PROPOSED

RESIDENTIAL DEVELOPMENT OF SIYANQOBA EXTENSIONS ON THE FARMS TWEEDAM 377 J.S. AND REMAINING EXTENT OF THE FARM LEEUWPOORT 283 J.S WITBANK, EMALAHLENI LOCAL MUNICIPALITY, MPUMALANGA PROVINCE

DEDET REF: 17/2/3N-317

Terrestrial Ecology Report

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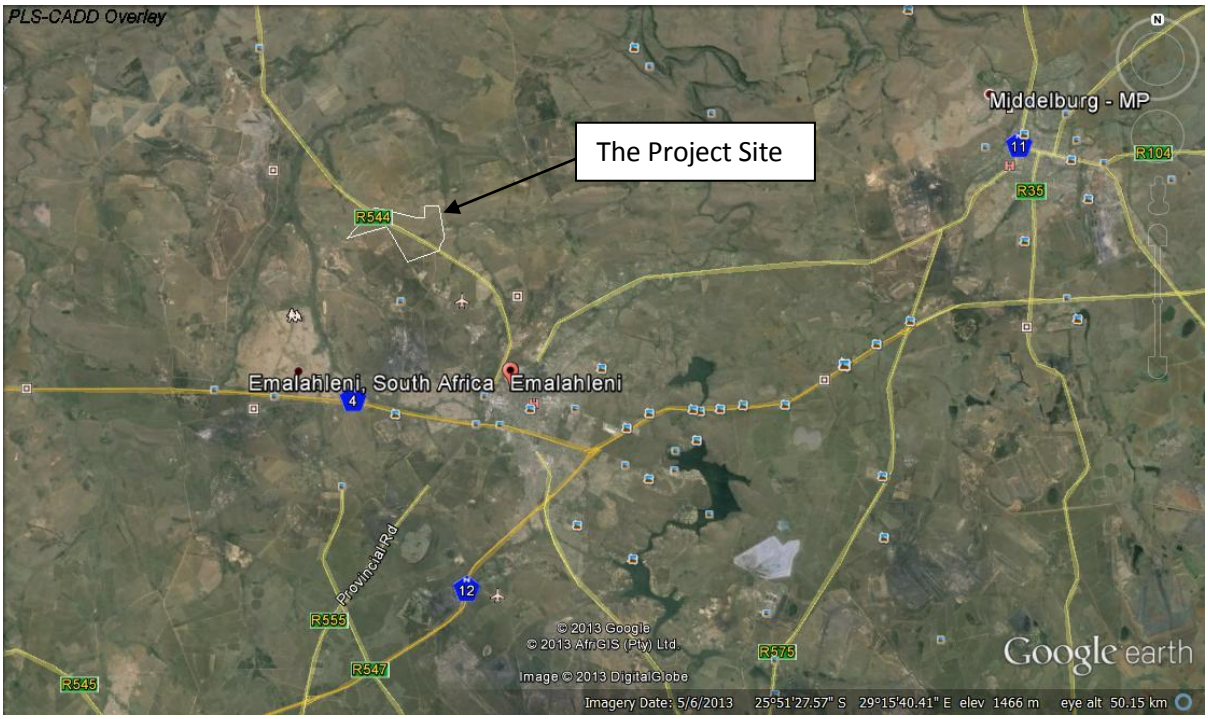
1. INTRODUCTION

1.1 Background

Vipcon Property Developers & Project Management has seen the need to develop the residential area of Siyanqoba Extension which will take place on the farms Tweedam 377 J.S. and remaining extent of the farm Leeuwpoort 283 J.S. It will consists of 4 residential areas of, 7 schools of 30.2 ha, 1 business centre, 2 public open spaces, 3 community facilities and 1 public transport centre. The area of the proposed project consists of two dams which will be part of the public open space as well as the existing borrow pits.

Location of site



An Environmental Impact Assessment (EIA) is required for the proposed development in terms of the EIA Regulations of 2010 as amended under the National Environmental Management Act (NEMA) (Act No. 107 of 1998). **Wandima Environmental Services (Pty) Ltd** was appointed by **Vipcon Property Developers & Project Management** to conduct the necessary environmental assessment for the residential development at Siyanqoba extensions. Wandima Environmental Services subcontracted Ligoga Consulting to undertake the Terrestrial Ecology Specialist Studies. This ecological report contributes towards meeting these requirements and highlights the likely impacts of the proposed development on the terrestrial ecology of the site.

1.2 Scope

The broad terms of reference required include the following aspects:

Vegetation assessment:

- Conduct vegetation survey
- Identify and map vegetation habitats
- Indicate presence of any seasonal wetlands, rivers, streams and dams
- Provide photos illustrating any conservation action or plant species that might need special attention
- Produce a vegetation sensitivity information that will be used to inform the layout of project infrastructure

Terrestrial faunal assessment off the site

- An assessment of the potential impacts (positive, negative or cumulative if relevant) on fauna during construction and operation of the proposed development
- A description of the occurrence and distribution of fauna (mammals, reptiles, amphibians)
- The identification of specific mitigating measures, for enhancing benefits and avoiding or mitigating negative impacts and risks, which should be implemented during the construction and operation of the proposed development

2. METHODOLOGICAL APPROACH

2.1 Approach and Assessment Philosophy

The assessment was conducted in response to TORs as suggested above, and following, as appropriate, the guidelines and principles for biodiversity assessment provided by De Villiers et al. (2005). These include the following:

1. A description of the ecological characteristics of the site and its surrounds in terms of patchiness, patch size, relative isolation, connectivity, corridors, disturbance regimes, eco-tones, buffering, viability, etc.

2. In terms of biodiversity pattern, the following were identified and described where appropriate:
    a. Community and ecosystem level
    b. Species level
    c. Other biodiversity pattern issues

3. In terms of biodiversity process, the following were identified or described:
    - The key ecological "drivers" of ecosystems on the site and in the vicinity, such as fire and grazing.
    - Environmental gradients (e.g. upland-lowland), biome boundaries, soil interfaces or sand movement corridors on the site or in its vicinity.
    - Any possible changes in key processes, e.g. increased fire frequency or drainage/artificial recharge of aquatic systems.
    - The condition and functioning of rivers and wetlands (if present) in terms of: possible changes to the channel, flow regime and naturally-occurring riparian vegetation.

4. Over and above the foregoing, the assessment included the following:
    - A description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed facility.
    - A description and evaluation of the environmental issues and potential impacts (including direct, indirect and cumulative impacts) that have been identified.
    - The nature and the extent of the impact.
    - A statement regarding the potential significance of the identified issues based on the evaluation of the issues/impacts.
    - "Red Flag" any sensitive or no-go areas within the broader study area which could influence the siting of the infrastructure.
    - In the event of potential conflicts arise, alternatives were identified as far as the ToR allowed.
    - Ecological opportunities and constraints will be identified, which may include mitigation measures and offsets to reduce the ecological impact of the development.
    - Recommendations for future management actions and monitoring.

2.2 Field Assessment Methodology

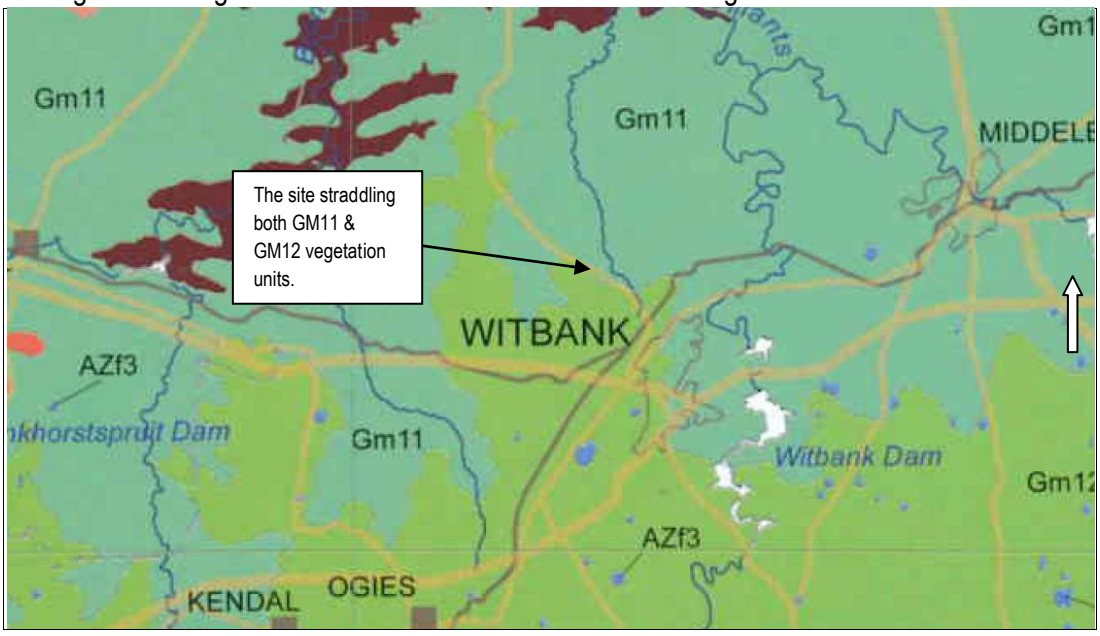
2.2.1 General

The site was visited and surveyed by the authors on November 19, 2013. During the site visit, the area earmarked for development was investigated and the surrounding broader area surveyed for any potential conflicts between the proposed development of the site and ecological processes and terrestrial biodiversity pattern and processes.

2.2.2 **Vegetation**

The area was walked and important plant species encountered were recorded and where necessary, photographed and or specimens obtained for verification purposes. The different habitats present were identified on site. The consultants looked out for potentially sensitive habitats or areas that appeared to be species-rich or host different or unique species, such as drainage areas, wetlands and rocky ridges. Literature references used to support findings and to assist in arriving at conclusions are listed. The vegetation units of Mucina & Rutherford (2006) were used as reference. The combination of the available literature with the survey results made stratification of vegetation communities possible.

Figure showing site location on Mucina and Rutherford Vegetation Units.



The site was also intensively searched for important species and the potential for Red Data Book (RDB) and other important species. The objective of this exercise was to identify distinct vegetation types and to establish their integrity and representation in the study area.

2.2.3 Terrestrial Fauna

The faunal investigation was based on desktop study verified by cross referencing with available habitats of the study area, so as to establish the faunal potential of site. All reptiles, amphibians, mammals and birds observed during field trip and floral surveys were recorded. Also recorded was any characteristic evidence of presence or activity such as

droppings, spoors, diggings, burrows etc. Within certain habitats such as rocky outcrops, the area was actively searched for reptile species characteristic of these areas or species of conservation concern which were identified beforehand as potentially occurring at the site. By method of elimination (based on available habitats and the taxon's biology and known distribution), lists of faunal representation for the study area was assembled. Literature references used to support findings and to assist in arriving at conclusions are listed.

2.2.4 **Ecological importance and sensitivity rating of habitats**

The information from the surveys indicated above was then synthesized into a sensitivity map of the area which ranked the ecological sensitivity of each unit identified according to:

- The conservation status of the untransformed vegetation in terms of the currently conserved and target amount as listed by Rouget et al. (2006) as well as the Draft National List of Threatened Ecosystems (Notice 1477 of 2009, Government Gazette No 32689, 6 November 2009).
- The likely presence and number of Red Data and other species of conservation significance within the habitat.
- The species richness and uniqueness of the habitat as observed in the field or reported in the literature.
- The topography of the unit in terms of the slope, presence of koppies or other significant landscape features.
- The nature and significance of ecological processes operating on the site, such as upland lowland gradients, drainage areas, corridors etc

Following the identification of the different ecological features of the site, lists of mammals, reptiles, amphibians and birds observed or likely to be associated with the different habitats present were compiled. These lists were compiled based on the observations made during the site visit as well as available literature sources (Friedman & Daly 2004) and spatial databases (SANBI's SIBIS and BGIS databases). The lists are based on species which are known to occur in the broad geographical area as well as an assessment of the availability and quality of suitable habitat at the site. For each species, the likelihood that it occurs at the site was rated according to the following scale:

- Low: The available habitat does not appear to be suitable for the species and it is unlikely that the species occurs at the site.
- Medium: The habitat is broadly suitable or marginal and the species may occur at the site.
- High: There is an abundance of suitable habitat at the site and it is highly probable that the species occurs there.
- Definite: Species that were directly or indirectly (spoor, droppings, characteristic diggings, burrows etc) observed at the site.

The ecological sensitivity of each unit identified, is rated according to the scale shown in Table 2.1:

The conservation status of each species is also listed, based on the IUCN Red List Categories and Criteria version 3.1 (2001) and where species have not been assessed under these criteria, the CITES status is reported where possible. These lists are adequate for mammals, amphibians and birds, the majority of which have been assessed, however the majority of reptiles have not been assessed and therefore, it is not adequate to assess the potential impact of the development on reptiles, based on those with a listed conservation status alone. In order to address this shortcoming the distribution of reptiles was also taken into account such that any narrow endemics or species with highly specialized habitat requirements occurring at the site were noted.

Figure showing sensitive areas according the Mpumalanga CBA.

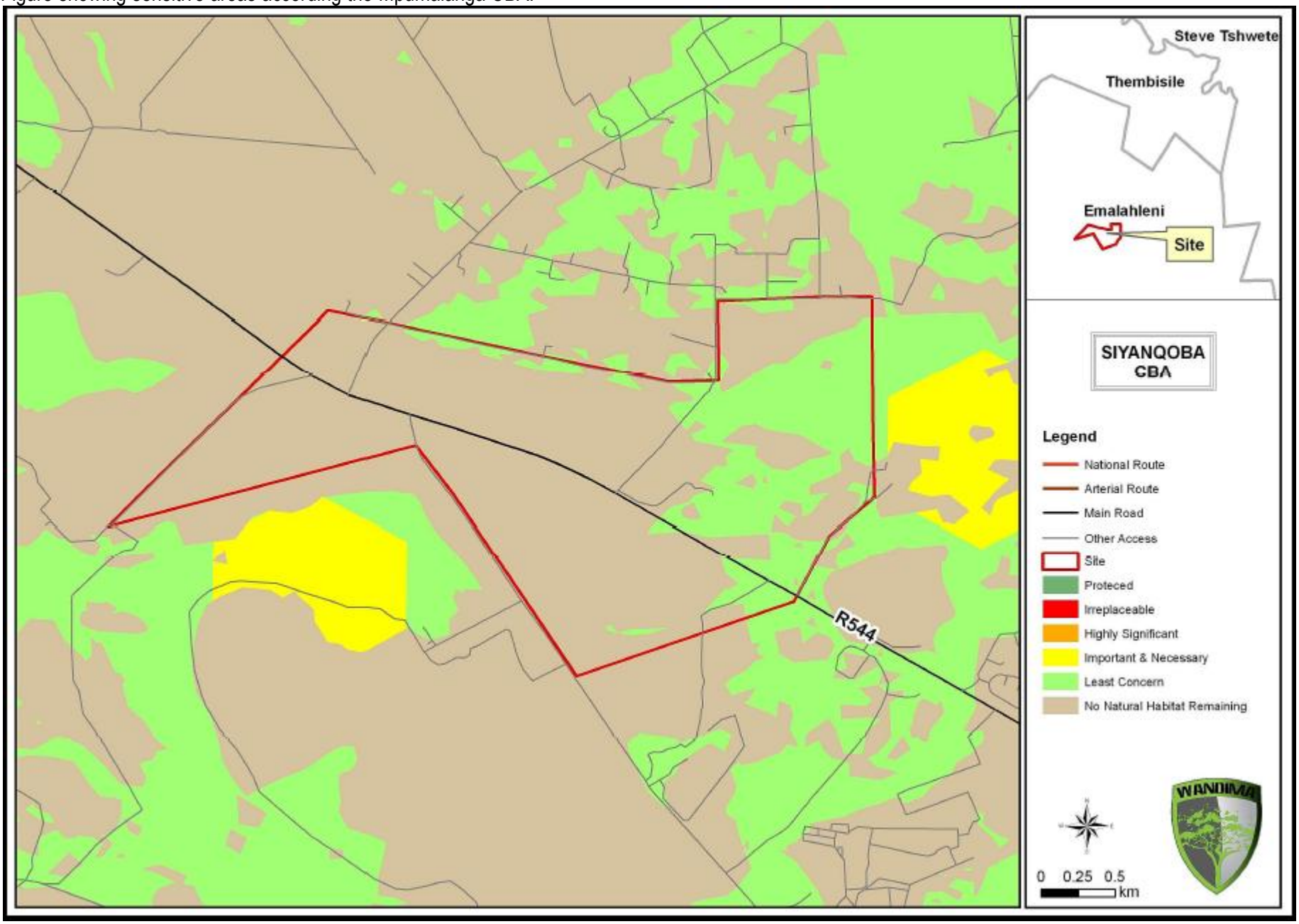


Figure showing Mpumalanga CBA sensitivity overlain on the site layout.

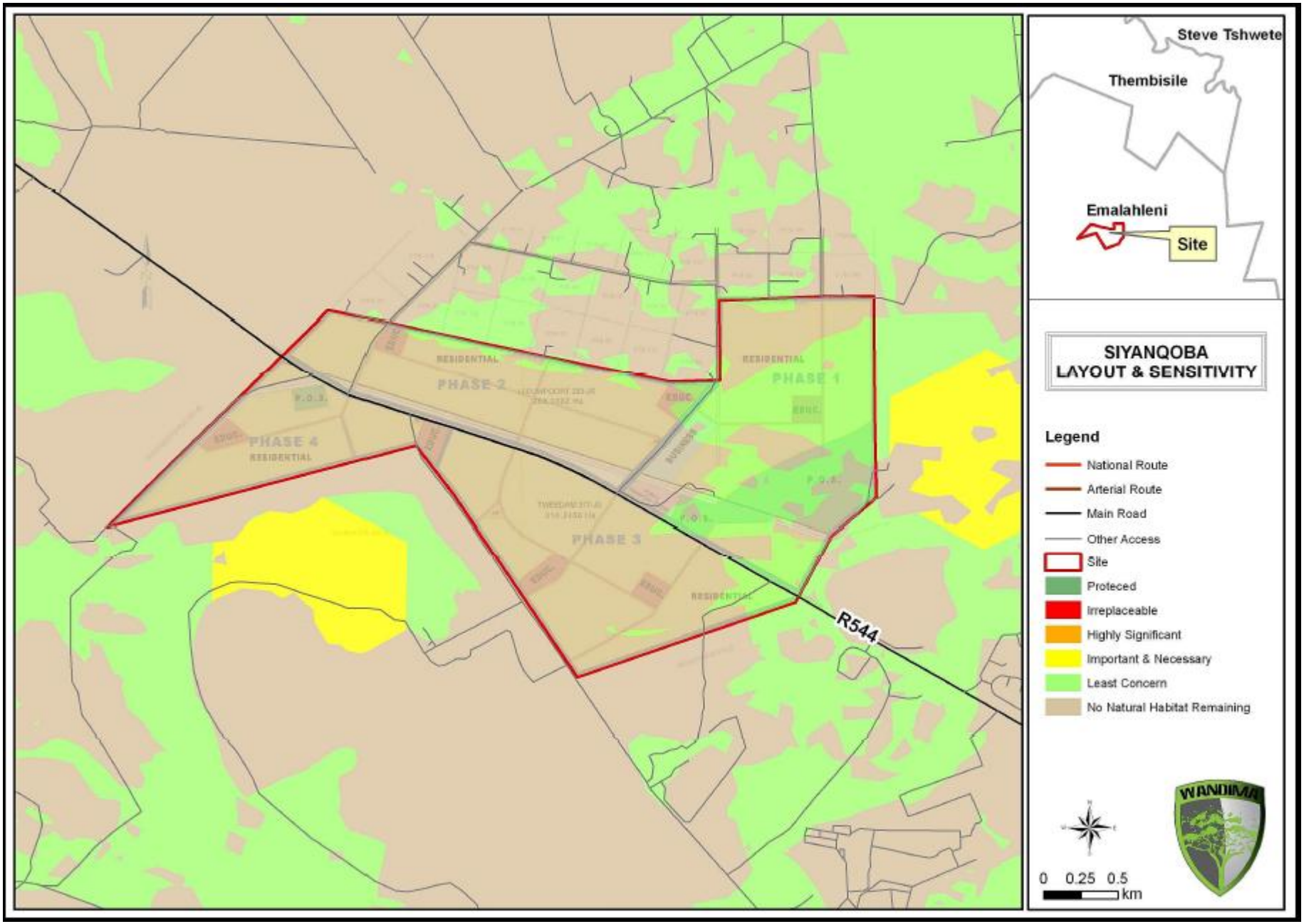


Table 2.1: Ecological Importance and Sensitivity Rating

Ecological Importance of Terrestrial and Riparian Communities	Sensitivity Rating
Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles.	*Very 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.	*High*
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.	*Medium*
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 agricultural purposes.	*Low*

2.3 Policies, Legislation, Standards and Guidelines

The National Environmental Management Act (NEMA) (Act No 107, 1998) requires that measures are taken that 'prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.' In addition it states that environmental management should:

- Avoid, minimise or remedy disturbance of ecosystems and loss of biodiversity
- Avoid degradation of the environment.
- Avoid jeopardizing the integrity of ecosystems.
- Pursue the best practicable environmental option by means of integrated environmental management.
- Protect the environment as the people's common heritage.
- Control and minimise environmental damage.
- Pay specific attention to sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems, especially where they are subject to significant human resource usage and development pressure.
- That a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions

The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA) provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems for South Africa was gazetted on 9 December 2011 (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GoN 1002), 9 December 2011). The list of threatened terrestrial ecosystems supersedes the information regarding terrestrial ecosystem status in the NSBA 2004. In terms of the EIA regulations, a basic assessment report is required for the transformation or removal of indigenous vegetation in a critically endangered or endangered ecosystem. It is important to note that a basic assessment report in terms of the EIA regulations is only triggered in remaining natural habitat within each ecosystem and not in portions of the ecosystem where natural habitat has already been irreversibly lost. Details of the Criteria used to identify the threat status of different the vegetation types are provided in the Act and will not be repeated here.

NEMBA also deals with endangered, threatened and otherwise controlled species. The Act provides for listing of species as threatened or protected, under one of the following categories:

- Critically Endangered: any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.
- Endangered: any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species.
- Vulnerable: any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species.
- Protected species: any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Certain activities, known as Restricted Activities, are regulated on listed species by a set of permit regulations published under the Act. While most of the activities center around the hunting, catching, import, export or movement of listed species, the following is relevant to the current development:

- Picking parts of, or cutting, chopping off, uprooting, damaging or destroying, any specimen of a listed threatened or protected species;
- Any other prescribed activity which involves a specimen of a listed threatened or protected species;

Under the recently published Listing Notice 3: List of activities and competent authorities identified in terms of sections 24(2) and 24D (R:546, 18 June 2010) of NEMA, various activities which require authorization are listed. Of particular relevance to the current study are the activities related to bioregional plans and Critical Biodiversity Areas (CBAs). The notice lists the following thresholds with regards to the clearing of natural vegetation:

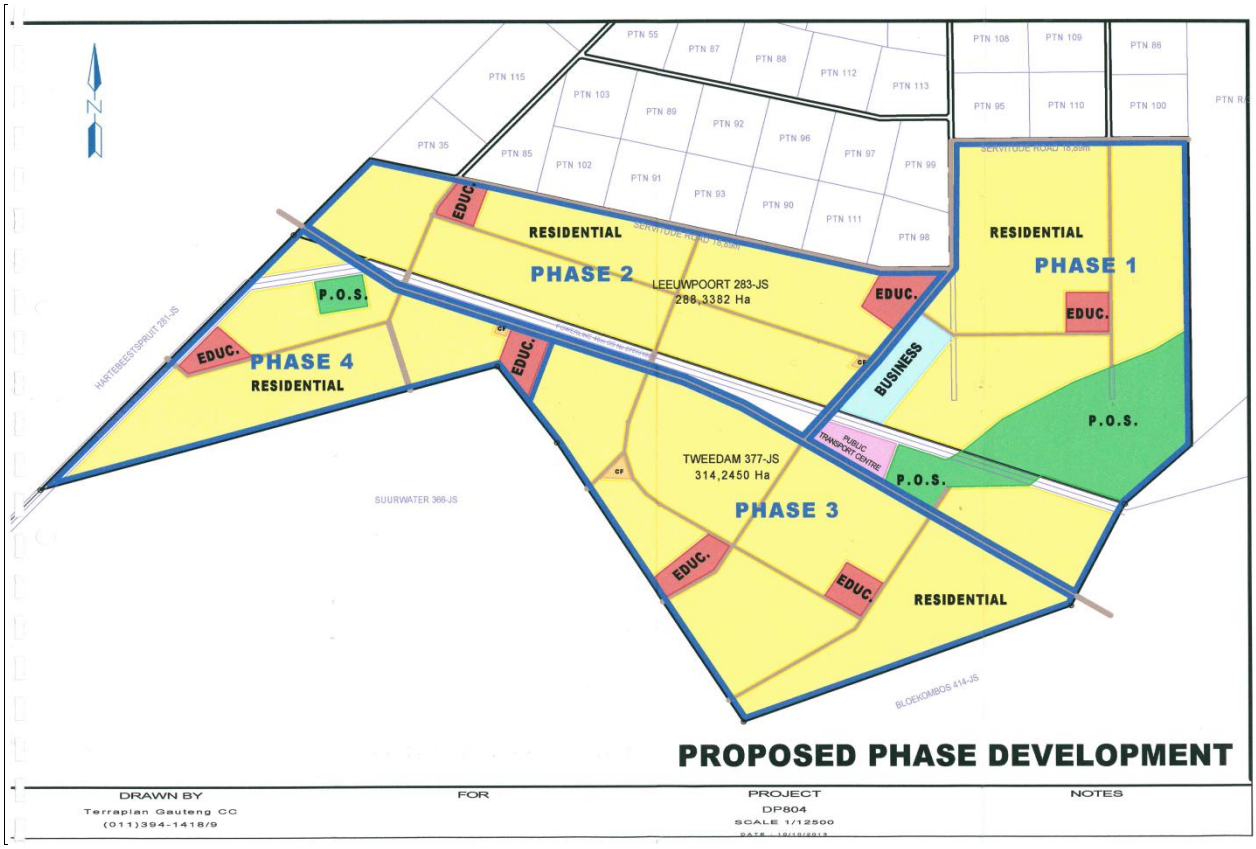
- 300m^2 within critical biodiversity areas identified in bioregional plans
- 1ha within critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority.

2.4 Relevant Aspects of the Development

The proposed project will include a residential development at Siyanqoba extensions on the farms Tweedam 377 J.S. and remaining extent of the farm Leeuwpoort 283 J.S, which consists of:

- 4 residential areas of approximately 8000 erven,
- 7 schools of 30.2 ha,
- 1 business centre 10 ha,
- 2 public open spaces 43 ha,
- 3 community facilities of 2 ha and
- 1 public transport centre of 5 ha.

Figure showing spatial configuration of the various activities planned for the site.



The electrical powerline servitude is 46 meters wide, it comprise a total of 21. 4 ha that will form part of the public open space system of the township. The two dams and borrow pits that are present on site will be used as a public open space and they comprise a total area of 44 ha.

Photos of the power lines that traverse the site.

Eskom power lines traverse the site. Along the R544

Eskom power lines traverse the site. On northern boundary.

Photos of the site showing the wetland areas that will comprise the Open Public Spaces.

Main dam on the site. To be kept as a public open space.

Smaller dam downstream of the upper dam.

2.5 Scenarios Considered in the Impact Assessment

A single scenario, based on an indicative layout as provided by Wandima Environmental Services has been considered. An alternative site is not currently being considered. Although, alternative layouts of the buildings, drive ways and parking bays do not directly form part of this assessment, it is however intended and anticipated that the results of this assessment will inform the final layout of the site that will accompany the application.

2.6 Description of the Affected Environment

Location

The project is located on Farm Tweedam 377 J.S. and remainder of portion 1 of Leeuwpoort 283 J.S, Emalahleni Local Municipality, Mpumalanga Province (Table 2.2). This locality falls within the Eastern Highveld Grassland vegetation unit in the Mesic Highveld Grassland Bioregion of the Grassland Biome. This vegetation unit straddles the Mpumalanga and Gauteng provinces. It is in the plains area between Belfast in the East and the eastern side of Johannesburg in the west and extending southwards to Bethal, Ermelo and west of Piet Retief.

Conservation Status

The study area according to Mucina and Rutherford (2006), straddles the Eastern Highveld Grassland and the Rand Highveld Grassland vegetations unit in the Mesic Highveld Grassland Bioregion of the Grassland Biome.

The Eastern Highveld Grassland (Gm12)

The habitat type is endangered and a target of 24% has been set according to Musina and Rutherford (2006). *Ibid,* only very a small fraction is conserved in statutory reserves (Nooitgedacht Dam and Jericho Dam Nature Reserves) and in private reserves (Holkranse, Kransbank, Morgenstond). Some 44% has been transformed primarily by cultivation, plantations, mines, urbanisation and by building of dams. No serious alien invasions are reported, but *Acacia mearnsii* can become dominant in disturbed sites. Erosion is very low.

Location of the site along the road R544 (heading out of Witbank in a north westerly direction).

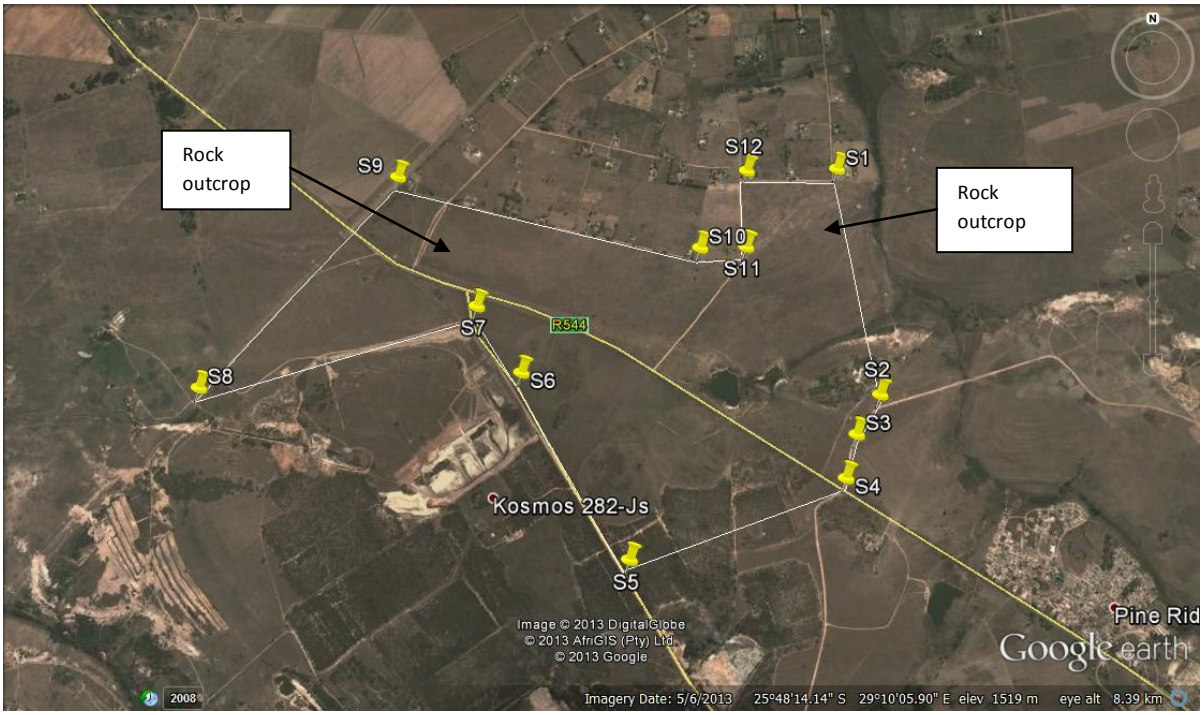


Table 2.2: Vegetation Unit Gm 12 Eastern Highveld Grassland (Mucina & Rutherford 2006)

Name of vegetation type	Eastern Highveld Grassland
Code as used in the Book - contains space	Gm12
Conservation Target (percent of area) from NSBA	24%
Protected (percent of area) from NSBA	0.3%
Remaining (percent of area) from NSBA	56%
Description of conservation status from NSBA	Endangered
Description of the Protection Status from NSBA	Hardly protected
Area (km^2) of the full extent of the Vegetation Type	12669.04
Name of the Biome	Grassland Biome
Name of Group (only differs from Bioregion in Fynbos)	Mesic Highveld Grassland Bioregion
Name of Bioregion (only differs from Group in Fynbos)	Mesic Highveld Grassland Bioregion

The Rand Highveld Grassland (Gm11)

Endangered. Target 24%. Poorly conserved (only 1%). Small patches protected in statutory reserves (Kwaggavoetpad, Van Riebeeck Park, Bronkhorstspruit, Boskop Dam Nature Reserves) and in private conservation areas (e.g. Doornkop, Zemvelo, Rhenosterpoort and Mpopomeni). Almost half has been transformed mostly by cultivation, plantations, urbanisation or dam-building. Cultivation may also have had an impact on an additional portion of the surface area of the unit where old lands are currently classified as grasslands in land-cover classifications and poor land management has led to degradation of significant portions of the remainder of this unit. Scattered alien species (most prominently *Acacia mearnsii*) occur in about 7% of this unit. Only about 7% has been subjected to moderate to high erosion levels.

Table 2.3: Vegetation Unit Gm 12 Eastern Highveld Grassland (Mucina & Rutherford 2006)

Name of vegetation type	Rand Highveld Grassland
Code as used in the Book - contains space	Gm11
Conservation Target (percent of area) from NSBA	24%
Protected (percent of area) from NSBA	0.9%
Remaining (percent of area) from NSBA	58.5%
Description of conservation status from NSBA	Endangered
Description of the Protection Status from NSBA	Hardly protected
Area (sqkm) of the full extent of the Vegetation Type	10261.29
Name of the Biome	Grassland Biome
Name of Group (only differs from Bioregion in Fynbos)	Mesic Highveld Grassland Bioregion
Name of Bioregion (only differs from Group in Fynbos)	Mesic Highveld Grassland Bioregion

Typical views from the study area.

Project EAP & specialists at the site with DEDET official.

Typical view of the site. Highveld grassland and *Acacia mearnsii* in the background.

Xyrophyta clavata

Setaria sphacelata.

Livestock grazing in neighboring farm north of the site.

Mining activities in adjacent farm on the north west of the site.

Gladiolus crassifolius

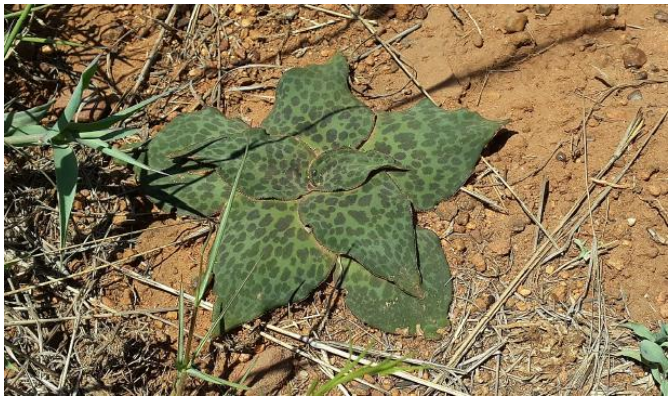
Hypoxis rigidula

Top Left and Right: Man made dam in the site. To be kept as a public open space.

Bottom left: Up stream of dam.

Bottom Right: Smaller dam downstream of the main dam.

Wetland sedge grass *(Cyperus esculentus)* in the periphery of the dam.



Ledebouria ovatifolia

Previously cultivated fields dominated by dried tall khakhi weed *(Tagetes minuta)* with mine dumps in the background.

Weaver nests indicating presence of birdlife in the dam area.

Eqyptian geese *Alopochen aegyptiacus* in man-made dam.

Masked weaver *Ploceus velatus*, nesting on the banks of the dam.

Physical characteristics

Climate: Strongly seasonal summer rainfall, with very dry winters. MAP 650-900 mm (overall average: 726 mm), MAP relatively uniform across most of this unit, but increases significantly in the extreme southeast. The coefficient of variation of MAP is 25% across most of the unit, but drops to 21% in the east and southeast. Incidence of frost from 13-42 days, but higher at higher elevations.

Geology and Soils: The dominant soils are Red to yellow soils typically found on shales and sandstones of the Madzaringwe Formation (Karoo Super group).

Vegetation

Graminoids: *Aristida aequiglumis* (d), *A. congesta* (d), *A. junciformis* subsp. *Galpinii* (d), *Brachiaria serrata* (d), *Cynodon dactylon* (d), *Digitaria monodactyla* (d), *D. tricholaenoides* (d), *Elionurus muticus* (d), *Eragrostis chloromelas* (d), *E. curvula* (d), *E. plana* (d), *E. racemosa* (d), *E. sclerantha* (d), *Heteropogon contortus* (d), *Loudetia simplex* (d), *Microchloa caffra* (d), *Monocymbium ceresiiforme* (d), *Setaria sphacelata* (d), *Sporobolus africanus* (d), *S. pectinatus* (d), *Themeda triandra* (d*), Trachypogon spicatus* (d), *Tristachya leucothrix* (d), *T. rehmannii* (d) *Alloteropsis semialata* subsp. *Eckloniana*, *Andropogon appendiculatus, A. schirensis, Bewsia biflora, Ctenium concinnum, Diheteropogon amplectens, Eragrostis capensis, E. gummiflua, E. patentissima, Harpochloa falx, Panicum natalense, Rendlia altera, Schizachyrium sanguineum, Setaria nigrirostris, Urelytrum agropyroides*.

Herbs: *Berkheya setifera* (d), *Haplocarpha scaposa* (d), *Justicia anagalloides* (d), *Pelargonium luridum* (d), *Acalypha angustata, Chamaecrista mimosoides, Dicoma anomala, Euryops gilfillanii, E. transvaalensis* subsp. *Setilobus, Helichrysum aureonitens, H. oreophilum, H. rugulosum, Ipomoea crassipes, Pentanisia prunelloides subsp. Latifolia, Selago densiflora, Senecio coronatus, Vernonia oligocephala, Wahlenbergia undulate.*

Geophytic herbs: *Gladiolus crassifolius, Haemanthus humilis* subsp. *hirsutus, Hypoxis rigidula var. pilosissima, Ledebouria ovatifolia.*

Succulent Herb: Aloe *ecklonis*.

Low Shrubs: *Anthospermum rigidum* subsp. *Pumilum, Stoebe plumosa.*

Table 2.4 Aliens, weeds and exotics, CARA categories are indicated where applicable

Name	Legislation	Status	Comments / GPS reference
Acacia mearnsii	CARA	Declared	Northern boundary of site
Tagetes minuta			On previously cultivated land.
Asclepias fruticosa			Along the roads.

Fauna

A few species of small mammals will use the natural habitats on the site. The mobility of most such mammals will ensure that they can adapt or relocate if disturbed by the activities.

Amphibians.

Frogs will utilize the aquatic and terrestrial habitats on the site for various reasons, such as breeding purposes. Frogs are rather sensitive to pollution and ecological imbalances, which is why the presence of frogs in an area indicates that the habitat is healthy and of good ecological integrity. It is not anticipated that frog species will be adversely affected if the mitigation measures outlined in this report are implemented.

Reptiles.

The reptile survey indicates that especially the rocky habitats are of high importance to reptiles, however all natural habitats will be utilized by reptiles on this property. Several important lizard species, is present on the rocky areas. However, it is not anticipated that these species will be adversely affected if given the necessary protection and habitat conservation.

Avifauna

The following literature, data bases and other methods will be used in order to cover as many as possible aspects for the avifauna assessment:

- Robert's Birds of Southern Africa. 1985. (Maclean G L)
- The Important Bird Areas of Southern Africa (IBA) data (Barnes, 1998) to determine if any IBA sites/regions are affected;
- Important Bird Areas in Africa and Associated Islands (Lincoln et al 2001).
- Mpumalanga Biodiversity Conservation Plan (MBCP) was consulted to determine the environmental sensitivity of the study area (Lötter, 2007);
- The vegetation types and habitats important to birds were determined by literature studies as described elsewhere in this report and actual site investigations were conducted to determine the on-site conditions and integrity of habitats as well as important-bird surveys;
- By method of deduction (using all the above mentioned data) the study area and alternative routes were assessed to determine the magnitude of possible impacts on birds.

The literature review indicates that a diverse group of birds may utilize the area. More than 200 species' range of distribution falls within and around the study area. Due to the topography and habitat types present in the study area, the expected birds will vary from commonly found forest to grassland specific species. Birds seen included the Masked weaver *Ploceus velatus*, Blacksmith Plover *Vanellus armatus*, Egyptian Goose *Alopochen aegyptiacus*, African Black Duck *Anas sparsa*, laughing dove *Streptopelia senegalensis*, Hadeda Ibis *Bostrychia hagedash*.

2.7 Identification of Risks and Potential Impacts

Potential impacts on the terrestrial ecology of the site resulting from the development of the Siyanqoba Township Development include negative impacts on the following

- Biodiversity – where biodiversity is taken to mean

i. the number of different species and individuals in a habitat or geographical area;
ii. the variety of different habitats within an area;
iii. the variety of interactions that occur between different species in a habitat; and
iv. the range of genetic variation among individuals within a species.

- Sensitive Habitats – impacts to ecologically sensitive habitats such as riparian areas or edaphically unique areas such as quartz patches, or areas which are the habitat of rare or endangered species.
- Ecosystem Function - Impacts on ecosystem function such as the regulation of water flow and quality resulting from changes to the abiotic environment. Changes to disturbance regimes such as fire frequency may also result.
- Connectivity – Habitat fragmentation or a reduction in the ability of fauna to move about the landscape, this may impact ecosystem function as well as gene flow and other aspects of biodiversity.
- Ecosystem Resilience - Intact ecosystems are better able to recover from perturbations and resist invasion by alien plants.
- Secondary/Cumulative Impacts – When considered in isolation, the development of a single site may not be significant, however, when considered in light of similar actual or potential developments in the area, a greater concern for broader ecological processes may arise.

In terms of the activities involved in the construction of the Siyanqoba Township Development, specific risks stem from the following activities

- The clearing and levelling of land for the foundations of buildings, driveways, parking bays etc.
- The excavation of borrow pits
- Increased risk of chemical contamination by construction vehicles
- Disturbance of natural ecosystems, making them vulnerable to invasion by alien organisms
- Hunting, collecting or otherwise damaging plants and animals by construction workers or other individuals who have gained access to the site as a result of the construction activities.

Mining and residential sites (low sensitivity) predominate on the edges of the development area. The area is fairly degraded and mostly infested/encroached with *Acacia mearnsii, Asclepias fruticosa, Tagetes minuta*. This however, does not signify the absence of other natural vegetation species. Should the layout require the transformation of intact vegetation, then it would be preferable for this to occur within the degraded areas as this would minimize biodiversity loss.

Again, it is important to ensure that roads and service areas are located in a manner which does not result in the loss or degradation of these fragments.

3.1 Vegetation

The loss and modification of important habitats can only be minimized by firstly avoiding sensitive habitats by making use of existing access roads and disturbed areas, and secondly by positioning of the structures (buildings & other facilities) on pre-selected sites of low floral importance. Besides the dams, two other sensitive sites were obsevrved. These are rock out crops on the far east of the site, and another parallel to the main road but on the west of the site. It is important to note that the whole site is surrounded by developments (settlements and mining activities) on all sides. Also these outcrops according to the Mpumalanga Critical Biodiversity Areas assessment occur in areas that are "Least Concern" and "No natural habitat Remains" respectively. Be that as it may, it is suggested that these two outcrops be regarded as "no go" areas for the project especially the one on the far east of the site. The loss of individual plants of importance can also be minimized by the above measures and site selection must be done prior to construction with the aid of a specialist.

Table 3.1 Assessment of the impact of the development of the Siyanqoba Township Development site on the local vegetation. Mitigation refers to the development proceeding under this specific layout which should avoid sensitive areas

CRITERIA	**IMPACT**			
			OPERATION	
Magnitude:	***Without***	***With mitigation***	***Without***	***With mitigation***
Extent	Local	Local	Local	Local
Duration	Long-Term	Long-Term	Long-term	Long-term
Intensity	High	Medium	Medium	Low
Likelihood:	High	Low	Low	Minor
Significance	Major	Moderate	Moderate	Minor
Status	Negative	Negative	Negative	Negative

3.2 Mammals

The occurrence of mice and rats cannot be ruled out as crop farming in proximity of the site is active. The major risk factors for mammals associated with the development are likely to be related to the increased levels of noise and human activity at the site. Direct habitat loss is not likely to be a significant factor due to the fact that the major development is within previously disturbed areas and surrounded with croplands and settlement. The noise, physical disturbance and high levels of human activity associated with the construction phase are likely to cause significant disruption to some smaller mammals which are likely to move away from

the site. However, such disturbance will be transient and during the operational phase it is likely that such animals will quickly become habituated to the presence of human and will resume their normal activities.

The impact on mammals is thus likely to be of low to medium intensity during the construction phase declining to a low intensity thereafter.

Many small mammals, such as mice, rely on acute hearing to avoid predators. The background noise resulting from the construction site could potentially impair the ability of such animals to hear approaching predators. Most predators (except snakes) on the other hand, rely primarily on vision to catch their prey and as a result are not likely to be similarly affected. Consequently, some small mammals could experience higher levels of predation which could have long-term consequences for their breeding potential and persistence at the site. The extent and severity of this effect has however not been documented and is regarded as an unknown.

Due to the proximity of the development to the adjacent villages and semi industrial sites, impacts will not be restricted to the site, but will nevertheless remain local in extent.

Table 3.2. Assessment of the impact of the development of the Siyanqoba Township Development site on mammals.

CRITERIA	IMPACT			
	CONSTRUCTION		OPERATION	
Magnitude:	**Without mitigation**	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local	Local	Local	Local
Duration	Short-Term	Short-Term	Long-term	Long-term
Intensity	Medium-High	Medium	Medium	Low
Likelihood:	Medium-High	Low	Medium	Low
Significance	Moderate	Moderate	Moderate	Minor
Status	Negative	Negative	Negative	Negative

3.3 Reptiles and Amphibians

The possibility exists that several of the important reptiles and amphibians discussed earlier, may occur in the site. However, due to the mobility of most such fauna, it is not anticipated that any of the taxa will be directly threatened by the activities. The animals can move away when disturbed an can return to the general area after the completion of the construction. The major impact on such fauna is expected to result from fragmentation of habitat. Impact on reptiles and amphibians and important species can be minimized by making use of existing access roads and disturbed areas and avoiding sensitive habitats (e.g. rocky outcrops and wetlands), and secondly by placing of the structures on pre-selected sites of low faunal importance.

3.4 Integrated Assessment

Ideally all structures should be situated within previously transformed areas. If this is not achievable due to design constraints then the positioning of structures has to be done in conjunction with a biodiversity specialist to avoid unnecessary destruction of protected species and important habitats.

With the appropriate mitigation, as described in mitigation measures, the impact of the operating infrastructure on all components of the terrestrial ecology of the site could be reduced to a low level. There are, however, also some potential impacts that are associated with the construction phase; these are listed along with appropriate mitigation measures Table 4.

Not all impacts associated with the construction phase can be mitigated. Little can practically be done to reduce the noise and the disturbance associated with the construction phase. However, this phase of the development should be fairly short-lived and the impacts transient.

The greatest uncertainty regarding the development, perhaps, is the potential for trophic ripple effects. Predators such as raptors and large carnivores such as jackal and caracal may avoid the area, which may affect the abundance of prey species which in turn may impact vegetation dynamics and herbivory patterns as well as the abundance of other small vertebrates. However, the extent and manner to which this is likely to occur is not well known and requires further investigation and research to clarify these aspects. Apart from keeping disturbance levels and human activity at the site to a minimum, there is little that can be done to reduce to the possibility of this impact, as in the long-term, it is most likely to be related to the presence of the people & vehicles themselves. Although further research might clarify the matter, this effect is difficult to quantify since the density of top predators is naturally low. Furthermore, research at a single site is unlikely to yield useful information and an integrated research effort involving several developments would probably be the most fruitful approach.

Given the appropriate mitigation, the development of the site is therefore not predicted to disrupt local or regional ecological processes, reduce the connectivity of the landscape to a significant degree or impact the ability of the terrestrial biota to utilise and move about the landscape. Overall, provided that the listed mitigation measures can be met then the likely impact of the development on the terrestrial ecology of the site can be seen as a low to minor negative impact. Under the appropriate mitigation, there are no compelling reasons from a terrestrial ecology standpoint to oppose the development.

4 MITIGATION

The objective of mitigation is to minimise impacts on vegetation and animal habitats and to maximise re-vegetation and rehabilitation of disturbed areas. Mitigation should be focussed on ameliorating the major risk factors associated with the development, which in the current development can be summarized under the following areas:

- Erosion
- Alien Plant Invasion
- Loss of Habitat & Habitat Fragmentation
- Impacts to Sensitive Environments
- Impacts to Rare or Endangered Plant Species
- Direct Faunal Impacts

These risk factors are in turn caused by or related to the following activities:

- Vegetation Clearing
- Road and facilities Construction Activities
- Vehicle Activity
- Human Activity

Mitigation measures associated with each of the risk factors listed above are described under the same headings below:

Erosion

The large amounts of soil disturbance that are likely to accompany the development imply that soil erosion is a high risk factor. Semi-arid areas are particularly vulnerable to erosion due to the low plant cover, susceptible soils and occasional intense rainfall events. Soil erosion is a serious ecological issue as it has the potential to cause ecosystem-wide impacts, particularly on sensitive ecosystems such as wetlands. Soil disturbance is the primary driver of erosion risk and consequently, soil disturbances of all kinds should be kept to an absolute minimum. The following mitigation measures are suggested as key factors in reducing the erosion risk associated with the development.

- Roads should avoid steep slopes as far as possible as it becomes increasingly difficult to regulate the flow of water with increasing slope and the risk of erosion increases rapidly. Should some of the steeper roads at the site prove vulnerable to erosion problems, then these areas should be surfaced with concrete or tar.
- Roads should not be built wider than necessary and only essential roads should be built
- It is important that where flow is diverted from the road surface that it is done in a manner which does not result in erosion problem in the adjacent vegetation. Serious attention should be given to flow attenuation and dispersion methods.
- The Public Open Spaces, especially wetland areas must have walkways (elevated wooden or stepping stones) designed into them to allow the public to enjoy the spaces without causing accelerated erosion.

Lay-down areas for the buildings and storm water drainage should be cleared to the minimum necessary. It is preferable to retain low vegetation as far as possible and to permit vehicles to traverse demarcated areas of natural vegetation rather than clear them completely. A site development plan that clearly indicates and demarcates the extent of vegetation clearance and development activities in different portions of the site should be compiled prior to construction and enforced by an

Environmental Control Officer. If vegetation needs to be cleared for temporary construction activities or lay down areas, it is preferable that only the vegetation is cleared (e.g. With a brush-cutter) and that the topsoil is left intact.

Where soil must be temporarily disturbed or moved such as at borrow pit sites, the topsoil should be set aside and replaced as soon as possible once the activity is completed. Disturbed sites in semi-arid regions usually recover very slowly and replacing topsoil at a site greatly increases the rate and extent of vegetation recovery. Topsoil that is stored for an extensive period of time becomes sterile and no longer acts to encourage natural re-vegetation. Where possible, existing roads should preferably be upgraded rather than constructing new roads. Alternatively if upgrading is not feasible, then the existing roads should be rehabilitated if they are no longer going to be used as they are likely to initiate erosion problems if not maintained.

Erosion control measures should be initiated as soon as signs of erosion problems become apparent. Problem areas may need to be fenced off and managed intensively. Should any erosion develop which cannot be remedied by simple erosion control measures, then the services of a rehabilitation and erosion control consultant with experience in semi-arid zones should be brought in to provide guidance in this regard.

Alien Plant Invasion

Due to the increased levels of human activity at the site and the large amount of disturbance and bare soil associated with the development, ideal conditions for the invasion of alien plants will be created. As there is already evidence level of alien plant invasion at the site e.g. Tall khakhi weed and shrubby milkweed , it could prove difficult to keep alien plants out of the disturbed areas. Within the croplands this is not a significant issue as these areas are already dominated by alien species and their biodiversity potential is low. However, where intact vegetation is disturbed, measures should be taken to reduce the invasion of alien species into these areas. Mitigation of alien plant invasion risk will to some extent be achieved by similar practices to those which limit the erosion risk at the site. The following mitigation measures are suggested in order to minimize the risk of alien plants invading the site.

- Vegetation clearing and soil disturbance should be kept to a minimum.
- Natural re-vegetation of disturbed areas such as road verges should be encouraged. Seed of indigenous species collected on site could be used to re-vegetate cleared areas.
- No foreign plant material should be brought onto the site;
- All alien plants observed at the site should be removed on a regular basis. This will however not be possible for the alien annual grasses, which need to be managed at the ecosystem level. Sweeps for alien plants and alien clearing activities should be conducted at least on a quarterly basis.
- Alien species should be controlled in the appropriate manner as incorrect control measures can exacerbate invasion problems. There are various publicly available sources which list the most appropriate control method for the different alien species likely to be encountered from South African National Biodiversity Institute.
- Clearing methods should themselves aim to keep disturbance to a minimum.

Loss of Habitat & Habitat Fragmentation

The site is already quite fragmented due to the high proportion of settlements and croplands in the area, leaving it vulnerable to further fragmentation and loss of habitat. The following mitigation measures are aimed at reducing these impacts:

- No structures should be built outside the area demarcated for the development. There is a tendency of hawkers putting up structures for selling food items to contractors which should be planned and controlled regardless of the need.
- There is a rock outcrop on the far east of the site, and another parallel to the main road but on the west of the site. These outcrops according to the Mpumalanga Critical Biodiversity Areas assessment occur in areas that are "Least Concern" and "No Natural Habitat Remains" respectively. Be that as it may, it is suggested that these two outcrops be regarded as **"no go"** areas for the project especially the one on the far east of the site.
- Although it is unavoidable that some roads will need to traverse areas of potential Sensitivity, the existing road infrastructure should be upgraded in such cases so as to avoid further impact to these areas. In addition, where roads are to be widened, the adjacent vegetation that is to be lost should be assessed by a qualified botanist before construction to ensure that rare, protected or endangered species are not being impacted by the road and if necessary alternative routes identified or the plants relocated to a similar nearby environment.
- Vegetation clearing should be kept to a minimum, and as already described, this should only occur where it is absolutely necessary and the use of a brush-cutter is highly preferable to the use of earth-moving equipment.
- Access roads should not be wider than the minimum requirement for the development (at least 4m wide).
- Re-vegetation of road verges should be encouraged, while the natural re-vegetation of facilities service areas and road surfaces should be tolerated as far practically feasible.
- All temporary construction lay-down areas should be sited on open areas, preferably flat areas. No natural vegetation should be transformed for temporary activities.
- Borrow pits should be located within previously transformed areas and the area disturbed should not be larger than necessary.

Impacts to Rare or Endangered Plant Species

There are several listed plant species which may occur at the site. The following recommendations are made regarding the potential impact on these species:

Prior to construction and preferably during the winter or early spring,

- The areas of natural vegetation that may be lost to the development should be searched for this species.
- Any individuals of important species located, should be relocated to an adjacent area and into a similar microsite from where they were taken.
- The success of the translocation should be monitored for at least a year after transplant to ascertain the success rate of the intervention.

Direct Fauna/ Impacts

High levels of human activity will be associated with the development, these activities pose several different risks to the fauna of the site, including collisions with vehicles, fires, collecting and disturbance. These risks will be very high during the construction phase and decrease during the operational phase. Mitigation and control measure that should be instituted include the following:

- Vehicles must adhere to a speed limit, 30-40 km/h is recommended for light vehicles and a lower speed for heavy vehicles.
- All construction and maintenance vehicles must stick to properly demarcated and prepared roads. Off-road driving should be strictly prohibited
- Fauna must have 'right of way' on the roads. Slow moving animals such as tortoises which may be in the way, should be placed at the side of the road in the direction the animal was seen traveling.
- No fires should be allowed at the site anywhere other than within demarcated areas within the compound.
- No dogs or other pets should be allowed at the site. All staff at the site should remain within the compound at night. No harvesting or collecting of plants, seeds, animals or their parts should be allowed. Poaching or hunting should be strictly forbidden.
- Littering should be strictly forbidden and waste generated by staff or at the compound should be disposed of in an appropriate manner, preferably off-site.
- The compound and other temporary lay-down areas should be fenced-off to reduce human-wildlife interactions.
- All chemical, fuel and oil spills should be cleaned up in the appropriate manner. As part of the EMP for the site, it should be mandatory for staff of both the developer as well as contractors to attend an environmental briefing and training session with respect to the guidelines outlined in this document and the EMP.

Table 4.1 Assessment of impacts on natural vegetation and habitats, including proposed mitigation measures.

Affected Habitat	**Impact Description**	**Impact Significance before Mitigation**	**Recommendations and Mitigation**	**Impact Significance after mitigation**
Grassland	Fragmentation of habitat. Loss of important flora species Destruction of sensitive areas.	Medium	• Minimize loss and disturbance of natural habitat by using already disturbed areas (cleared lands) • Make use of existing access roads. • Align access roads with existing linear infrastructure (e.g. roads, power lines) • The two identified outcrops be regarded as “no go” areas for the project especially the one on the far east of the site.	Low
Wetland habitat	Fragmentation / degradation of wetland habitat Loss of riverine species	Medium	• Use appropriate environmental management designs to protect the wetlands (dams) or surface water from the risk of large scale spillage of hazardous chemicals; • Minimise vegetation clearance to protect wetland wildlife habitat and minimise soil erosion • stockpile topsoil for re-vegetation after construction; • Use standard equipment when working ‘in-wetland’ to minimise the risk of concrete spillage, and • Use dust suppression equipment during construction. • Make every effort to save protected trees. • The Public Open Spaces, especially wetland areas must have walkways (elevated wooden or stepping stones) designed into them to allow the public to enjoy the spaces without causing accelerated erosion	Low

Table 4.2 Assessment of impacts on fauna, including proposed mitigation measures.

Taxa	Impact Significance before mitigation	Impacts Description	Recommendations and mitigation	Impact Significance after mitigation
Mammals	Medium	Loss of habitat and creation of breaks in continuity of biodiversity corridors	Minimize loss of natural habitat by using already disturbed areas. Make use of existing access roads.	Low
Avifauna	Low	No significant impacts are anticipated	Minimize loss of natural habitat by using already disturbed areas. Make use of existing access roads.	Low
Reptiles and amphibians	Medium	Loss of habitat. Disturbance as well as killing of serpentines and frogs by crews.	Crews must be educated to the value of biodiversity and not to disturb or kill wild animals.	Low

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APPENDICES

Appendix 1. List of Plant Species recorded or likely to occur in the study area.

FamilyName	SpeciesName
ACANTHACEAE	Barleria obtusa
ACANTHACEAE	Barleria pretoriensis
ACANTHACEAE	Blepharis innocua
ACANTHACEAE	Blepharis subvolubilis
ACANTHACEAE	Chaetacanthus costatus
ACANTHACEAE	Crossandra greenstockii
ACANTHACEAE	Dicliptera clinopodia
ACANTHACEAE	Dicliptera minor subsp. minor
ACANTHACEAE	Isoglossa grantii
ACANTHACEAE	Justicia anagalloides
ACANTHACEAE	Ruellia cordata
ACANTHACEAE	Ruttya ovata
ACANTHACEAE	Sclerochiton sp.
ACANTHACEAE	Thunbergia atriplicifolia
ACAROSPORACEAE	Acarospora intrusa
ACAROSPORACEAE	Acarospora laevigata
ACAROSPORACEAE	Acarospora tenuis
AGAPANTHACEAE	Agapanthus inapertus subsp. pendulus
AGYRIACEAE	Trapelia coarctata
AGYRIACEAE	Trapeliopsis parilis
ALLIACEAE	Tulbaghia acutiloba
ALLIACEAE	Tulbaghia leucantha
AMARANTHACEAE	Alternanthera pungens
AMARANTHACEAE	Amaranthus hybridus subsp. hybridus var. hybridus
AMARANTHACEAE	Gomphrena celosioides
AMARANTHACEAE	Guilleminea densa
AMARANTHACEAE	Kyphocarpa angustifolia
AMARANTHACEAE	Pupalia lappacea var. lappacea
AMARYLLIDACEAE	Boophone disticha
AMARYLLIDACEAE	Crinum bulbispermum
AMARYLLIDACEAE	Crinum graminicola
AMARYLLIDACEAE	Crinum macowanii
AMARYLLIDACEAE	Cyrtanthus breviflorus
AMARYLLIDACEAE	Cyrtanthus tuckii var. transvaalensis
AMARYLLIDACEAE	Haemanthus humilis subsp. hirsutus
AMARYLLIDACEAE	Haemanthus humilis subsp. humilis
AMARYLLIDACEAE	Nerine rehmannii
AMARYLLIDACEAE	Scadoxus puniceus
ANACARDIACEAE	Lannea discolor
ANACARDIACEAE	Lannea edulis var. edulis

ANACARDIACEAE	Lannea gossweileri subsp. tomentella
ANACARDIACEAE	Ozoroa paniculosa var. paniculosa
ANACARDIACEAE	Rhus magalismontana
ANACARDIACEAE	Searsia dentata
ANACARDIACEAE	Searsia gerrardii
ANACARDIACEAE	Searsia gracillima var. glaberrima
ANACARDIACEAE	Searsia magalismontana subsp. magalismontana
ANACARDIACEAE	Searsia montana
ANACARDIACEAE	Searsia pyroides var. pyroides
ANACARDIACEAE	Searsia zeyheri
ANEURACEAE	Riccardia sp.
ANTHERICACEAE	Chlorophytum calyptrocarpum
ANTHERICACEAE	Chlorophytum fasciculatum
ANTHERICACEAE	Chlorophytum recurvifolium
APIACEAE	Afrosciadium magalismontanum
APIACEAE	Alepidea longeciliata
APIACEAE	Alepidea peduncularis
APIACEAE	Alepidea setifera
APIACEAE	Centella asiatica
APIACEAE	Conium chaerophylloides
APIACEAE	Foeniculum vulgare var. vulgare
APIACEAE	Heteromorpha arborescens var. abyssinica
APIACEAE	Sium repandum
APOCYNACEAE	Acokanthera oppositifolia
APOCYNACEAE	Ancylobotrys capensis
APOCYNACEAE	Asclepias albens
APOCYNACEAE	Asclepias brevipes
APOCYNACEAE	Asclepias crispa var. crispa
APOCYNACEAE	Asclepias eminens
APOCYNACEAE	Asclepias fallax
APOCYNACEAE	Asclepias gibba var. gibba
APOCYNACEAE	Aspidoglossum araneiferum
APOCYNACEAE	Aspidoglossum biflorum
APOCYNACEAE	Aspidoglossum glabrescens
APOCYNACEAE	Aspidoglossum interruptum
APOCYNACEAE	Aspidoglossum validum
APOCYNACEAE	Brachystelma circinatum
APOCYNACEAE	Brachystelma nanum
APOCYNACEAE	Brachystelma rubellum
APOCYNACEAE	Caralluma bredae var. thomallae
APOCYNACEAE	Cordylogyne globosa
APOCYNACEAE	Cryptolepis cryptolepidioides
APOCYNACEAE	Cryptolepis oblongifolia
APOCYNACEAE	Diplorhynchus condylocarpon
APOCYNACEAE	Duvalia polita

APOCYNACEAE	Gomphocarpus fruticosus subsp. fruticosus
APOCYNACEAE	Gomphocarpus glaucophyllus
APOCYNACEAE	Gomphocarpus rivularis
APOCYNACEAE	Gomphocarpus tomentosus subsp. tomentosus
APOCYNACEAE	Huernia kirkii
APOCYNACEAE	Huernia loeseneriana
APOCYNACEAE	Huernia stapelioides
APOCYNACEAE	Pachycarpus asperifolius
APOCYNACEAE	Pachycarpus suaveolens
APOCYNACEAE	Parapodium costatum
APOCYNACEAE	Pentarrhinum insipidum
APOCYNACEAE	Pergularia daemia subsp. daemia
APOCYNACEAE	Periglossum angustifolium
APOCYNACEAE	Raphionacme galpinii
APOCYNACEAE	Raphionacme hirsuta
APOCYNACEAE	Riocreuxia polyantha
APOCYNACEAE	Secamone alpini
APOCYNACEAE	Sisyranthus imberbis
APOCYNACEAE	Sisyranthus randii
APOCYNACEAE	Stapelia gettliffei
APOCYNACEAE	Tavaresia barklyi
APOCYNACEAE	Xysmalobium asperum
APONOGETONACEAE	Aponogeton stuhlmannii
AQUIFOLIACEAE	Ilex mitis var. mitis
ARACEAE	Stylochaeton natalensis
ARACEAE	Zantedeschia albomaculata subsp. macrocarpa
ARALIACEAE	Cussonia paniculata subsp. sinuata
ARALIACEAE	Cussonia spicata
ARALIACEAE	Cussonia transvaalensis
ARCHIDIACEAE	Archidium ohioense
ASPARAGACEAE	Asparagus angusticladus
ASPARAGACEAE	Asparagus cooperi
ASPARAGACEAE	Asparagus flavicaulis subsp. flavicaulis
ASPARAGACEAE	Asparagus suaveolens
ASPARAGACEAE	Asparagus transvaalensis
ASPARAGACEAE	Asparagus virgatus
ASPHODELACEAE	Aloe aculeata
ASPHODELACEAE	Aloe arborescens
ASPHODELACEAE	Aloe ecklonis
ASPHODELACEAE	Aloe sp.
ASPHODELACEAE	Aloe spicata
ASPHODELACEAE	Aloe verdoorniae
ASPHODELACEAE	Aloe verecunda
ASPHODELACEAE	Aloe zebrina

ASPHODELACEAE	Bulbine abyssinica
ASPHODELACEAE	Bulbine favosa
ASPHODELACEAE	Chortolirion angolense
ASPHODELACEAE	Haworthia koelmaniorum var. mcmurtryi
ASPHODELACEAE	Kniphofia ensifolia subsp. ensifolia
ASPHODELACEAE	Kniphofia porphyrantha
ASPHODELACEAE	Trachyandra asperata var. asperata
ASPHODELACEAE	Trachyandra asperata var. carolinensis
ASPHODELACEAE	Trachyandra asperata var. nataglencoensis
ASPHODELACEAE	Trachyandra reflexipilosa
ASPHODELACEAE	Trachyandra saltii var. saltii
ASPHODELACEAE	Trachyandra sp.
ASPLENIACEAE	Asplenium aethiopicum
ASPLENIACEAE	Asplenium cordatum
ASTERACEAE	Acanthospermum australe
ASTERACEAE	Acanthospermum glabratum
ASTERACEAE	Artemisia afra var. afra
ASTERACEAE	Aspilia mossambicensis
ASTERACEAE	Aster harveyanus
ASTERACEAE	Aster peglerae
ASTERACEAE	Athrixia elata
ASTERACEAE	Berkheya insignis
ASTERACEAE	Berkheya radula
ASTERACEAE	Berkheya seminivea
ASTERACEAE	Berkheya speciosa subsp. lanceolata
ASTERACEAE	Blumea dregeanoides
ASTERACEAE	Brachylaena rotundata
ASTERACEAE	Callilepis laureola
ASTERACEAE	Callilepis leptophylla
ASTERACEAE	Chrysocoma ciliata
ASTERACEAE	Chrysocoma sp.
ASTERACEAE	Cineraria lobata subsp. lobata
ASTERACEAE	Conyza canadensis
ASTERACEAE	Conyza chilensis
ASTERACEAE	Conyza podocephala
ASTERACEAE	Conyza scabrida
ASTERACEAE	Conyza sumatrensis var. sumatrensis
ASTERACEAE	Conyza ulmifolia
ASTERACEAE	Cotula anthemoides
ASTERACEAE	Denekia capensis
ASTERACEAE	Dicoma anomala subsp. anomala
ASTERACEAE	Dicoma anomala subsp. gerrardii
ASTERACEAE	Dicoma sp.
ASTERACEAE	Dimorphotheca caulescens
ASTERACEAE	Dimorphotheca spectabilis

ASTERACEAE	Euryops gilfillanii
ASTERACEAE	Euryops transvaalensis subsp. transvaalensis
ASTERACEAE	Felicia muricata subsp. cinerascens
ASTERACEAE	Felicia muricata subsp. muricata
ASTERACEAE	Felicia muricata subsp. strictifolia
ASTERACEAE	Gamochaeta coarctata
ASTERACEAE	Gamochaeta subfalcata
ASTERACEAE	Gazania krebsiana subsp. serrulata
ASTERACEAE	Geigeria aspera var. aspera
ASTERACEAE	Geigeria burkei subsp. burkei var. intermedia
ASTERACEAE	Gerbera ambigua
ASTERACEAE	Gerbera jamesonii
ASTERACEAE	Gerbera natalensis
ASTERACEAE	Gerbera piloselloides
ASTERACEAE	Gnaphalium filagopsis
ASTERACEAE	Haplocarpha scaposa
ASTERACEAE	Helichrysum acutatum
ASTERACEAE	Helichrysum argyrolepis
ASTERACEAE	Helichrysum aureonitens
ASTERACEAE	Helichrysum caespititium
ASTERACEAE	Helichrysum cephaloideum
ASTERACEAE	Helichrysum cerastioides var. cerastioides
ASTERACEAE	Helichrysum chionosphaerum
ASTERACEAE	Helichrysum difficile
ASTERACEAE	Helichrysum kraussii
ASTERACEAE	Helichrysum lepidissimum
ASTERACEAE	Helichrysum mixtum var. mixtum
ASTERACEAE	Helichrysum nudifolium var. nudifolium
ASTERACEAE	Helichrysum paronychioides
ASTERACEAE	Helichrysum rugulosum
ASTERACEAE	Helichrysum setosum
ASTERACEAE	Helichrysum subglomeratum
ASTERACEAE	Helichrysum subluteum
ASTERACEAE	Hypochaeris radicata
ASTERACEAE	Inula paniculata
ASTERACEAE	Lactuca inermis
ASTERACEAE	Lasiospermum pedunculare
ASTERACEAE	Lopholaena segmentata
ASTERACEAE	Macledium zeyheri subsp. zeyheri
ASTERACEAE	Mikania natalensis
ASTERACEAE	Nidorella anomala
ASTERACEAE	Nidorella hottentotica
ASTERACEAE	Nidorella resedifolia subsp. resedifolia
ASTERACEAE	Nolletia rarifolia
ASTERACEAE	Osteospermum muricatum subsp. muricatum

ASTERACEAE	Osteospermum striatum
ASTERACEAE	Pseudognaphalium oligandrum
ASTERACEAE	Schistostephium heptalobum
ASTERACEAE	Schistostephium sp.
ASTERACEAE	Schkuhria pinnata
ASTERACEAE	Senecio albanopsis
ASTERACEAE	Senecio barbertonicus
ASTERACEAE	Senecio breviscapus
ASTERACEAE	Senecio burchellii
ASTERACEAE	Senecio coronatus
ASTERACEAE	Senecio glanduloso-pilosus
ASTERACEAE	Senecio gregatus
ASTERACEAE	Senecio harveianus
ASTERACEAE	Senecio inaequidens
ASTERACEAE	Senecio inornatus
ASTERACEAE	Senecio laevigatus var. laevigatus
ASTERACEAE	Senecio latifolius
ASTERACEAE	Senecio lydenburgensis
ASTERACEAE	Senecio serratuloides
ASTERACEAE	Senecio sp.
ASTERACEAE	Senecio venosus
ASTERACEAE	Seriphium plumosum
ASTERACEAE	Sonchus dregeanus
ASTERACEAE	Sonchus nanus
ASTERACEAE	Sonchus oleraceus
ASTERACEAE	Stoebe vulgaris
ASTERACEAE	Tagetes minuta
ASTERACEAE	Tarchonanthus camphoratus
ASTERACEAE	Ursinia nana subsp. leptophylla
ASTERACEAE	Vernonia galpinii
ASTERACEAE	Vernonia hirsuta
ASTERACEAE	Vernonia oligocephala
ASTERACEAE	Vernonia staehelinoides
ASTERACEAE	Vernonia steetziana
ASTERACEAE	Xanthium strumarium
ASTERACEAE	Zinnia peruviana
AYTONIACEAE	Asterella bachmannii
AYTONIACEAE	Asterella wilmsii
AYTONIACEAE	Plagiochasma rupestre var. rupestre
BARTRAMIACEAE	Bartramia aristaria
BARTRAMIACEAE	Breutelia microdonta
BARTRAMIACEAE	Philonotis africana
BARTRAMIACEAE	Philonotis dregeana
BARTRAMIACEAE	Philonotis hastata
BASELLACEAE	Anredera cordifolia

BLECHNACEAE	Blechnum australe subsp. australe
BORAGINACEAE	Cynoglossum lanceolatum
BORAGINACEAE	Lithospermum cinereum
BORAGINACEAE	Trichodesma physaloides
BRASSICACEAE	Heliophila rigidiuscula
BRASSICACEAE	Lepidium bonariense
BRASSICACEAE	Lepidium transvaalense
BRUCHIACEAE	Cladophascum gymnomitrioides
BRYACEAE	Brachymenium acuminatum
BRYACEAE	Bryum alpinum
BRYACEAE	Bryum argenteum
BRYACEAE	Bryum capillare
BRYACEAE	Bryum pycnophyllum
BUDDLEJACEAE	Buddleja salviifolia
BUDDLEJACEAE	Gomphostigma virgatum
BUDDLEJACEAE	Nuxia congesta
BUXACEAE	Buxus macowanii
CALYMPERACEAE	Syrrhopodon gaudichaudii
CAMPANULACEAE	Wahlenbergia paniculata
CAMPANULACEAE	Wahlenbergia undulata
CANDELARIACEAE	Candelariella vitellina var. vitellina
CAPPARACEAE	Boscia foetida subsp. rehmanniana
CAPPARACEAE	Capparis fascicularis var. fascicularis
CAPPARACEAE	Cleome gynandra
CAPPARACEAE	Cleome maculata
CAPPARACEAE	Maerua cafra
CARYOPHYLLACEAE	Corrigiola litoralis subsp. litoralis var. litoralis
CARYOPHYLLACEAE	Dianthus mooiensis subsp. mooiensis var. mooiensis
CARYOPHYLLACEAE	Dianthus transvaalensis
CARYOPHYLLACEAE	Pollichia campestris
CARYOPHYLLACEAE	Polycarpaea corymbosa var. corymbosa
CARYOPHYLLACEAE	Silene burchellii var. angustifolia
CARYOPHYLLACEAE	Silene undulata
CELASTRACEAE	Gymnosporia buxifolia
CELASTRACEAE	Gymnosporia tenuispina
CELASTRACEAE	Maytenus acuminata var. acuminata
CELASTRACEAE	Maytenus undata
CELASTRACEAE	Pterocelastrus echinatus
CELASTRACEAE	Pterocelastrus sp.
CELTIDACEAE	Celtis africana
CHENOPODIACEAE	Chenopodium hederiforme var. undulatum
CHENOPODIACEAE	Chenopodium schraderianum
CHRYSOBALANACEAE	Parinari capensis subsp. capensis
COLCHICACEAE	Camptorrhiza strumosa
COLLEMATACEAE	Leptogium caespitosum

COLLEMATACEAE	Leptogium coralloideum
COLLEMATACEAE	Leptogium furfuraceum
COMBRETACEAE	Combretum apiculatum subsp. apiculatum
COMBRETACEAE	Combretum erythrophyllum
COMBRETACEAE	Combretum moggii
COMBRETACEAE	Combretum molle
COMBRETACEAE	Combretum sp.
COMBRETACEAE	Combretum zeyheri
COMBRETACEAE	Terminalia sericea
COMMELINACEAE	Commelina africana var. africana
COMMELINACEAE	Commelina africana var. lancispatha
COMMELINACEAE	Commelina benghalensis
COMMELINACEAE	Commelina eckloniana
COMMELINACEAE	Commelina livingstonii
COMMELINACEAE	Commelina modesta
COMMELINACEAE	Cyanotis lapidosa
COMMELINACEAE	Cyanotis speciosa
COMMELINACEAE	Floscopa glomerata
CONVOLVULACEAE	Convolvulus sagittatus
CONVOLVULACEAE	Convolvulus thunbergii
CONVOLVULACEAE	Cuscuta appendiculata
CONVOLVULACEAE	Falkia oblonga
CONVOLVULACEAE	Ipomoea bathycolpos
CONVOLVULACEAE	Ipomoea crassipes var. crassipes
CONVOLVULACEAE	Ipomoea oblongata
CONVOLVULACEAE	Ipomoea obscura var. obscura
CONVOLVULACEAE	Ipomoea ommanneyi
CONVOLVULACEAE	Merremia verecunda
CONVOLVULACEAE	Xenostegia tridentata subsp. angustifolia
CRASSULACEAE	Cotyledon orbiculata var. oblonga
CRASSULACEAE	Crassula lanceolata subsp. lanceolata
CRASSULACEAE	Crassula lanceolata subsp. transvaalensis
CRASSULACEAE	Crassula nodulosa var. nodulosa forma nodulosa
CRASSULACEAE	Crassula setulosa var. setulosa forma setulosa
CRASSULACEAE	Crassula sp.
CRASSULACEAE	Kalanchoe paniculata
CUCURBITACEAE	Citrullus lanatus
CUCURBITACEAE	Coccinia adoensis
CUCURBITACEAE	Cucumis myriocarpus subsp. myriocarpus
CUCURBITACEAE	Cucumis zeyheri
CUCURBITACEAE	Trochomeria macrocarpa subsp. macrocarpa
CYATHEACEAE	Alsophila dregei
CYPERACEAE	Ascolepis capensis
CYPERACEAE	Bulbostylis burchellii
CYPERACEAE	Bulbostylis contexta

CYPERACEAE	Bulbostylis hispidula subsp. pyriformis
CYPERACEAE	Bulbostylis humilis
CYPERACEAE	Bulbostylis oritrephes
CYPERACEAE	Bulbostylis schlechteri
CYPERACEAE	Bulbostylis schoenoides
CYPERACEAE	Bulbostylis scleropus
CYPERACEAE	Carex glomerabilis
CYPERACEAE	Carex spicato-paniculata
CYPERACEAE	Cyperus albostriatus
CYPERACEAE	Cyperus congestus
CYPERACEAE	Cyperus deciduus
CYPERACEAE	Cyperus denudatus var. denudatus
CYPERACEAE	Cyperus difformis
CYPERACEAE	Cyperus esculentus var. esculentus
CYPERACEAE	Cyperus keniensis
CYPERACEAE	Cyperus leptocladus
CYPERACEAE	Cyperus longus var. longus
CYPERACEAE	Cyperus margaritaceus var. margaritaceus
CYPERACEAE	Cyperus marginatus
CYPERACEAE	Cyperus obtusiflorus var. flavissimus
CYPERACEAE	Cyperus obtusiflorus var. obtusiflorus
CYPERACEAE	Cyperus rupestris var. rupestris
CYPERACEAE	Cyperus semitrifidus
CYPERACEAE	Cyperus sphaerospermus
CYPERACEAE	Cyperus tenax
CYPERACEAE	Eleocharis atropurpurea
CYPERACEAE	Eleocharis dregeana
CYPERACEAE	Eleocharis limosa
CYPERACEAE	Fimbristylis complanata
CYPERACEAE	Fuirena coerulescens
CYPERACEAE	Fuirena pubescens var. pubescens
CYPERACEAE	Isolepis costata
CYPERACEAE	Kyllinga alata
CYPERACEAE	Kyllinga alba
CYPERACEAE	Kyllinga erecta var. erecta
CYPERACEAE	Kyllinga pulchella
CYPERACEAE	Lipocarpha nana
CYPERACEAE	Lipocarpha rehmannii
CYPERACEAE	Mariscus uitenhagensis
CYPERACEAE	Pycreus cooperi
CYPERACEAE	Pycreus macranthus
CYPERACEAE	Pycreus nitidus
CYPERACEAE	Rhynchospora brownii
CYPERACEAE	Schoenoplectus brachyceras
CYPERACEAE	Schoenoplectus corymbosus

CYPERACEAE	Schoenoplectus decipiens
CYPERACEAE	Schoenoplectus scirpoides
CYPERACEAE	Scirpoides burkei
CYPERACEAE	Scirpoides dioecus
CYPERACEAE	Scleria aterrima
CYPERACEAE	Scleria welwitschii
DENNSTAEDTIACEAE	Pteridium aquilinum subsp. aquilinum
DICHAPETALACEAE	Dichapetalum cymosum
DICRANACEAE	Campylopus introflexus
DICRANACEAE	Campylopus pallidus
DICRANACEAE	Campylopus pilifer var. pilifer
DICRANACEAE	Campylopus robillardei
DICRANACEAE	Campylopus sp.
DIOSCOREACEAE	Dioscorea dregeana
DIOSCOREACEAE	Dioscorea sp.
DIOSCOREACEAE	Dioscorea sylvatica var. sylvatica
DIPSACACEAE	Cephalaria sp.
DIPSACACEAE	Scabiosa columbaria
DROSERACEAE	Drosera collinsiae
DROSERACEAE	Drosera madagascariensis
EBENACEAE	Diospyros lycioides subsp. guerkei
EBENACEAE	Diospyros lycioides subsp. lycioides
EBENACEAE	Diospyros whyteana
EBENACEAE	Euclea crispa subsp. crispa
EBENACEAE	Euclea sp.
EQUISETACEAE	Equisetum ramosissimum subsp. ramosissimum
ERICACEAE	Erica drakensbergensis
ERIOCAULACEAE	Syngonanthus wahlbergii var. wahlbergii
ERIOSPERMACEAE	Eriospermum cooperi var. cooperi
ERIOSPERMACEAE	Eriospermum flagelliforme
ERIOSPERMACEAE	Eriospermum mackenii subsp. galpinii
ERIOSPERMACEAE	Eriospermum porphyrovalve
ERPODIACEAE	Aulacopilum trichophyllum
EUPHORBIACEAE	Acalypha angustata
EUPHORBIACEAE	Acalypha caperonioides var. caperonioides
EUPHORBIACEAE	Acalypha sp.
EUPHORBIACEAE	Acalypha villicaulis
EUPHORBIACEAE	Acalypha wilmsii
EUPHORBIACEAE	Clutia monticola var. monticola
EUPHORBIACEAE	Clutia pulchella var. pulchella
EUPHORBIACEAE	Croton gratissimus var. gratissimus
EUPHORBIACEAE	Croton gratissimus var. subgratissimus
EUPHORBIACEAE	Dalechampia capensis
EUPHORBIACEAE	Euphorbia cooperi
EUPHORBIACEAE	Euphorbia cooperi var. cooperi

EUPHORBIACEAE	Euphorbia gueinzii var. albovillosa
EUPHORBIACEAE	Euphorbia pseudotuberosa
EUPHORBIACEAE	Euphorbia striata var. striata
EUPHORBIACEAE	Jatropha hirsuta var. oblongifolia
EUPHORBIACEAE	Jatropha lagarinthoides
EUPHORBIACEAE	Jatropha sp.
EUPHORBIACEAE	Jatropha zeyheri
EUPHORBIACEAE	Monadenium lugardiae
EXORMOTHECACEAE	Exormotheca holstii
EXORMOTHECACEAE	Exormotheca megastomata
EXORMOTHECACEAE	Exormotheca pustulosa
FABACEAE	Abrus laevigatus
FABACEAE	Acacia ataxacantha
FABACEAE	Acacia caffra
FABACEAE	Acacia karroo
FABACEAE	Acacia sieberiana var. woodii
FABACEAE	Acacia sp.
FABACEAE	Aeschynomene rehmannii var. leptobotrya
FABACEAE	Aeschynomene rehmannii var. rehmannii
FABACEAE	Aeschynomene sp.
FABACEAE	Alysicarpus zeyheri
FABACEAE	Argyrolobium megarrhizum
FABACEAE	Argyrolobium molle
FABACEAE	Argyrolobium pauciflorum
FABACEAE	Argyrolobium pauciflorum var. pauciflorum
FABACEAE	Argyrolobium tuberosum
FABACEAE	Burkea africana
FABACEAE	Chamaecrista comosa var. capricornia
FABACEAE	Chamaecrista mimosoides
FABACEAE	Dolichos angustifolius
FABACEAE	Dolichos falciformis
FABACEAE	Dolichos trilobus subsp. transvaalicus
FABACEAE	Elephantorrhiza burkei
FABACEAE	Elephantorrhiza elephantina
FABACEAE	Elephantorrhiza obliqua var. glabra
FABACEAE	Eriosema burkei var. burkei
FABACEAE	Eriosema cordatum
FABACEAE	Eriosema gunniae
FABACEAE	Eriosema kraussianum
FABACEAE	Eriosema nutans
FABACEAE	Eriosema psoraleoides
FABACEAE	Eriosema salignum
FABACEAE	Eriosema sp.
FABACEAE	Eriosema squarrosum
FABACEAE	Erythrina humeana

FABACEAE	Erythrina lysistemon
FABACEAE	Erythrina zeyheri
FABACEAE	Indigastrum burkeanum
FABACEAE	Indigastrum fastigiatum
FABACEAE	Indigofera atrata
FABACEAE	Indigofera confusa
FABACEAE	Indigofera daleoides var. daleoides
FABACEAE	Indigofera egens
FABACEAE	Indigofera frondosa
FABACEAE	Indigofera hedyantha
FABACEAE	Indigofera hilaris var. hilaris
FABACEAE	Indigofera melanadenia
FABACEAE	Indigofera mollicoma
FABACEAE	Indigofera obscura
FABACEAE	Indigofera oxalidea
FABACEAE	Indigofera oxytropis
FABACEAE	Indigofera rostrata
FABACEAE	Indigofera sordida
FABACEAE	Indigofera sp.
FABACEAE	Indigofera velutina
FABACEAE	Indigofera zeyheri
FABACEAE	Leobordea platycarpa
FABACEAE	Listia heterophylla
FABACEAE	Lotononis eriantha
FABACEAE	Lotononis foliosa
FABACEAE	Lotononis sp.
FABACEAE	Lotus discolor subsp. discolor
FABACEAE	Melolobium alpinum
FABACEAE	Melolobium wilmsii
FABACEAE	Mundulea sericea subsp. sericea
FABACEAE	Neonotonia wightii
FABACEAE	Neorautanenia ficifolia
FABACEAE	Pearsonia aristata
FABACEAE	Pearsonia cajanifolia subsp. cajanifolia
FABACEAE	Pearsonia grandifolia subsp. latibracteolata
FABACEAE	Pearsonia sessilifolia subsp. filifolia
FABACEAE	Pearsonia sessilifolia subsp. sessilifolia
FABACEAE	Psoralea pinnata var. pinnata
FABACEAE	Rhynchosia caribaea
FABACEAE	Rhynchosia crassifolia
FABACEAE	Rhynchosia monophylla
FABACEAE	Rhynchosia nervosa var. nervosa
FABACEAE	Rhynchosia nitens
FABACEAE	Rhynchosia sp.
FABACEAE	Rhynchosia totta var. totta

FABACEAE	Smithia erubescens
FABACEAE	Sphenostylis angustifolia
FABACEAE	Tephrosia capensis var. capensis
FABACEAE	Tephrosia elongata var. elongata
FABACEAE	Tephrosia longipes subsp. longipes var. longipes
FABACEAE	Tephrosia macropoda var. macropoda
FABACEAE	Tephrosia multijuga
FABACEAE	Tephrosia retusa
FABACEAE	Tephrosia semiglabra
FABACEAE	Tephrosia shiluwanensis
FABACEAE	Trifolium dubium
FABACEAE	Vigna unguiculata subsp. stenophylla
FABACEAE	Vigna vexillata var. vexillata
FABACEAE	Zornia capensis subsp. capensis
FABACEAE	Zornia linearis
FABACEAE	Zornia milneana
FISSIDENTACEAE	Fissidens aciphyllus
FISSIDENTACEAE	Fissidens asplenioides
FISSIDENTACEAE	Fissidens borgenii
FISSIDENTACEAE	Fissidens bryoides
FISSIDENTACEAE	Fissidens curvatus var. curvatus
FISSIDENTACEAE	Fissidens sciophyllus
FISSIDENTACEAE	Fissidens sp.
FISSIDENTACEAE	Fissidens submarginatus
FOSSOMBRONIACEAE	Fossombronia crispa
FOSSOMBRONIACEAE	Fossombronia gemmifera
FOSSOMBRONIACEAE	Fossombronia pusilla
FOSSOMBRONIACEAE	Fossombronia sp.
GENTIANACEAE	Chironia krebsii
GENTIANACEAE	Chironia purpurascens subsp. humilis
GENTIANACEAE	Sebaea grandis
GENTIANACEAE	Sebaea leiostyla
GERANIACEAE	Monsonia angustifolia
GERANIACEAE	Monsonia attenuata
GERANIACEAE	Pelargonium alchemilloides
GERANIACEAE	Pelargonium luridum
GERANIACEAE	Pelargonium multicaule subsp. multicaule
GERANIACEAE	Pelargonium multicaule subsp. subherbaceum
GERANIACEAE	Pelargonium pseudofumarioides
GERANIACEAE	Pelargonium sidoides
GISEKIACEAE	Gisekia pharnacioides var. pharnacioides
GLEICHENIACEAE	Gleichenia polypodioides
GREYIACEAE	Greyia radlkoferi
HAEMATOMMATACEAE	Haematomma persoonii
HALORAGACEAE	Laurembergia repens subsp. brachypoda

HETEROPYXIDACEAE	Heteropyxis natalensis
HYACINTHACEAE	Albuca setosa
HYACINTHACEAE	Albuca shawii
HYACINTHACEAE	Dipcadi gracillimum
HYACINTHACEAE	Dipcadi marlothii
HYACINTHACEAE	Dipcadi rigidifolium
HYACINTHACEAE	Dipcadi viride
HYACINTHACEAE	Drimiopsis atropurpurea
HYACINTHACEAE	Drimiopsis burkei subsp. burkei
HYACINTHACEAE	Eucomis autumnalis subsp. clavata
HYACINTHACEAE	Eucomis vandermerwei
HYACINTHACEAE	Ledebouria cooperi
HYACINTHACEAE	Ledebouria luteola
HYACINTHACEAE	Ledebouria marginata
HYACINTHACEAE	Ledebouria revoluta
HYACINTHACEAE	Ornithogalum flexuosum
HYACINTHACEAE	Ornithogalum tenuifolium subsp. tenuifolium
HYACINTHACEAE	Schizocarphus nervosus
HYDROCHARITACEAE	Lagarosiphon major
HYDROCHARITACEAE	Lagarosiphon muscoides
HYPERICACEAE	Hypericum lalandii
HYPOXIDACEAE	Hypoxis acuminata
HYPOXIDACEAE	Hypoxis filiformis
HYPOXIDACEAE	Hypoxis hemerocallidea
HYPOXIDACEAE	Hypoxis interjecta
HYPOXIDACEAE	Hypoxis iridifolia
HYPOXIDACEAE	Hypoxis neliana
HYPOXIDACEAE	Hypoxis rigidula var. pilosissima
HYPOXIDACEAE	Hypoxis rigidula var. rigidula
ICACINACEAE	Apodytes dimidiata subsp. dimidiata
ICACINACEAE	Cassinopsis ilicifolia
IRIDACEAE	Babiana bainesii
IRIDACEAE	Babiana hypogaea var. hypogaea
IRIDACEAE	Crocosmia paniculata
IRIDACEAE	Dierama medium
IRIDACEAE	Dierama mossii
IRIDACEAE	Freesia laxa subsp. laxa
IRIDACEAE	Gladiolus antholyzoides
IRIDACEAE	Gladiolus crassifolius
IRIDACEAE	Gladiolus elliotii
IRIDACEAE	Gladiolus longicollis subsp. platypetalus
IRIDACEAE	Gladiolus paludosus
IRIDACEAE	Gladiolus papilio
IRIDACEAE	Gladiolus permeabilis subsp. edulis
IRIDACEAE	Gladiolus vernus

IRIDACEAE	Gladiolus vinosomaculatus
IRIDACEAE	Gladiolus woodii
IRIDACEAE	Hesperantha coccinea
IRIDACEAE	Lapeirousia sandersonii
IRIDACEAE	Moraea pallida
IRIDACEAE	Moraea spathulata
IRIDACEAE	Sisyrinchium sp.
IRIDACEAE	Tritonia nelsonii
IRIDACEAE	Watsonia bella
JUNCACEAE	Juncus dregeanus
JUNCACEAE	Juncus dregeanus subsp. dregeanus
JUNCACEAE	Juncus effusus
JUNCACEAE	Juncus exsertus
JUNCACEAE	Juncus lomatophyllus
JUNCACEAE	Juncus oxycarpus
LAMIACEAE	Acrotome hispida
LAMIACEAE	Aeollanthus buchnerianus
LAMIACEAE	Clerodendrum glabrum
LAMIACEAE	Geniosporum angolense
LAMIACEAE	Leonotis ocymifolia
LAMIACEAE	Leucas martinicensis
LAMIACEAE	Ocimum angustifolium
LAMIACEAE	Ocimum obovatum subsp. obovatum var. obovatum
LAMIACEAE	Plectranthus cylindraceus
LAMIACEAE	Plectranthus hadiensis var. hadiensis
LAMIACEAE	Plectranthus neochilus
LAMIACEAE	Pycnostachys reticulata
LAMIACEAE	Rotheca hirsuta
LAMIACEAE	Rotheca louwalbertsii
LAMIACEAE	Rotheca myricoides
LAMIACEAE	Salvia runcinata
LAMIACEAE	Salvia sp.
LAMIACEAE	Scutellaria racemosa
LAMIACEAE	Stachys natalensis var. galpinii
LAMIACEAE	Stachys natalensis var. natalensis
LAMIACEAE	Syncolostemon canescens
LAMIACEAE	Syncolostemon pretoriae
LAMIACEAE	Tetradenia brevispicata
LAMIACEAE	Teucrium trifidum
LECANORACEAE	Carbonea latypizodes
LECANORACEAE	Lecanora oreinoides
LECANORACEAE	Lecidella viridans
LECIDEACEAE	Lecidea angolensis
LENTIBULARIACEAE	Utricularia livida
LENTIBULARIACEAE	Utricularia subulata

LEUCOBRYACEAE	Leucobryum acutifolium
LINACEAE	Linum thunbergii
LOBELIACEAE	Cyphia elata var. elata
LOBELIACEAE	Cyphia stenopetala
LOBELIACEAE	Lobelia angolensis
LOBELIACEAE	Lobelia cuneifolia var. hirsuta
LOBELIACEAE	Lobelia erinus
LOBELIACEAE	Lobelia flaccida subsp. flaccida
LOBELIACEAE	Lobelia sp.
LOBELIACEAE	Monopsis decipiens
LOPHIOCARPACEAE	Lophiocarpus tenuissimus
LORANTHACEAE	Agelanthus natalitius subsp. zeyheri
LYCOPODIACEAE	Lycopodiella sarcocaulon
LYTHRACEAE	Ammannia sp.
LYTHRACEAE	Nesaea cordata
LYTHRACEAE	Nesaea sagittifolia var. sagittifolia
LYTHRACEAE	Nesaea schinzii
LYTHRACEAE	Rotala filiformis
MALPIGHIACEAE	Sphedamnocarpus pruriens subsp. galphimiifolius
MALPIGHIACEAE	Sphedamnocarpus pruriens subsp. pruriens
MALPIGHIACEAE	Triaspis hypericoides subsp. nelsonii
MALVACEAE	Corchorus asplenifolius
MALVACEAE	Corchorus trilocularis
MALVACEAE	Dombeya rotundifolia var. rotundifolia
MALVACEAE	Grewia flava
MALVACEAE	Grewia flavescens
MALVACEAE	Grewia monticola
MALVACEAE	Grewia occidentalis var. occidentalis
MALVACEAE	Grewia vernicosa
MALVACEAE	Hermannia depressa
MALVACEAE	Hermannia lancifolia
MALVACEAE	Hermannia sp.
MALVACEAE	Hermannia tomentosa
MALVACEAE	Hermannia transvaalensis
MALVACEAE	Hibiscus aethiopicus var. ovatus
MALVACEAE	Hibiscus calyphyllus
MALVACEAE	Hibiscus pusillus
MALVACEAE	Pavonia burchellii
MALVACEAE	Pavonia transvaalensis
MALVACEAE	Sida chrysantha
MALVACEAE	Sida rhombifolia subsp. rhombifolia
MALVACEAE	Triumfetta sonderi
MALVACEAE	Waltheria indica
MELIACEAE	Melia azedarach
MENYANTHACEAE	Nymphoides thunbergiana

MESEMBRYANTHEMACEAE	Frithia humilis
MESEMBRYANTHEMACEAE	Mossia intervallaris
MICAREACEAE	Micarea endoviolascens
MNIACEAE	Mielichhoferia bryoides
MOLLUGINACEAE	Psammotropha mucronata var. foliosa
MOLLUGINACEAE	Psammotropha mucronata var. mucronata
MOLLUGINACEAE	Psammotropha myriantha
MORACEAE	Ficus abutilifolia
MORACEAE	Ficus glumosa
MORACEAE	Ficus ingens
MORACEAE	Ficus salicifolia
MORACEAE	Ficus sur
MORACEAE	Ficus thonningii
MORACEAE	Morus alba var. alba
MYRICACEAE	Morella pilulifera
MYRICACEAE	Morella serrata
MYROTHAMNACEAE	Myrothamnus flabellifolius
MYRSINACEAE	Myrsine africana
NYCTAGINACEAE	Commicarpus pentandrus
OCHNACEAE	Ochna inermis
OCHNACEAE	Ochna natalitia
OCHNACEAE	Ochna pretoriensis
OCHNACEAE	Ochna pulchra
OLACACEAE	Ximenia caffra var. caffra
OLEACEAE	Jasminum multipartitum
OLEACEAE	Jasminum quinatum
OLEACEAE	Jasminum stenolobum
OLEACEAE	Menodora africana
OLEACEAE	Olea capensis subsp. enervis
OLINIACEAE	Olinia emarginata
ONAGRACEAE	Epilobium salignum
ONAGRACEAE	Epilobium tetragonum subsp. tetragonum
ONAGRACEAE	Ludwigia palustris
ONAGRACEAE	Oenothera jamesii
ONAGRACEAE	Oenothera parodiana subsp. parodiana
ONAGRACEAE	Oenothera rosea
ONAGRACEAE	Oenothera stricta subsp. stricta
OPHIOGLOSSACEAE	Ophioglossum costatum
ORCHIDACEAE	Bonatea antennifera
ORCHIDACEAE	Brachycorythis ovata subsp. ovata
ORCHIDACEAE	Brachycorythis tenuior
ORCHIDACEAE	Disa baurii
ORCHIDACEAE	Disa rhodantha
ORCHIDACEAE	Disa saxicola
ORCHIDACEAE	Disa versicolor

ORCHIDACEAE	Eulophia foliosa
ORCHIDACEAE	Eulophia hians var. hians
ORCHIDACEAE	Eulophia hians var. nutans
ORCHIDACEAE	Eulophia milnei
ORCHIDACEAE	Eulophia ovalis var. ovalis
ORCHIDACEAE	Habenaria bicolor
ORCHIDACEAE	Habenaria epipactidea
ORCHIDACEAE	Habenaria falcicornis subsp. caffra
ORCHIDACEAE	Habenaria filicornis
ORCHIDACEAE	Habenaria galpinii
ORCHIDACEAE	Habenaria tridens
ORCHIDACEAE	Neobolusia tysonii
ORCHIDACEAE	Satyrium cristatum var. cristatum
ORCHIDACEAE	Satyrium hallackii subsp. ocellatum
ORCHIDACEAE	Satyrium longicauda var. longicauda
ORCHIDACEAE	Satyrium parviflorum
ORCHIDACEAE	Satyrium trinerve
ORCHIDACEAE	Schizochilus zeyheri
OROBANCHACEAE	Alectra sessiliflora var. monticola
OROBANCHACEAE	Alectra sessiliflora var. sessiliflora
OROBANCHACEAE	Alectra vogelii
OROBANCHACEAE	Buchnera ciliolata
OROBANCHACEAE	Buchnera longespicata
OROBANCHACEAE	Buchnera simplex
OROBANCHACEAE	Buchnera sp.
OROBANCHACEAE	Cycnium tubulosum subsp. tubulosum
OROBANCHACEAE	Graderia subintegra
OROBANCHACEAE	Harveya huttonii
OROBANCHACEAE	Rhamphicarpa brevipedicellata
OROBANCHACEAE	Sopubia cana var. cana
OROBANCHACEAE	Striga bilabiata subsp. bilabiata
OSMUNDACEAE	Osmunda regalis
OXALIDACEAE	Oxalis depressa
OXALIDACEAE	Oxalis latifolia
OXALIDACEAE	Oxalis obliquifolia
PALLAVICINIACEAE	Symphyogyna brasiliensis
PAPAVERACEAE	Papaver aculeatum
PARMELIACEAE	Karoowia adligans
PARMELIACEAE	Neofuscelia verisidiosa
PARMELIACEAE	Paraparmelia subtortula
PARMELIACEAE	Paraparmelia usitata
PARMELIACEAE	Parmelia patula
PARMELIACEAE	Parmelia saxeti
PARMELIACEAE	Parmelia subconspersa
PARMELIACEAE	Parmotrema reticulatum

PARMELIACEAE	Xanthoparmelia congensis
PARMELIACEAE	Xanthoparmelia tasmanica
PARMELIACEAE	Xanthoparmelia tinctina
PASSIFLORACEAE	Adenia digitata
PEDALIACEAE	Ceratotheca triloba
PEDALIACEAE	Sesamum capense
PELTULACEAE	Peltula africana
PERTUSARIACEAE	Pertusaria dealbata
PHYLLANTHACEAE	Pseudolachnostylis maprouneifolia var. glabra
PHYSCIACEAE	Buellia discors
PHYSCIACEAE	Buellia lutata
PHYSCIACEAE	Buellia olivacea
PHYSCIACEAE	Buellia sp.
PHYSCIACEAE	Buellia transvaalica
PHYSCIACEAE	Buellia xantholepsis
PHYSCIACEAE	Dirinaria africana
PHYSCIACEAE	Heterodermia diademata
PHYSCIACEAE	Pyxine petricola var. petricola
PILOTRICHACEAE	Callicostella tristis
PILOTRICHACEAE	Cyclodictyon vallis-gratiae
PITTOSPORACEAE	Pittosporum viridiflorum
PLANTAGINACEAE	Plantago longissima
POACEAE	Agrostis eriantha var. eriantha
POACEAE	Alloteropsis semialata subsp. eckloniana
POACEAE	Andropogon appendiculatus
POACEAE	Andropogon eucomus
POACEAE	Andropogon huillensis
POACEAE	Andropogon schirensis
POACEAE	Aristida aequiglumis
POACEAE	Aristida canescens subsp. canescens
POACEAE	Aristida congesta subsp. barbicollis
POACEAE	Aristida congesta subsp. congesta
POACEAE	Aristida diffusa subsp. burkei
POACEAE	Aristida junciformis subsp. junciformis
POACEAE	Aristida stipitata subsp. stipitata
POACEAE	Arundinella nepalensis
POACEAE	Bewsia biflora
POACEAE	Brachiaria bovonei
POACEAE	Brachiaria brizantha
POACEAE	Brachiaria eruciformis
POACEAE	Brachiaria nigropedata
POACEAE	Brachiaria serrata
POACEAE	Briza minor
POACEAE	Cenchrus ciliaris
POACEAE	Chloris gayana

POACEAE	Chloris virgata
POACEAE	Ctenium concinnum
POACEAE	Cymbopogon caesius
POACEAE	Cynodon dactylon
POACEAE	Diandrochloa namaquensis
POACEAE	Digitaria brazzae
POACEAE	Digitaria eriantha
POACEAE	Digitaria monodactyla
POACEAE	Digitaria natalensis
POACEAE	Digitaria sanginalis
POACEAE	Digitaria ternata
POACEAE	Digitaria tricholaenoides
POACEAE	Diheteropogon amplectens var. amplectens
POACEAE	Eleusine coracana subsp. africana
POACEAE	Elionurus muticus
POACEAE	Enneapogon pretoriensis
POACEAE	Eragrostis capensis
POACEAE	Eragrostis chloromelas
POACEAE	Eragrostis cilianensis
POACEAE	Eragrostis curvula
POACEAE	Eragrostis gummiflua
POACEAE	Eragrostis hierniana
POACEAE	Eragrostis inamoena
POACEAE	Eragrostis lappula
POACEAE	Eragrostis nindensis
POACEAE	Eragrostis plana
POACEAE	Eragrostis procumbens
POACEAE	Eragrostis racemosa
POACEAE	Eragrostis sclerantha subsp. sclerantha
POACEAE	Eragrostis superba
POACEAE	Eragrostis stapfii
POACEAE	Eragrostis trichophora
POACEAE	Eriochrysis pallida
POACEAE	Eustachys paspaloides
POACEAE	Festuca caprina
POACEAE	Harpochloa falx
POACEAE	Helictotrichon turgidulum
POACEAE	Heteropogon contortus
POACEAE	Hyparrhenia anamesa
POACEAE	Hyparrhenia dregeana
POACEAE	Hyparrhenia hirta
POACEAE	Hyparrhenia newtonii var. newtonii
POACEAE	Hyparrhenia tamba
POACEAE	Imperata cylindrica
POACEAE	Ischaemum fasciculatum

POACEAE	Koeleria capensis
POACEAE	Leersia hexandra
POACEAE	Leptochloa fusca
POACEAE	Lophacme digitata
POACEAE	Loudetia flavida
POACEAE	Loudetia simplex
POACEAE	Melinis nerviglumis
POACEAE	Melinis repens subsp. repens
POACEAE	Microchloa caffra
POACEAE	Microchloa kunthii
POACEAE	Miscanthus junceus
POACEAE	Monocymbium ceresiiforme
POACEAE	Panicum natalense
POACEAE	Panicum repentellum
POACEAE	Panicum schinzii
POACEAE	Panicum sp.
POACEAE	Paspalum dilatatum
POACEAE	Paspalum distichum
POACEAE	Paspalum scrobiculatum
POACEAE	Paspalum urvillei
POACEAE	Pennisetum macrourum
POACEAE	Pennisetum sphacelatum
POACEAE	Perotis patens
POACEAE	Phalaris arundinacea
POACEAE	Phalaris canariensis
POACEAE	Phragmites australis
POACEAE	Pogonarthria sp.
POACEAE	Pogonarthria squarrosa
POACEAE	Sacciolepis chevalieri
POACEAE	Schizachyrium sanguineum
POACEAE	Schizachyrium ursulus
POACEAE	Setaria incrassata
POACEAE	Setaria lindenbergiana
POACEAE	Setaria nigrirostris
POACEAE	Setaria pumila
POACEAE	Setaria sphacelata var. sphacelata
POACEAE	Setaria sphacelata var. torta
POACEAE	Sporobolus africanus
POACEAE	Sporobolus albicans
POACEAE	Sporobolus festivus
POACEAE	Sporobolus natalensis
POACEAE	Sporobolus pectinatus
POACEAE	Sporobolus pyramidalis
POACEAE	Sporobolus stapfianus
POACEAE	Stiburus alopecuroides

POACEAE	Stiburus conrathii
POACEAE	Themeda triandra
POACEAE	Trachypogon sp.
POACEAE	Trachypogon spicatus
POACEAE	Tragus Berteronianus
POACEAE	Tricholaena monachne
POACEAE	Trichoneura grandiglumis
POACEAE	Tripogon minimus
POACEAE	Triraphis andropogonoides
POACEAE	Tristachya biseriata
POACEAE	Tristachya leucothrix
POACEAE	Tristachya rehmannii
POACEAE	Urelytrum agropyroides
POACEAE	Urochloa oligotricha.
POLYGALACEAE	Polygala africana
POLYGALACEAE	Polygala gracilenta
POLYGALACEAE	Polygala hottentotta
POLYGALACEAE	Polygala houtboshiana
POLYGALACEAE	Polygala ohlendorfiana
POLYGALACEAE	Polygala producta
POLYGALACEAE	Polygala spicata
POLYGALACEAE	Polygala transvaalensis subsp. transvaalensis
POLYGALACEAE	Polygala virgata var. decora
POLYGALACEAE	Polygala virgata var. virgata
POLYGONACEAE	Oxygonum dregeanum subsp. canescens var. linearifolium
POLYGONACEAE	Persicaria attenuata subsp. africana
POLYGONACEAE	Persicaria lapathifolia
POLYGONACEAE	Persicaria meisneriana
POLYGONACEAE	Persicaria serrulata
POLYGONACEAE	Rumex acetosella subsp. angiocarpus
POLYGONACEAE	Rumex lanceolatus
POLYGONACEAE	Rumex woodii
POLYTRICHACEAE	Polytrichum commune
PORTULACACEAE	Portulaca hereroensis
PORTULACACEAE	Talinum arnotii
POTAMOGETONACEAE	Potamogeton nodosus
POTAMOGETONACEAE	Potamogeton octandrus
POTAMOGETONACEAE	Potamogeton pectinatus
POTAMOGETONACEAE	Potamogeton trichoides
POTTIACEAE	Hyophila involuta
POTTIACEAE	Hypodontium dregei
POTTIACEAE	Leptophascum leptophyllum
POTTIACEAE	Syntrichia laevipila
POTTIACEAE	Trichostomum brachydontium
PROTEACEAE	Faurea saligna

PROTEACEAE	Protea caffra subsp. caffra
PROTEACEAE	Protea repens
PROTEACEAE	Protea roupelliae subsp. roupelliae
PROTEACEAE	Protea welwitschii
PTERIDACEAE	Actiniopteris radiata
PTERIDACEAE	Cheilanthes hirta var. brevipilosa
PTERIDACEAE	Cheilanthes hirta var. hirta
PTERIDACEAE	Cheilanthes multifida subsp. lacerata
PTERIDACEAE	Cheilanthes viridis var. viridis
PTERIDACEAE	Pellaea calomelanos var. calomelanos
PTERIDACEAE	Pellaea pectiniformis
PTERIDACEAE	Pteris catoptera var. catoptera
PTYCHOMITRIACEAE	Ptychomitrium crispatum
RANUNCULACEAE	Clematis brachiata
RANUNCULACEAE	Clematis oweniae
RANUNCULACEAE	Ranunculus multifidus
RHAMNACEAE	Berchemia zeyheri
RHAMNACEAE	Helinus integrifolius
RHAMNACEAE	Ziziphus mucronata
RHAMNACEAE	Ziziphus mucronata subsp. mucronata
RICCIACEAE	Riccia angolensis
RICCIACEAE	Riccia atropurpurea
RICCIACEAE	Riccia lanceolata
RICCIACEAE	Riccia macrocarpa
RICCIACEAE	Riccia mammifera
RICCIACEAE	Riccia microciliata
RICCIACEAE	Riccia natalensis
RICCIACEAE	Riccia okahandjana
RICCIACEAE	Riccia rosea
RICCIACEAE	Riccia volkii
ROSACEAE	Alchemilla woodii
ROSACEAE	Cliffortia linearifolia
ROSACEAE	Rubus rigidus
RUBIACEAE	Afrocanthium gilfillanii
RUBIACEAE	Anthospermum hispidulum
RUBIACEAE	Anthospermum rigidum subsp. pumilum
RUBIACEAE	Anthospermum rigidum subsp. rigidum
RUBIACEAE	Anthospermum welwitschii
RUBIACEAE	Canthium inerme
RUBIACEAE	Fadogia homblei
RUBIACEAE	Galium capense subsp. capense
RUBIACEAE	Galium capense subsp. garipense var. garipense
RUBIACEAE	Kohautia amatymbica
RUBIACEAE	Oldenlandia herbacea var. herbacea
RUBIACEAE	Oldenlandia rupicola var. rupicola

RUBIACEAE	Oldenlandia tenella
RUBIACEAE	Pachystigma pygmaeum
RUBIACEAE	Pachystigma thamnus
RUBIACEAE	Pavetta gardeniifolia var. subtomentosa
RUBIACEAE	Pavetta lanceolata
RUBIACEAE	Pavetta zeyheri subsp. middelburgensis
RUBIACEAE	Pavetta zeyheri subsp. zeyheri
RUBIACEAE	Pentanisia angustifolia
RUBIACEAE	Pentanisia prunelloides subsp. latifolia
RUBIACEAE	Pentanisia prunelloides subsp. prunelloides
RUBIACEAE	Psydrax livida
RUBIACEAE	Psydrax obovata subsp. obovata
RUBIACEAE	Pygmaeothamnus chamaedendrum var. chamaedendrum
RUBIACEAE	Pygmaeothamnus zeyheri var. rogersii
RUBIACEAE	Pygmaeothamnus zeyheri var. zeyheri
RUBIACEAE	Richardia brasiliensis
RUBIACEAE	Richardia scabra
RUBIACEAE	Rothmannia capensis
RUBIACEAE	Rubia petiolaris
RUBIACEAE	Spermacoce senensis
RUBIACEAE	Tricalysia lanceolata
RUBIACEAE	Vangueria cyanescens
RUBIACEAE	Vangueria infausta subsp. infausta
RUBIACEAE	Vangueria parvifolia
RUBIACEAE	Vangueria sp.
RUTACEAE	Thamnosma africana
RUTACEAE	Vepris reflexa
RUTACEAE	Vepris sp.
RUTACEAE	Zanthoxylum thorncroftii
SALICACEAE	Dovyalis zeyheri
SALICACEAE	Populus alba
SALICACEAE	Populus alba var. alba
SALICACEAE	Salix fragilis var. fragilis
SALICACEAE	Scolopia zeyheri
SANTALACEAE	Osyris lanceolata
SANTALACEAE	Thesium burkei
SANTALACEAE	Thesium exile
SANTALACEAE	Thesium junceum var. junceum
SANTALACEAE	Thesium magalismontanum
SANTALACEAE	Thesium pallidum
SANTALACEAE	Thesium procerum
SANTALACEAE	Thesium resedoides
SANTALACEAE	Thesium sp.
SANTALACEAE	Thesium spartioides
SAPOTACEAE	Englerophytum magalismontanum

SAPOTACEAE	Mimusops zeyheri
SCROPHULARIACEAE	Chaenostoma floribundum
SCROPHULARIACEAE	Chaenostoma leve
SCROPHULARIACEAE	Craterostigma wilmsii
SCROPHULARIACEAE	Diclis rotundifolia
SCROPHULARIACEAE	Halleria lucida
SCROPHULARIACEAE	Hebenstretia angolensis
SCROPHULARIACEAE	Hebenstretia sp.
SCROPHULARIACEAE	Jamesbrittenia aurantiaca
SCROPHULARIACEAE	Lindernia parviflora
SCROPHULARIACEAE	Manulea parviflora var. parviflora
SCROPHULARIACEAE	Manulea rhodantha subsp. aurantiaca
SCROPHULARIACEAE	Melanospermum rudolfii
SCROPHULARIACEAE	Melanospermum transvaalense
SCROPHULARIACEAE	Mimulus gracilis
SCROPHULARIACEAE	Nemesia fruticans
SCROPHULARIACEAE	Selago sp.
SCROPHULARIACEAE	Zaluzianskya elongata
SCROPHULARIACEAE	Zaluzianskya katharinae
SCROPHULARIACEAE	Zaluzianskya spathacea
SELAGINELLACEAE	Selaginella dregei
SELAGINELLACEAE	Selaginella mittenii
SOLANACEAE	Physalis angulata
SOLANACEAE	Physalis peruviana
SOLANACEAE	Physalis viscose
SOLANACEAE	Solanum capense
SOLANACEAE	Solanum giganteum
SOLANACEAE	Solanum lichtensteinii
SOLANACEAE	Solanum nigrum
SOLANACEAE	Solanum retroflexum
SOLANACEAE	Solanum sisymbriifolium
SOLANACEAE	Withania somnifera
SPHAGNACEAE	Sphagnum capense
SPHAGNACEAE	Sphagnum sp.
SPHAGNACEAE	Sphagnum truncatum
STEREOCAULACEAE	Lepraria sp.
STRYCHNACEAE	Strychnos cocculoides
STRYCHNACEAE	Strychnos pungens
TARGIONIACEAE	Targionia hypophylla
THELOTREMATACEAE	Diploschistes caesioplumbeus
THELOTREMATACEAE	Diploschistes sp.
THELYPTERIDACEAE	Thelypteris confluens
THYMELAEACEAE	Gnidia capitata
THYMELAEACEAE	Gnidia gymnostachya
THYMELAEACEAE	Gnidia kraussiana var. kraussiana

THYMELAEACEAE	Gnidia microcephala
THYMELAEACEAE	Gnidia sericocephala
THYMELAEACEAE	Gnidia sp.
TYPHACEAE	Typha capensis
UNKNOWN	Unknown sp.
URTICACEAE	Pouzolzia mixta var. mixta
VAHLIACEAE	Vahlia capensis subsp. capensis
VELLOZIACEAE	Xerophyta retinervis
VERBENACEAE	Chascanum adenostachyum
VERBENACEAE	Chascanum hederaceum var. hederaceum
VERBENACEAE	Chascanum incisum
VERBENACEAE	Lantana rugosa
VERBENACEAE	Lantana sp.
VERBENACEAE	Lippia javanica
VERBENACEAE	Lippia rehmannii
VERBENACEAE	Lippia wilmsii
VERBENACEAE	Verbena aristigera
VERBENACEAE	Verbena bonariensis
VERBENACEAE	Verbena brasiliensis
VERRUCARIACEAE	Dermatocarpon hepaticum
VERRUCARIACEAE	Verrucaria sp.
VISCACEAE	Viscum combreticola
VISCACEAE	Viscum rotundifolium
VISCACEAE	Viscum spragueanum
VITACEAE	Cissus fragilis
VITACEAE	Cyphostemma lanigerum
VITACEAE	Cyphostemma puberulum
VITACEAE	Cyphostemma simulans
VITACEAE	Rhoicissus tridentata subsp. tridentata
XYRIDACEAE	Xyris capensis
XYRIDACEAE	Xyris congensis
XYRIDACEAE	Xyris gerrardii
ZAMIACEAE	Encephalartos eugene-maraisii
ZAMIACEAE	Encephalartos lanatus
ZAMIACEAE	Encephalartos middelburgensis
APIACEAE	Cyclospermum leptophyllum
APOCYNACEAE	Pachycarpus concolor subsp. transvaalensis
ASTERACEAE	Hilliardiella aristata
ASTERACEAE	Hilliardiella hirsuta
ASTERACEAE	Hilliardiella oligocephala
CYPERACEAE	Cyperus decurvatus
CYPERACEAE	Cyperus uitenhagensis
FABACEAE	Leobordea divaricata
FABACEAE	Leobordea eriantha
FABACEAE	Leobordea foliosa

FABACEAE	Listia solitudinis
TECTARIACEAE	Megalastrum peregrinum

Appendix 2. List of Animals likely to occur in the study area.

FamilyName	SpeciesName
Actinolaimidae	Afractinolaimus noblei
Aeshnidae	Aeshna sp.
Aeshnidae	Anax sp.
Aeshnidae	Unidentified Aeshnidae
Ancylidae	Burnupia sp.
Ancylidae	Burnupia transvaalensis
Ancylidae	Ferrissia lacustrus
Araneidae	Argiope australis
Araneidae	Neoscona blondeli
Araneidae	Neoscona moreli
Araneidae	Neoscona subfusca
Arrenuridae	Arrenurus sp.
Asilidae	Gonioscelis mantis
Atyidae	Caridina nilotica
Baetidae	Baetis harrisoni
Baetidae	Cloeon aeneum
Baetidae	Cloeon virgiliae
Baetidae	Afroptilum excisum
Baetidae	Afroptilum sp.
Baetidae	Austrocloeon africanum
Baetidae	Baetis bellus
Baetidae	Baetis glaucus
Baetidae	Baetis latus
Baetidae	Baetis sp.
Baetidae	Cloeon africanum
Baetidae	Cloeon sp.
Baetidae	Pseudocloeon maculosum
Baetidae	Pseudocloeon sp.
Baetidae	Pseudocloeon vinosum
Baetidae	Unidentified Baetidae
Belostomatidae	Diplonychus nepoides
Belostomatidae	Diplonychus capensis
Belostomatidae	Diplonychus sp.
Buthidae	Hottentotta aeratus
Buthidae	Parabuthus villosus
Caenidae	Austrocaenis capensis
Caenidae	Caenis capensis
Caenidae	Unidentified Caenidae
Cambalidae	Julomorpha schultzei

Carabidae	Lebia fulvicollis v.thoracica
Carabidae	Metagonum crenato-striatum
Carabidae	Unidentified Carabidae
Ceratopogonidae	Atrichopogon sp.
Ceratopogonidae	Bezzia sp.
Ceratopogonidae	Culicoides sp.
Ceratopogonidae	Probezzia sp.
Chironomidae	Chironomus linearis
Chironomidae	Cricotopus scottae
Chironomidae	Limnophyes natalensis
Chironomidae	Pentapedilum anale
Chironomidae	Chironomus calipterus
Chironomidae	Chironomus disparilis
Chironomidae	Corynoneura sp.
Chironomidae	Endochironomus disparilis
Chironomidae	Pentaneura sp.
Chironomidae	Rheotanytarsus sp.
Chironomidae	Tanypus sp.
Chironomidae	Tanytarsus sp.
Chironomidae	Unidentified Chironomidae
Chlorocyphidae	Chlorocypha sp.
Chrysididae	Hedychrum comptum
Chrysididae	Hedychrum tessmanni
Chydoridae	Alona intermedia
Chydoridae	Alona sp.
Chydoridae	Camptocercus rectirostris
Chydoridae	Chydorus globosus
Chydoridae	Chydorus sp.
Chydoridae	Leydigia quadrangularis
Chydoridae	Leydigia sp.
Chydoridae	Pleuroxus sp.
Chydoridae	Unidentified Chydoridae
Coenagrionidae	Pseudagrion kersteni
Coenagrionidae	Pseudagrion massaicum
Coenagrionidae	Enallagma glaucum
Coenagrionidae	Pseudagrion natalense
Coenagrionidae	Pseudagrion sp.
Corbiculidae	Corbicula Africana
Corduliidae	Macromia sp.
Corduliidae	Unidentified Corduliidae
Cordylidae	Cordylus vandami
Cordylidae	Cordylus vittifer
Corixidae	Micronecta bleekiana
Corixidae	Micronecta dimidiata
Corixidae	Micronecta scutellaris

Corixidae	Unidentified Corixidae
Culicidae	Anopheles sp.
Culicidae	Culex sp.
Curculionidae	Tanymeus rappax
Cyclopidae	Cryptocyclops assimilis
Cyclopidae	Cryptocyclops caudatus
Cyclopidae	Cryptocyclops crassipes
Cyclopidae	Cryptocyclops sp.
Cyclopidae	Eucyclops sp.
Cyclopidae	Unidentified Cyclopidae
Cypridae	Isocypris sp.
Cyprididae	Cypridopsis sp.
Cyprididae	Stenocypris sp.
Daphniidae	Ceriodaphnia sp.
Daphniidae	Daphnia sp.
Daphniidae	Simocephalus sp.
Daphniidae	Simocephalus vetulus
Dixidae	Dixa sp.
Dorylaimidae	Ischiodorylaimus gulliver
Dytiscidae	Agabus raffrayi
Dytiscidae	Hydaticus capicola
Dytiscidae	Potamonectes vagrans
Dytiscidae	Tikoloshanes eretiformis
Dytiscidae	Yola natalensis
Dytiscidae	Guignotus bivittatus
Dytiscidae	Guignotus sp.
Dytiscidae	Hydrocanthus sp.
Dytiscidae	Hydrovatus sp.
Dytiscidae	Hyphydrus aethiopicus
Dytiscidae	Rantus capensis
Dytiscidae	Unidentified Dytiscidae
Dytiscidae	Uvarus vitticollis
Ecnomidae	Ecnomus sp.
Elmidae	Helminthopsis bifida
Elmidae	Helminthopsis compacta
Elmidae	Helminthopsis elongata
Elmidae	Leptelmis fragilis
Elmidae	Leptelmis orchymonti
Elmidae	Microdinodes pilistriatus
Elmidae	Microdinodes transvaalicus
Elmidae	Microdinodes vaalensis
Elmidae	Pachyelmis rufomarginata
Elmidae	Stenelmis gades
Elmidae	Stenelmis sp.
Elmidae	Stenelmis thusa

Elmidae	Unidentified Elmidae
Ephemeridae	Eatonica sp.
Gerridae	Gerris swakopensis
Gnaphosidae	Zelotes fuliginea
Gomphidae	Paragomphus hageni
Gomphidae	Paragomphus sp.
Gyrinidae	Aulonogyrus abdominalis
Gyrinidae	Orectogyrus conformis
Gyrinidae	Orectogyrus elongatus
Gyrinidae	Aulonogyrus sp.
Gyrinidae	Dineutus grossus
Gyrinidae	Unidentified Gyrinidae
Halictidae	Halictus rufiventris
Halictidae	Sphecodes vumbuensis
Haliplidae	Haliplus sp.
Haliplidae	Unidentified Haliplidae
Harpacticidae	Unidentified Harpacticidae
Hemerobiidae	Hemerobius rudebecki
Heptageniidae	Afronurus barnardi
Heptageniidae	Afronurus peringueyi
Heptageniidae	Afronurus scotti
Heptageniidae	Compsoneuria sp.
Heptageniidae	Notonurus cooperi
Heptageniidae	Notonurus sp.
Hesperiidae	Gegenes niso niso
Hesperiidae	Metisella meninx
Histeridae	Hister crenatipennis
Hydraenidae	Hydraena accurate
Hydraenidae	Hydraena sp.
Hydraenidae	Ochthebius exaratus
Hydraenidae	Unidentified Hydraenidae
Hydropsychidae	Cheumatopsyche sp.
Hydropsychidae	Cheumatopsyche thomasseti
Hydroptilidae	Hydroptila capensis
Hydroptilidae	Oxyethira velocipes
Hydroptilidae	Hydroptila sp.
Hydroptilidae	Orthotrichia sp.
Hydroptilidae	Oxyethira sp.
Hydroptilidae	Unidentified Hydroptilidae
Leptoceridae	Athripsodes harrisoni
Leptoceridae	Athripsodes prionii
Leptoceridae	Leptocerina spinigera
Leptoceridae	Oecetis sp.
Leptoceridae	Parasetodes sp.
Leptoceridae	Triaenodes falculatus

Leptoceridae	Triaenodes sp.
Leptoceridae	Trichosetodes sp.
Leptophlebiidae	Euthraulus elegans
Leptophlebiidae	Euthraulus sp.
Lestidae	Lestes sp.
Libellulidae	Tetrathemis polleni
Libellulidae	Crocothemis sp.
Libellulidae	Orthetrum sp.
Libellulidae	Sympetrum sp.
Libellulidae	Trithemis sp.
Libellulidae	Unidentified Libellulidae
Lymnaeidae	Lymnaea natalensis
Lymnaeidae	Lymnaea sp.
Mutillidae	Mutilla heterochroa
Mutillidae	Strangulotilla bechuana
Naididae	Allonais ranauana
Naididae	Dero nivea
Naididae	Nais communis
Naididae	Nais simplex
Naididae	Unidentified Naididae
Notonectidae	Anisops balcis
Notonectidae	Nychia marshalli
Oribatidae	Unidentified Oribatidae
Planorbidae	Biomphalaria pfeifferi
Planorbidae	Biomphalaria sp.
Planorbidae	Bulinus sp.
Planorbidae	Gyraulus costulatus
Planorbidae	Gyraulus lamyi
Planorbidae	Gyraulus sp.
Planorbidae	Physopsis africanus
Pleidae	Plea pullula
Pleidae	Plea piccanina
Polycentropodidae	Nyctiophylax sp.
Polymitarcyidae	Ephoron savignyi
Polymitarcyidae	Povilla adusta
Potamonautidae	Potamonautes sp.
Prosopistomatidae	Prosopistoma deguernei
Prosopistomatidae	Prosopistoma sp.
Psephenidae	Eubrianax sp.
Reduviidae	Varus flavoannulatus
Scarabaeidae	Lepithrix gentiles
Scarabaeidae	Lepitrichula albovillosus
Scarabaeidae	Pseudoheterochelus wallekraalensis
Scarabaeidae	Schizonycha saga
Scelionidae	Shreemana

Scorpionidae	Opistophthalmus nitidiceps
Simuliidae	Simulium sp.
Sphecidae	Tachysphex scaurus
Tachinidae	Pseudoperichaeta pacta
Tephritidae	Sphenella helianthoides
Tricorythidae	Tricorythus discolour
Tricorythidae	Dicercomyzon sp.
Tubificidae	Limnodrilus sp.
Veliidae	Microvelia major
Veliidae	Unidentified Veliidae
Vespidae	Odyneres (Rygchium) bellatulus

Appendix 3. List of Reptiles and Amphibians likely to occur in the study area.

FamilyName	SpeciesName
Atractaspididae	Aparallactus capensis
Atractaspididae	Atractaspis bibronii
Cambalidae	Julomorpha schultzei
Colubridae	Crotaphopeltis hotamboeia
Colubridae	Dasypeltis scabra
Colubridae	Lamprophis aurora
Colubridae	Lamprophis capensis
Colubridae	Lycodonomorphus rufulus
Colubridae	Psammophis subtaeniatus
Colubridae	Psammophylax tritaeniatus
Colubridae	Telescopus semiannulatus
Colubridae	Philothamnus natalensis
Cordylidae	Cordylus vandami
Cordylidae	Cordylus vittifer
Elapidae	Hemachatus haemachatus
Elapidae	Elapsoidea sundevallii
Ranidae	Hyperolius sp.
Ranidae	Rana sp.
Scincidae	Trachylepis capensis
Scincidae	Trachylepis punctatissima
Scincidae	Trachylepis striata
Scincidae	Acontias gracilicauda
Testudinidae	Psammobates tentorius
Viperidae	Causus rhombeatus

Appendix 4. List of Birds recorded* or likely to occur in the study area

ENGLISH NAME	GENUS	SPECIES
Helmeted Guineafowl	Numida	meleagris
Coqui Francolin	Peliperdix	coqui
Red-winged Francolin	Scleroptila	levaillantii
Shelley's Francolin	Scleroptila	shelleyi
Natal Spurfowl	Pternistis	natalensis
Swainson's Spurfowl	Pternistis	swainsonii
Common Quail	Coturnix	coturnix
Harlequin Quail	Coturnix	delegorguei
White-faced Whistling Duck	Dendrocygna	viduata
Fulvous Whistling Duck	Dendrocygna	bicolor
White-backed Duck	Thalassornis	leuconotus
Spur-winged Goose	Plectropterus	gambensis
Knob-billed Duck	Sarkidiornis	melanotos
Egyptian Goose*	Alopochen	aegyptiaca
Cape Teal	Anas	capensis
African Black Duck*	Anas	sparsa
Yellow-billed Duck	Anas	undulata
Cape Shoveler	Anas	smithii
Red-billed Teal	Anas	erythrorhyncha
Hottentot Teal	Anas	hottentota
Southern Pochard	Netta	erythrophthalma
Maccoa Duck	Oxyura	maccoa
Little Grebe	Tachybaptus	ruficollis
Greater Flamingo	Phoenicopterus	roseus
Lesser Flamingo	Phoeniconaias	minor
Yellow-billed Stork	Mycteria	ibis
Black Stork	Ciconia	nigra
Abdim's Stork	Ciconia	abdimii
White Stork	Ciconia	ciconia
African Sacred Ibis	Threskiornis	aethiopicus
Hadeda Ibis*	Bostrychia	hagedash
Glossy Ibis	Plegadis	falcinellus
African Spoonbill	Platalea	alba
Eurasian Bittern	Botaurus	stellaris
Little Bittern	Ixobrychus	minutus
Black-crowned Night Heron	Nycticorax	nycticorax
Green-backed Heron	Butorides	striata
Squacco Heron	Ardeola	ralloides
Western Cattle Egret*	Bubulcus	ibis
Grey Heron	Ardea	cinerea
Black-headed Heron	Ardea	melanocephala
Goliath Heron	Ardea	goliath
Purple Heron	Ardea	purpurea
Great Egret	Ardea	alba
Yellow-billed Egret	Egretta	intermedia
Black Heron	Egretta	ardesiaca

Little Egret	Egretta	garzetta
Hamerkop	Scopus	umbretta
Reed Cormorant	Microcarbo	africanus
White-breasted Cormorant	Phalacrocorax	lucidus
African Darter	Anhinga	rufa
Secretarybird	Sagittarius	serpentarius
Western Osprey	Pandion	haliaetus
Black-shouldered Kite	Elanus	caeruleus
European Honey Buzzard	Pernis	apivorus
Cape Vulture	Gyps	coprotheres
Martial Eagle	Polemaetus	bellicosus
Wahlberg's Eagle	Hieraaetus	wahlbergi
Booted Eagle	Hieraaetus	pennatus
Verreaux's Eagle	Aquila	verreauxii
Little Sparrowhawk	Accipiter	minullus
Ovambo Sparrowhawk	Accipiter	ovampensis
Black Sparrowhawk	Accipiter	melanoleucus
African Marsh Harrier	Circus	ranivorus
Pallid Harrier	Circus	macrourus
Montagu's Harrier	Circus	pygargus
Yellow-billed Kite	Milvus	aegyptius
African Fish Eagle	Haliaeetus	vocifer
Common Buzzard	Buteo	buteo
Jackal Buzzard	Buteo	rufofuscus
Lesser Kestrel	Falco	naumanni
Rock Kestrel	Falco	rupicolus
Greater Kestrel	Falco	rupicoloides
Amur Falcon	Falco	amurensis
Eurasian Hobby	Falco	subbuteo
Lanner Falcon	Falco	biarmicus
Peregrine Falcon	Falco	peregrinus
Denham's Bustard	Neotis	denhami
White-bellied Korhaan	Eupodotis	senegalensis
Blue Korhaan	Eupodotis	caerulescens
Red-crested Korhaan	Lophotis	ruficrista
Red-chested Flufftail	Sarothrura	rufa
African Finfoot	Podica	senegalensis
African Rail	Rallus	caerulescens
African Crake	Crecopsis	egregia
Corn Crake	Crex	crex
Black Crake	Amaurornis	flavirostra
Baillon's Crake	Porzana	pusilla
Spotted Crake	Porzana	porzana
Purple Gallinule	Porphyrio	martinica
Common Moorhen	Gallinula	chloropus
Lesser Moorhen	Gallinula	angulata
Red-knobbed Coot	Fulica	cristata
Blue Crane	Grus	paradiseus
Common Buttonquail	Turnix	sylvaticus
Spotted Thick-knee	Burhinus	capensis

Black-winged Stilt	Himantopus	himantopus
Pied Avocet	Recurvirostra	avosetta
Blacksmith Lapwing	Vanellus	armatus
Crowned Lapwing	Vanellus	coronatus
African Wattled Lapwing	Vanellus	senegallus
Common Ringed Plover	Charadrius	hiaticula
Kittlitz's Plover	Charadrius	pecuarius
Three-banded Plover	Charadrius	tricollaris
Caspian Plover	Charadrius	asiaticus
Greater Painted Snipe	Rostratula	benghalensis
African Snipe	Gallinago	nigripennis
Marsh Sandpiper	Tringa	stagnatilis
Green Sandpiper	Tringa	ochropus
Wood Sandpiper	Tringa	glareola
Common Sandpiper	Actitis	hypoleucos
Little Stint	Calidris	minuta
Curlew Sandpiper	Calidris	ferruginea
Ruff	Philomachus	pugnax
Burchell's Courser	Cursorius	rufus
Temminck's Courser	Cursorius	temminckii
Black-winged Pratincole	Glareola	nordmanni
Whiskered Tern	Chlidonias	hybrida
White-winged Tern	Chlidonias	leucopterus
Rock Dove	Columba	livia
African Olive Pigeon	Columba	arquatrix
Red-eyed Dove	Streptopelia	semitorquata
Cape Turtle Dove	Streptopelia	capicola
Laughing Dove*	Spilopelia	senegalensis
Emerald-spotted Wood Dove	Turtur	chalcospilos
Namaqua Dove	Oena	capensis
African Green Pigeon	Treron	calvus
White-browed Coucal	Centropus	superciliosus
Great Spotted Cuckoo	Clamator	glandarius
Jacobin Cuckoo	Clamator	jacobinus
Diederik Cuckoo	Chrysococcyx	caprius
Klaas's Cuckoo	Chrysococcyx	klaas
Black Cuckoo	Cuculus	clamosus
Red-chested Cuckoo	Cuculus	solitarius
African Cuckoo	Cuculus	gularis
Common Cuckoo	Cuculus	canorus
Western Barn Owl	Tyto	alba
African Grass Owl	Tyto	capensis
Cape Eagle-Owl	Bubo	capensis
Spotted Eagle-Owl	Bubo	africanus
Verreaux's Eagle-Owl	Bubo	lacteus
Marsh Owl	Asio	capensis
European Nightjar	Caprimulgus	europaeus
Rufous-cheeked Nightjar	Caprimulgus	rufigena
Fiery-necked Nightjar	Caprimulgus	pectoralis
Freckled Nightjar	Caprimulgus	tristigma

African Palm Swift	Cypsiurus	parvus
Alpine Swift	Tachymarptis	melba
Common Swift	Apus	apus
African Black Swift	Apus	barbatus
Little Swift	Apus	affinis
Horus Swift	Apus	horus
White-rumped Swift	Apus	caffer
Speckled Mousebird	Colius	striatus
White-backed Mousebird	Colius	colius
Red-faced Mousebird	Urocolius	indicus
Lilac-breasted Roller	Coracias	caudatus
European Roller	Coracias	garrulus
Brown-hooded Kingfisher	Halcyon	albiventris
Malachite Kingfisher	Corythornis	cristata
Half-collared Kingfisher	Alcedo	semitorquata
Giant Kingfisher	Megaceryle	maxima
Pied Kingfisher	Ceryle	rudis
White-fronted Bee-eater	Merops	bullockoides
Blue-cheeked Bee-eater	Merops	persicus
European Bee-eater	Merops	apiaster
African Hoopoe	Upupa	africana
Green Wood-hoopoe	Phoeniculus	purpureus
Yellow-fronted Tinkerbird	Pogoniulus	chrysoconus
Acacia Pied Barbet	Tricholaema	leucomelas
Black-collared Barbet	Lybius	torquatus
Crested Barbet	Trachyphonus	vaillantii
Brown-backed Honeybird	Prodotiscus	regulus
Lesser Honeyguide	Indicator	minor
Greater Honeyguide	Indicator	indicator
Red-throated Wryneck	Jynx	ruficollis
Bennett's Woodpecker	Campethera	bennettii
Golden-tailed Woodpecker	Campethera	abingoni
Ground Woodpecker	Geocolaptes	olivaceus
Cardinal Woodpecker	Dendropicos	fuscescens
Bearded Woodpecker	Dendropicos	namaquus
Chinspot Batis	Batis	molitor
White-crested Helmetshrike	Prionops	plumatus
Bokmakierie	Telophorus	zeylonus
Brown-crowned Tchagra	Tchagra	australis
Black-crowned Tchagra	Tchagra	senegalus
Southern Boubou	Laniarius	ferrugineus
Crimson-breasted Shrike	Laniarius	atrococcineus
Brubru	Nilaus	afer
Black Cuckooshrike	Campephaga	flava
Southern White-crowned Shrike	Eurocephalus	anguitimens
Red-backed Shrike	Lanius	collurio
Lesser Grey Shrike	Lanius	minor
Southern Fiscal	Lanius	collaris
Eurasian Golden Oriole	Oriolus	oriolus
Black-headed Oriole	Oriolus	larvatus

Fork-tailed Drongo	Dicrurus	adsimilis
African Paradise Flycatcher	Terpsiphone	viridis
Cape Crow	Corvus	capensis
Pied Crow	Corvus	albus
Fairy Flycatcher	Stenostira	scita
Southern Black Tit	Parus	niger
Ashy Tit	Parus	cinerascens
Grey Penduline Tit	Anthoscopus	caroli
Melodious Lark	Mirafra	cheniana
Rufous-naped Lark	Mirafra	africana
Cape Clapper Lark	Mirafra	apiata
Sabota Lark	Calendulauda	sabota
Cape Long-billed Lark	Certhilauda	curvirostris
Spike-heeled Lark	Chersomanes	albofasciata
Red-capped Lark	Calandrella	cinerea
Pink-billed Lark	Spizocorys	conirostris
Chestnut-backed Sparrow-Lark	Eremopterix	leucotis
Grey-backed Sparrow-Lark	Eremopterix	verticalis
African Red-eyed Bulbul	Pycnonotus	nigricans
Brown-throated Martin	Riparia	paludicola
Sand Martin	Riparia	riparia
Banded Martin	Riparia	cincta
Barn Swallow	Hirundo	rustica
White-throated Swallow	Hirundo	albigularis
Pearl-breasted Swallow	Hirundo	dimidiata
Rock Martin	Ptyonoprogne	fuligula
Common House Martin	Delichon	urbicum
Greater Striped Swallow	Cecropis	cucullata
Lesser Striped Swallow	Cecropis	abyssinica
Red-breasted Swallow	Cecropis	semirufa
South African Cliff Swallow	Petrochelidon	spilodera
Cape Grassbird	Sphenoeacus	afer
Long-billed Crombec	Sylvietta	rufescens
Willow Warbler	Phylloscopus	trochilus
Lesser Swamp Warbler	Acrocephalus	gracilirostris
Great Reed Warbler	Acrocephalus	arundinaceus
Sedge Warbler	Acrocephalus	schoenobaenus
African Reed Warbler	Acrocephalus	baeticatus
Marsh Warbler	Acrocephalus	palustris
Icterine Warbler	Hippolais	icterina
Little Rush Warbler	Bradypterus	baboecala
Lazy Cisticola	Cisticola	aberrans
Rattling Cisticola	Cisticola	chiniana
Wailing Cisticola	Cisticola	lais
Levaillant's Cisticola	Cisticola	tinniens
Neddicky	Cisticola	fulvicapilla
Zitting Cisticola	Cisticola	juncidis
Desert Cisticola	Cisticola	aridulus
Cloud Cisticola	Cisticola	textrix
Wing-snapping Cisticola	Cisticola	ayresii

Tawny-flanked Prinia	Prinia	subflava
Black-chested Prinia	Prinia	flavicans
Yellow-bellied Eremomela	Eremomela	icteropygialis
Burnt-necked Eremomela	Eremomela	usticollis
Arrow-marked Babbler	Turdoides	jardineii
Garden Warbler	Sylvia	borin
Layard's Tit-babbler	Sylvia	layardi
Cape White-eye	Zosterops	capensis
Common Myna	Acridotheres	tristis
Wattled Starling	Creatophora	cinerea
Cape Glossy Starling	Lamprotornis	nitens
Pied Starling	Lamprotornis	bicolor
Violet-backed Starling	Cinnyricinclus	leucogaster
Red-winged Starling	Onychognathus	morio
Groundscraper Thrush	Psophocichla	litsitsirupa
Kurrichane Thrush	Turdus	libonyanus
Olive Thrush	Turdus	olivaceus
White-throated Robin	Irania	gutturalis
Cape Robin-Chat	Cossypha	caffra
White-browed Scrub Robin	Erythropygia	leucophrys
African Stonechat	Saxicola	torquatus
Capped Wheatear	Oenanthe	pileata
Mountain Wheatear	Oenanthe	monticola
Familiar Chat	Oenanthe	familiaris
Ant-eating Chat	Myrmecocichla	formicivora
Mocking Cliff Chat	Thamnolaea	cinnamomeiventris
Southern Black Flycatcher	Melaenornis	pammelaina
Fiscal Flycatcher	Sigelus	silens
Spotted Flycatcher	Muscicapa	striata
Malachite Sunbird	Nectarinia	famosa
Greater Double-collared Sunbird	Cinnyris	afer
Marico Sunbird	Cinnyris	mariquensis
White-bellied Sunbird	Cinnyris	talatala
House Sparrow	Passer	domesticus
Cape Sparrow	Passer	melanurus
Northern Grey-headed Sparrow	Passer	griseus
Cape Weaver	Ploceus	capensis
Southern Masked Weaver	Ploceus	velatus
Red-billed Quelea	Quelea	quelea
Yellow-crowned Bishop	Euplectes	afer
Southern Red Bishop	Euplectes	orix
Yellow Bishop	Euplectes	capensis
Red-collared Widowbird	Euplectes	ardens
Long-tailed Widowbird	Euplectes	progne
Red-headed Finch	Amadina	erythrocephala
Cut-throat Finch	Amadina	fasciata
Red-billed Firefinch	Lagonosticta	senegala
African Firefinch	Lagonosticta	rubricata
Jameson's Firefinch	Lagonosticta	rhodopareia
Blue Waxbill	Uraeginthus	angolensis

Swee Waxbill	Coccopygia	melanotis
Common Waxbill	Estrilda	astrild
Orange-breasted Waxbill	Amandava	subflavus
African Quail-Finch	Ortygospiza	fuscocrissa
Bronze Mannikin	Lonchura	cucullata
Dusky Indigobird	Vidua	funerea
Pin-tailed Whydah	Vidua	macroura
Long-tailed Paradise Whydah	Vidua	paradisaea
Western Yellow Wagtail	Motacilla	flava
Cape Wagtail	Motacilla	capensis
African Pied Wagtail	Motacilla	aguimp
Cape Longclaw	Macronyx	capensis
Mountain Pipit	Anthus	hoeschi
Buffy Pipit	Anthus	vaalensis
Plain-backed Pipit	Anthus	leucophrys
Striped Pipit	Anthus	lineiventris
Short-tailed Pipit	Anthus	brachyurus
Bushveld Pipit	Anthus	caffer
Black-throated Canary	Crithagra	atrogularis
Yellow-fronted Canary	Crithagra	mozambica
Streaky-headed Seedeater	Crithagra	gularis
Cape Canary	Serinus	canicollis
Cinnamon-breasted Bunting	Emberiza	tahapisi
Cape Bunting	Emberiza	capensis
Golden-breasted Bunting	Emberiza	flaviventris

Appendix 5. List of Butterflies likely to occur in the study area

Scientific name	Common name
Danaus chrysippus aegyptius	Southern Milkweed butterfly, African monarch
Melanitis leda Helena	Twilight brown, evening brown
Aeropetes tulbaghia	Table mountain beauty, mountain pride.
Acraea horta	Garden acraea
Acraea neobule neobule	Wandering donkey acraea
Acraea rahira rahira	Marsh acraea
Charaxes jahlusa	Pearl-spotted charaxes, pearl-spotted emperor
Charaxes achaemenes achaemenes	Bushveld charaxes, bushveld emperor
Hypolimnas misippus	Diadem (male), mimic (female)
Catacroptera cloanthe cloanthe	Pirate
Junonia archesia	Garden inspector
Junonia oenone oenone	Blue pansy, black pansy
Junonia hierta cebrene	Yellow pans
Junonia orithya Madascariensis	Ox-eyed pansy, eyed pansy
Vanessa cardui	Painted lady
Phalanta phalantha aethiopica	Poplar leopard, African leopard
Alaena amazoula	Yellow Zulu
Cyclyrius pirithous	Common blue
Lanchnocnema bibulus	Wolly legs
Virachola autalus	Brownplayboy
Virachola dinochares	Apricot playboy, red playboy
Myrina silenus	Figtree blue
Stugeta bowkeri	Bowker's tailed blue
Lolaus pallene	Saffron, scarce sapphire

Lolaus mimosae mimosae	Mimosa sapphire
Spinclasis natalensis	Natal barred blue
Gonatomyrina gorgias gorgias	Common black-eye
Anthene amarah amarah	Black-striped hairtail
Anthene butleri livida	Pale hairtail
Cacyreus marshallie	Geranium bronze, geranium blue
Tuxentius melaena	Black-pie
Tarucus Sybaris sybaris	Dotted blue
Lampides boeticus	Lucerne blue, long-tailed blue
Eicochrysops messapus	Cape blue , cupreous blue (subsp, mahallakoaena)
Harpendyreus noquasa	Marshblue
Cupidopsis cissus	Meadow blue
Freyeria trochylus	Grass jewel
Azarius jesous jesous	Topaz blue
Draidium barbarae	Dwarf blue, barber's blue
Zizula hylax	Gaika blue
Aloeides taikosama	African copper
Lepidochrysops ignota	Zulublue
Lepidochrysops plebeian plebeia	Twin-spot blue
Lepidochrysops patricia	Patricia blue
Lepidochrysops letsea	Freestate blue
Pinacopteryx eriphia eriphia	Zebra white
Colias electo electo	African clouded yellow, Lucerne butterfly
Catopsilia Florella	African migrant, African vagrant
Eurema brigitta brigitta	Broad-bordered grass yellow
Colotis vesta	Veined orange
Colotis ione	Purple-tip

Colotis regina	Queen purple-tip
Colotis anterippe garisa	Red-tip
Colotis agoye agoye	Speckled Sulphur-tip
Colotis evagore antigone	Small orange-tip
Colotis eris eris	Banded gold-tip
Colotis subfasciatus subfasciatus	Lemon traveler
Belenois zochalia zochalia	Forest white
Belenois aurota aurota	Brown-veined white
Belenois creona severina	African common white
Pontia helice helice	Meadow white, African cabbage white
Mylothris rueppellii haemus	Twin dotted border
Princeps demodocus demodocus	Citrus swallowtail, Christmas butterfly
Coeliades forestan forestan	Striped policeman
Spialia spio	Mountain sandman
Kedestes macomo	Macomo ranger
Gegenes Hottentota	Latreile's skipper