charadrius*	*tricollaris*
Tawny-flanked	*Prinia*	*subflava*
Black-backed	*Dryoscopus*	*cubla*
Red-billed	*Quelea*	*quelea*
White-throated	*Cossypha*	*humeralis*
Lilac-breasted	*Coracias*	*caudatus*
Purple	*Coracias*	*naevius*
White-browed	*Cercotrichas*	*leucophrys*
Magpie	*Urolestes*	*melanoleucus*
Cape	*Passer*	*melanurus*
House	*Passer*	*domesticus*
Southern Grey-headed	*Passer*	*diffusus*
Yellow-throated Bush	*Gymnoris*	*superciliaris*
Natal	*Pternistis*	*natalensis*
Burchell's	*Lamprotornis*	*australis*
Cape	*Lamprotornis*	*nitens*
Violet-backed	*Cinnyricinclus*	*leucogaster*
Wattled	*Creatophora*	*cinerea*
African	*Saxicola*	*torquatus*
Woolly-necked	*Ciconia*	*episcopus*

Common species	Genus	Species
Collared	*Hedydipna*	*collaris*
Marico	*Cinnyris*	*mariquensis*
Scarlet-chested	*Chalcomitra*	*senegalensis*
White-bellied	*Cinnyris*	*talatala*
Barn	*Hirundo*	*rustica*
Lesser Striped	*Cecropis*	*abyssinica*
Red-breasted	*Cecropis*	*semirufa*
Wire-tailed	*Hirundo*	*smithii*
Black-crowned	*Tchagra*	*senegalus*
Brown-crowned	*Tchagra*	*australis*
Groundscraper	*Turdus*	*litsitsirupa*
Kurrichane	*Turdus*	*libonyana*
Yellow-fronted	*Pogoniulus*	*chrysoconus*
Grey Penduline	*Anthoscopus*	*caroli*
Southern Black	*Melaniparus*	*niger*
Hooded	*Necrosyrtes*	*monachus*
White-backed	*Gyps*	*africanus*
Willow	*Phylloscopus*	*trochilus*
Blue	*Uraeginthus*	*angolensis*
Common	*Estrilda*	*astrild*
Southern Masked	*Ploceus*	*velatus*
Spectacled	*Ploceus*	*ocularis*
Pin-tailed	*Vidua*	*macroura*
Green	*Phoeniculus*	*purpureus*
Bearded	*Chloropicus*	*namaquus*
Bennett's	*Campethera*	*bennettii*
Cardinal	*Dendropicos*	*fuscescens*
Stierling's	*Calamonastes*	*stierlingi*