

**COMET EXTENSION 8
Ecological report**

SEF Reference No. 505052

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I, **Karin van der Walt**, in my capacity as a specialist consultant, hereby declare that I -

- Act as an independent consultant;
- Do not have any financial interest in the undertaking of the activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998);
- Have and will not have vested interest in the proposed activity proceeding;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity;
- Undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998);
- Will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not;
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- Based on information provided to me by the project proponent, and in addition to information obtained during the course of this study, have presented the results and conclusion within the associated document to the best of my professional judgement;
- Reserve the right to modify aspects pertaining to the present investigation should additional information become available through ongoing research and/or further work in this field; and
- Undertake to have my work peer reviewed on a regular basis by a competent specialist in the field of study for which I am registered.



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04 September 2013

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EXECUTIVE SUMMARY

Strategic Environmental Focus (Pty) Ltd, as independent environmental practitioners and ecological specialists, was appointed by Urban Dynamics Inc. to conduct an ecological study in order to establish the assemblages and state of the fauna and flora present in the area associated with the proposed development at Comet extension 8, Boksburg, Gauteng Province.

The study area falls within the Soweto Highveld Grassland vegetation type which is located within the Grassland biome. Soweto Highveld Grassland is classified as Endangered according to Mucina & Rutherford (2006) due to large scale transformation through mining, cultivation and urban sprawl. Furthermore, Soweto Highveld Grassland is also listed as a Vulnerable ecosystem in terms of Section 52 of the National Environmental Management: Biodiversity Act (Government Gazette, 2011). The original extent of the ecosystem was 1 451 000ha with about 54% natural area currently remaining, none of which is formally protected.

The study area was found to be highly disturbed and dominated by alien plant species such as *Bidens pilosa*, *Pennisetum clandestinum* and *Eucalyptus* sp. with isolated specimens of only two indigenous plant species recorded, namely *Acacia karroo* and *Hyparrhenia hirta*. The area was also used as a dumping site for building rubble, garden refuse and domestic waste, while major roads like the R21 and houses further prevents the movement of biodiversity to and from the study area. Literature surveys revealed that at least 16 plant species of conservation concern have been recorded in QDGC2628AA, although due to the high level of disturbance none of the species are expected to occur within the study area.

In addition, due to the high level of disturbance, lack of indigenous vegetation and close proximity of roads and houses, faunal diversity is very low within the study area and although this survey was conducted during late winter, it is not expected that faunal diversity will be significantly higher during summer.

Therefore, the study area was considered to be of low ecological importance due to the extensive infestations by alien species, lack of indigenous vegetation, close proximity of major roads and dumping of building rubble, garden refuse and domestic waste.

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LIST OF ABBREVIATIONS

CBA	Critical Biodiversity Area
DDD	Data Deficient Distribution
DDT	Data Deficient Taxonomic
EIA	Environmental Impact Assessment
EN	Endangered
ESA	Ecological Support Area
GDARD	Gauteng Province: Department of Agriculture and Rural Development
IUCN	International Union for the Conservation of Nature
NT	Near Threatened
PA	Protected Area
POSA	Plants of Southern Africa
SEF	Strategic Environmental Focus
VU	Vulnerable

GLOSSARY

Alien species	Plant taxa in a given area, whose presence there, is due to the intentional or accidental introduction as a result of human activity.
Biodiversity	Biodiversity is the variability among living organisms from all sources including <i>inter alia</i> terrestrial, marine and other aquatic ecosystems and ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.
Biome	A major biotic unit consisting of plant and animal communities having similarities in form and environmental conditions, but not including the abiotic portion of the environment.
Buffer zone	A collar of land that filters edge effects.
Climax community	<p>The presumed end point of successional sequence; a community that has reached a steady state, the most mature and fully developed vegetation that an ecosystem can achieve under the prevailing conditions. It is reached after a sequence of changes in the ecosystem, known as succession. Once climax vegetation develops, the changes are at a minimum and the vegetation is in dynamic equilibrium with its environment.</p> <p>Very few places show a true climax because physical environments are constantly changing so that ecosystems are always seeking to adjust to the new conditions through the process of succession.</p>
Conservation	The management of the biosphere so that it may yield the greatest sustainable benefit to present generation while maintaining its potential to meet the needs and aspirations of future generations. The wise use of natural resources to prevent loss of ecosystems function and

	integrity.
Conservation concern	Plants of conservation concern are those plants that are important for South Africa's conservation decision making processes and include all plants that are Threatened (see Threatened), Extinct in the wild, Data deficient, Near threatened , Critically rare, Rare and Declining . These plants are nationally protected by the National Environmental Management: Biodiversity Act. Within the context of these reports, plants that are Declining are also discussed under this heading.
Conservation status	An indicator of the likelihood of that species remaining extant either in the present day or the near future. Many factors are taken into account when assessing the conservation status of a species: not simply the number remaining, but the overall increase or decrease in the population over time, breeding success rates, known threats, and so on.
Community	Assemblage of populations living in a prescribed area or physical habitat, inhabiting some common environment.
Correspondence Analysis	Correspondence Analysis simultaneously ordines species and samples.
Critically Endangered	A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
Data Deficient	There is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. However, "data deficient" is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.
Declining	A taxon is declining when it does not meet any of the five IUCN criteria and does not qualify for the categories Threatened or Near Threatened, but there are threatening processes causing a continuous decline in the population (Raimondo <i>et al.</i> , 2009).
Ecological Corridors	Corridors are roadways of natural habitat providing connectivity of various patches of native habitats along or through which faunal species may travel without any obstructions where other solutions are not feasible.
Edge effect	Inappropriate influences from surrounding activities, which physically degrade habitat, endanger resident biota and reduce the functional size of remnant fragments including, for example, the effects of invasive plant and animal species, physical damage and soil compaction caused through trampling and harvesting, abiotic habitat alterations and pollution.
Endangered	A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future.

Fauna	The animal life of a region.
Flora	The plant life of a region.
Forb	A herbaceous plant other than grasses.
Habitat	Type of environment in which plants and animals live.
Indigenous	Any species of plant, shrub or tree that occurs naturally in South Africa.
Invasive species	Naturalised alien plants that have the ability to reproduce, often in large numbers. Aggressive invaders can spread and invade large areas.
Least Concern	A taxon is Least Concern when it has been evaluated against five IUCN criteria and does not qualify for the Threatened or Near threatened Categories (Raimondo <i>et al.</i> , 2009).
Mitigation	The implementation of practical measures to reduce adverse impacts.
Near Threatened	A Taxon is Near Threatened when available evidence indicates that that it nearly meets any of the five IUCN criteria for Vulnerable, and is therefore likely to qualify for a threatened category in the near future (Raimondo <i>et al.</i> , 2009).
Plant community	A collection of plant species within a designated geographical unit, which forms a relatively uniform patch, distinguishable from neighbouring patches of different vegetation types. The components of each plant community are influenced by soil type, topography, climate and human disturbance.
Protected Plant	According to Provincial Nature Conservation Ordinances, no one is allowed to sell, buy, transport, or remove this plant without a permit from the responsible authority. These plants are protected by provincial legislation.
Threatened	Species that have naturally small populations and species which have been reduced to small (often unsustainable) population by man's activities.
Red Data	A list of species, fauna and flora that require environmental protection - based on the IUCN definitions. Now termed Plants of Conservation Concern.
Species diversity	A measure of the number and relative abundance of species.
Species richness	The number of species in an area or habitat.
Succession	Progressive change in the composition of a community of plants, e.g. from the initial colonisation of a bare area, or of an already established community towards a largely stable climax. The complete process of succession may take hundreds or thousands of years and entails a number of intermediate communities - each called a seral community. The

	replacement of one seral community by another in most cases leads to the eventual formation of a climax community, a relatively stable community of plants and animals.
Vegetation Unit	A complex of plant communities ecologically and historically (both in spatial and temporal terms) occupying habitat complexes at the landscape scale. Mucina and Rutherford (2006) state: "Our vegetation units are the obvious vegetation complexes that share some general ecological properties such as position on major ecological gradients and nutrient levels, and appear similar in vegetation structure and especially floristic composition".
Threatened	Threatened Species are those that are facing a high risk of extinction, indicated by placing in the categories Critically Endangered (CR), Endangered (E) and Vulnerable (VU) (Raimondo <i>et al.</i> , 2009).
Vulnerable	A taxon is Vulnerable when it is not Critically Endangered or Endangered but meets any of the five IUCN criteria for Vulnerable and is therefore facing a high risk of extinction in the wild in the future (Raimondo <i>et al.</i> , 2009).

1. INTRODUCTION

1.1 Project Description

Strategic Environmental Focus (Pty) Ltd, as independent environmental practitioners and ecological specialists, was appointed by Urban Dynamics Inc. to conduct an ecological study in order to establish the assemblages and state of the fauna and flora present in the area associated with the proposed development at Comet extension 8, Boksburg, Gauteng Province.

1.2 Terms of Reference

The terms of reference for the floral and faunal baseline assessments were as follows:

- Identify and describe all fauna and flora in the area;
- Identify all Provincially protected and species of conservation concern occurring at the site;
- Describe the current state of biodiversity on site;
- Determine the extent of disturbance affecting the site;
- Identify all biodiversity attributes on the site that require conservation; and
- Identify the exotic species in the study area.

1.3 Methodology

The field survey was undertaken on the 29th of August 2013. The methodology entailed the following:

- Review of relevant literature including all previous surveys and assessments conducted, review of the vegetation unit(s) expected to occur on the site as well as the conservation status of the vegetation unit(s);
- Review of relevant literature which included the distribution data of fauna within the study area;
- Review of available information layers within the Geographical Information System (GIS); and
- A one day field survey to assess the faunal and floral habitat within the study area, as well as the degree of disturbances within the area.

Further details regarding the methodology employed during the surveys are provided in Appendix A.

1.4 Limitations

The following limitations were experienced during the course of the field survey:

- In order to obtain a comprehensive understanding of the dynamics of the biota on the site, including species of conservation concern, on a specific site, studies should include investigations through different seasons, over a number of years

and should include extensive sampling. Due to project time constraints, such long term research was not feasible;

2. BACKGROUND

2.1 Location

The study area is located on Comet Extension 8 on Portion 406 of the farm Driefontein 85-IR in Boksburg, Gauteng and falls in Quarter Degree Grid Cell (QDGC) 2628AA between 26°12'47.8" – 26°12'59.1" south and 28°14'16.0" – 28°14'12.3" east (Figure 1).

2.2 Climate

The study area usually receives around 648mm of rain per year, mostly occurring during the summer months. The average daily maximum temperature range is 15.9°C in June to 24.3°C in January, while the minimum temperature drops to 0°C on average over night in July. The study area occurs at an altitude of between 1600 and 2000 m above sea level (Mucina & Rutherford, 2006).

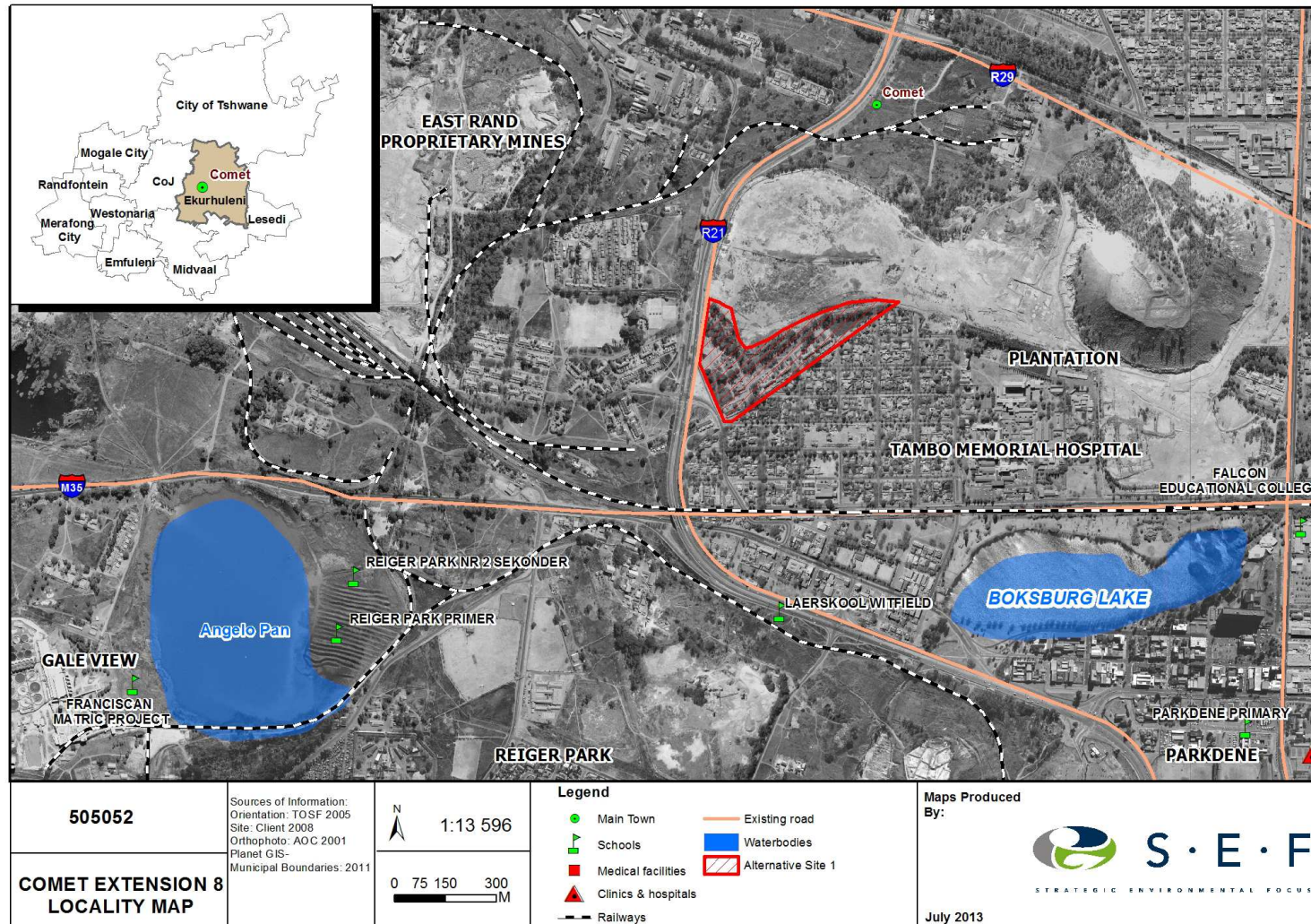


Figure 1: Locality of the study area

2.3 Regional Vegetation

The study area falls within the Grassland Biome (Rutherford & Westfall, 1994) which is characterized by high summer rainfall and dry winters. Frequent frost during the winter nights as well as marked diurnal temperature variations is unfavourable for tree growth resulting in the Grassland Biome consisting mainly of grasses and plants with perennial underground storage organs, such as bulbs and tubers. A large number of Rare and Threatened plant species in the summer rainfall regions of South Africa is restricted to high-rainfall grassland, making this the vegetation type in most urgent need of conservation.

Frost, fire and grazing within grasslands maintain the herbaceous grass and forb layer and prevent the establishment of thickets (Tainton, 1999). Fire is a natural disturbance caused by lightning, and natural fires (or controlled burning every 3 years or so) is therefore essential for maintaining the structure and biodiversity of this biome. However, if prevented due to activities such as agriculture and mining, thicket forming tree or alien species eventually dominate the natural vegetation and place an additional burden on already scarce resources such as water.

The Grassland Biome can be divided into smaller sections known as vegetation units. Of these vegetation units, Soweto Highveld Grassland occurs in the study (Mucina & Rutherford, 2006). Soweto Highveld Grassland is dominated by *Themeda triandra* (Red Grass) accompanied by grasses such as *Elionorus muticus* (Wire Grass), *Eragrostis racemosa* (Narrow Heart Love Grass), *Heteropogon contortus* (Spear Grass) and *Tristachya leucothrix* (Hairy Trident Grass) (Mucina & Rutherford, 2006). Undisturbed Soweto Highveld Grassland could contain wetlands, narrow stream alluvial and ridges or rocky outcrops (Mucina & Rutherford, 2006). According to Mucina and Rutherford (2006), Soweto Highveld Grassland is classified as an endangered vegetation type with more than 50% transformed by mining, cultivation, urban sprawl and building of road and infrastructure. The remaining patches should be conserved to prevent further transformation.

2.4 Gauteng Conservation Plan

The Gauteng Conservation Plan (C-Plan) was started in 2000 and the aim was to revise this plan at least every five years. The small size of Gauteng province made it feasible to conduct extensive biodiversity surveys which aimed to provide the information on spatial occurrence of biodiversity which was necessary for conservation planning. C-Plan 3 is based on the principles of complementarity, efficiency, defensibility and flexibility, irreplaceability, retention, persistence and accountability (GDARD, 2012).

Knowledge of the distribution of biodiversity, the conservation status of species approaches for dealing with aspects such as climate change, methods of data analysis, and the nature of threats to biodiversity within the planning region are constantly

changing, especially in Gauteng province where development is taking place at a rapid rate. The main purposes of the C-Plan 3 are:

- To serve as the primary decision support tool for the biodiversity component of the Environmental Impact Assessment (EIA) process;
- To inform protected area expansion and biodiversity stewardship programmes within the province; and
- To serve as a basis for development of Bioregional Plans in municipalities within the province.

The C-Plan 3 considers the following biodiversity features:

- Plants (Including priority ranking of species of conservation concern in Gauteng);
- Bird habitat models;
- Invertebrates (includes species of conservation concern and known localities with buffers);
- Fish;
- Herpetofauna;
- Pan clusters;
- Near pristine quaternary catchments;
- Bioclimatic zones;
- Carbon sequestration; and
- Primary vegetation.

The C-Plan furthermore makes provision for Critical Biodiversity Areas (CBA's) and Ecological Support Areas (ESA's). According to the C-Plan, the study area does not fall into any of the C-Plan conservation categories (Figure 2).

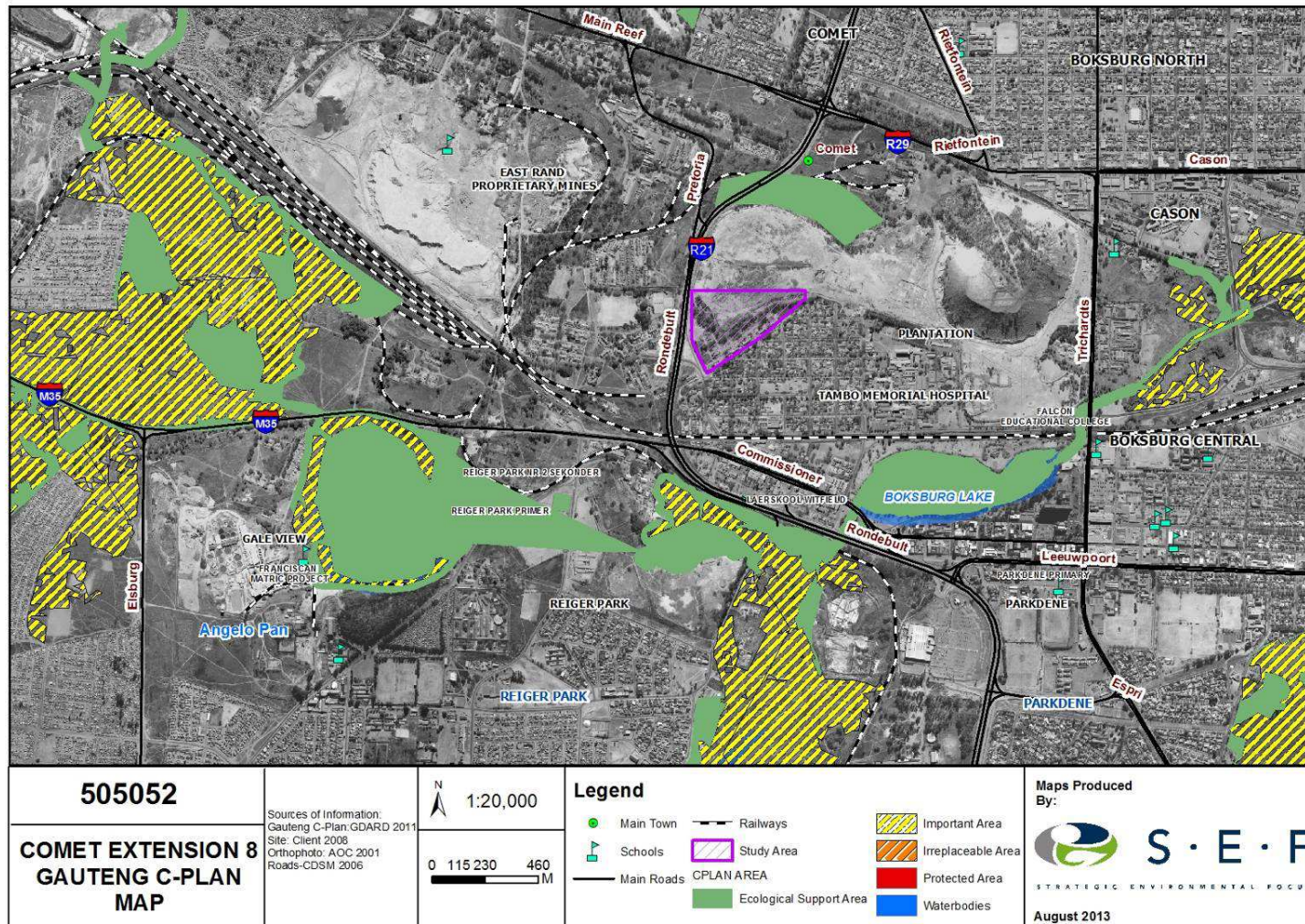


Figure 2: The Gauteng C-Plan in relation to the study area

2.5 Listed Ecosystems

The National Environmental Management: Biodiversity Act (Act 10 of 2004; NEM:BA) provides for listing threatened or protected ecosystems, in one of four categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Protected (Government Gazette, 2011). The main purpose of listing threatened ecosystems is to reduce the rate of ecosystem and species extinction and includes the prevention of further degradation and loss of structure, function and composition of threatened ecosystems.

Threatened terrestrial ecosystems have been delineated based on the following:

- The South African Vegetation Map;
- National forest types;
- Priority areas identified in a provincial systematic biodiversity plan (in this case the Mpumalanga Conservation Plan); or

High irreplaceability forest patches and clusters. The criteria used for identifying threatened terrestrial ecosystems was done through extensive stakeholder engagement and based on the best available science. The criteria for thresholds for critically endangered, endangered and vulnerable ecosystems are summarized in Table 1.

Table 1: Criteria used to identify threatened terrestrial ecosystems

Criterion	Critically Endangered	Endangered	Vulnerable
A1: Irreversible loss of natural habitat	Remaining natural habitat \leq biodiversity target	Remaining natural habitat \leq biodiversity target + 15%	Remaining natural habitat \leq 60% of original area
A2: Ecosystem degradation and loss of integrity	\geq 60% of ecosystem significantly degraded	\geq 40% of ecosystem significantly degraded	\geq 20% of ecosystem significantly degraded
C: Limited extent and imminent threat	-	Ecosystem extent \leq 3000ha and imminent threat	Ecosystem extent \leq 6000ha and imminent threat
D1: Threatened plant species associations	\geq 80 threatened Red List plant species	\geq 60 threatened Red List plant species	\geq 40 threatened Red List plant species
F: Priority areas for meeting explicit biodiversity targets as defined in a systematic biodiversity plan	Very high irreplaceability and high threat	Very high irreplaceability and medium threat	Very high biodiversity and low threat

There are four main types of implications of listed ecosystems on development:

- Planning related implications, linked to the requirement in the Biodiversity Act for listed ecosystems to be taken into account in municipal Integrated Development Plans and Spatial Development Frameworks;

- Environmental authorisation implications, especially in terms of NEMA and EIA regulations;
- Proactive management implications, in terms of the Biodiversity Act; and
- Monitoring and reporting implications, in terms of the Biodiversity Act.

The Environmental Impact Assessment (EIA) Regulations include three lists of activities that require environmental authorisation:

- Listing Notice 1: activities that require a basic assessment (R544 of 2010);
- Listing Notice 2: activities that require scoping and environmental impact report (EIR)(R545 of 2010);
- Listing Notice 3: activities that require a basic assessment in specific identified geographical areas only (R546 of 2010).

Activity 12 in Listing Notice 3 relates to the clearance of 300m² of more of vegetation, which will trigger a basic assessment within any critically endangered or endangered ecosystem listed in terms of Section 52 of the Biodiversity Act. This means any development that involves loss of natural habitat in a listed critically endangered or endangered ecosystem is likely to require at least a basic assessment in terms of the EIA regulations.

It is important to note that while the original extent of each listed ecosystem has been mapped, a basic assessment report in terms of the EIA regulations is triggered only in remaining natural habitat within each ecosystem and not in portions of the ecosystem where natural habitat has already been irreversibly lost.

The present study area is located within the Soweto Highveld Grassland ecosystem which is currently listed as Vulnerable in terms of Section 52 of NEM:BA (Government Gazette, 2011). The original extent of the ecosystem was 1 451 000ha with about 54% natural area currently remaining, none of which is formally protected.

3. RESULTS

3.1 Overview

The study area was transformed by extensive infestations by alien plant species such as *Pennisetum clandestinum*, *Bidens pilosa*, *Eucalyptus* sp., *Conyza* sp. and *Melia azedarach* with isolated specimens of only two indigenous species recorded, namely *Acacia karroo* and *Hyparrhenia hirta*. Extensive dumping of building rubble, garden refuse and domestic waste was also recorded in the study area (Photograph 1).



Photograph 1: Extensive infestations by alien species such as *Eucalyptus* sp. and *Bidens pilosa* as well as illegal dumping was recorded throughout the study area

3.2 Plants of Conservation Concern

Plants of conservation concern are those plants that are important for South Africa's conservation decision making processes. A plant taxon is of conservation concern when it is considered to be threatened, or close to becoming threatened with extinction and therefore classified as Critically Endangered, Endangered, Vulnerable or Near Threatened. These plants are nationally protected by the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). Within the context of this report, plants that are Declining, Rare and Data Deficient (Taxonomic and Distribution) are also referenced under this heading.

Rare and Endangered species are mostly small, very localized and visible for only a few weeks in the year when they flower (Ferrar and Lötter, 2007). As these plants might not have been visible at the time of the field survey, the probabilities of occurrence for these plants were based on distribution data and information gathered concerning the area.

A minimum of sixteen (16) plant species of conservation concern have been recorded from QDGC 2628AA (Raimondo *et al.*, 2009; POSA, 2011). These species, including their conservation status and habitat requirements, are listed in Table 2. Due to the high level of transformation, it is highly unlikely that any of these species will occur in the study area.

Table 2: Species of conservation concern recorded in QDGC2628AA, their conservation status and habitat requirements

Scientific Name	Conservation Status	Habitat requirements
<i>Alepidea peduncularis</i>	DDT	Unknown
<i>Stenostelma umbelluliferum</i>	NT	Deep black turf in open woodland mainly in the vicinity of drainage lines. Has been recorded in Pretoria North and adjacent areas in the North West Province.

<i>Trachyandra erythrorrhiza</i>	NT	Marshy areas, grassland, usually in black turf marshes
<i>Callilepis leptophylla</i>	Declining	Grassland or open woodland
<i>Cineraria austrotransvaalensis</i>	NT	Amongst rocks on steep slopes of hills and ridges or edge of thick bush under trees on all aspects and various soil types
<i>Cineraria longipes</i>	VU	Grassland, on koppies, amongst rocks and along seepage lines, exclusively on basalt on south-facing slopes
<i>Adromischus umbraticola</i> subsp. <i>umbraticola</i>	NT	Rock crevices on rocky ridges.
<i>Crassula arborescens</i> subsp. <i>undulatifolia</i>	Critically Rare	Scarp, mistbelt and coastal riverine forests. Also in loose rocky habitats in light shade or partial shade. Often grows in proximity to a water source. 100-1400m.
<i>Acalypha caperonioides</i> var. <i>caperonioides</i>	DDT	Unknown
<i>Drimia elata</i>	DDT	Unknown
<i>Gunnera perpensa</i>	Declining	Usually in wetlands, marshes or along streambanks
<i>Hypoxis hemerocallidea</i>	Declining	Wide range of habitats
<i>Salvia schlechteri</i>	DDD	Unknown
<i>Khadia beswickii</i>	VU	Nigel.
<i>Myrothamnus flabellifolius</i>	DDT	Unknown
<i>Holothrix randii</i>	NT	Grassy slopes and rock ledges, usually southern aspects

3.3 Provincially Protected Plants

A number of plant species have been classified as Orange and Red list species by the Department: Agriculture and Rural Development for Gauteng Province (GDARD, 2012). Due to the high level of transformation, it is highly unlikely that any of these species will be present in the study area

3.4 Medicinal Plant Species

The demand for medicinal plants is on the increase while the frequently used species and the communal land that it is harvested from, are on the decline. With an increase in the country's population and the high rate of infectious diseases, this will put an even higher strain on the already scarce natural medicinal resources (Emery *et al.*, 2002). Areas of high biodiversity are thus important for the conservation and sustainable use of these resources and should be protected. No indigenous medicinal plant species were recorded in the study area, although the alien species, *Bidens pilosa* and *Eucalyptus* sp. are frequently used for medicinal purposes.

3.5 Alien and Invasive Plants

Declared weeds and invaders have the tendency to dominate or replace the herbaceous layer of natural ecosystems, thereby transforming the structure, composition and

function of natural ecosystems. Therefore, it is important that all these transformers (as defined above) be eradicated and controlled by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species (Henderson, 2001).

The amended Regulations (Regulation 15) of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA) identifies three categories of problem plants:

- **Category 1** plants may not occur on any land other than a biological control reserve and must be controlled or eradicated. Therefore, no person shall establish, plant, maintain, propagate or sell/import any category 1 plant species;
- **Category 2** plants are plants with commercial application and may only be cultivated in demarcated areas (such as biological control reserves) otherwise they must be controlled; and
- **Category 3** plants are ornamentally used plants and may no longer be planted, except those species already in existence at the time of the commencement of the regulations (30 March 2001), unless they occur within 30m of a 1:50 year flood line and must be prevented from spreading.

The following categories are proposed on the revised (CARA) and the NNEM:BA, and are thus included within the present assessment:

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

The study area was dominated by alien species, most notably the extensive *Eucalyptus* sp., *Pennisetum clandestinum* and *Bidens pilosa* invasions. Table 3 summarizes the alien species recorded in the study area as well as the current and proposed categories.

Table 3: Preliminary list of alien species recorded in the study area. Species in red should be prioritised for control

Scientific name	Common name	Category	CARA/NEM:BA
<i>Eucalyptus</i> species	Blue Gum Trees	Invader: 2	2
<i>Bidens pilosa</i>	Black Jack	Weed	None
<i>Conyza canadensis</i>	0	No Category	0
<i>Melia azedarach</i>	Syringa	Invader: 3	1b in Gauteng
<i>Pennisetum clandestinum</i>	Kikuyu Grass	Proposed invader: 2	None
<i>Pinus patula</i>	Patula Pine	Invader: 2	2

<i>Solanum mauritianum</i>	Brazilian Pepper Tree	No Category	0
<i>Schinuis terebinthifolius</i>	Brazilian Pepper Tree	No Category	0
<i>Eriobotrya japonica</i>	Common Thorn Apple	Annual Weed	0
<i>Opuntia humifusa</i>	Prickly Pear	Weed: Category 1	0
<i>Agave potatorum</i>	Spreading century plant	None	2
<i>Ipomoea alba</i>	0	Weed – Category 1	0
<i>Trachycarpus</i> sp.	Brazilian Pepper Tree	No Category	0

3.6 Faunal Species Occurrence

3.6.1 Mammals

The region includes a relatively high diversity of mammals with approximately 90 species expected to occur within the geographical area associated with the study area according to the IUCN. These species are listed in Appendix B along with the probability of each species occurring in the study area as well as their national (Friedmann & Daly, 2004; DEAT, 2007) and global (IUCN, 2012) conservation status. Due to the transformed state of the study area, as well as the close proximity of roads and houses, only two mammal species, both of which are alien rodent species, were given a high probability of occurring in the study area, namely *Mus musculus* (House Mouse) and *Rattus rattus* (Black Rat).

3.6.2 Avifauna

Approximately 407 bird species occur within QDGC 2628AA and the region of the study site. Due to the high level of habitat transformation, very low avifaunal diversity was recorded in the study area and immediate surroundings. These species are listed in Appendix C.

The region holds a high level of avifaunal endemism with approximately 59 of the total species found in the QDGC being endemic to southern Africa. Furthermore, 32 bird species of conservation concern (species having a Red Data Status higher than Least Concern) are found within the QDGC, five of which are also endemic to southern Africa. All bird species of conservation concern (including endemics) occurring within the QDGC are listed in Appendix D along with their national and global conservation status. Due to the lack of indigenous vegetation and high level of transformation, none of these species are likely to occur within the study area.

3.6.3 Reptiles

According to ReptileMAP, a continuation of the Southern African Reptile Conservation Assessment (SARCA) (ADU, 2012), 47 reptile species have been confirmed to occur within QDGC 2628AA (Appendix E) including the Near Threatened *Homoroselaps dorsalis* (Striped Harlequin Snake). While two of these species are endemic to southern Africa, the majority have not had their conservation status adequately evaluated. Although no reptile species were recorded at the time of the survey, this was not

considered a true reflection of the reptile diversity likely to be in the study area since the building rubble and other rubbish are likely to attract prey species and provide suitable refuge areas for various reptile species (Photograph 2).



Photograph 2: Dumping of rubbish such as domestic waste (left) and building rubble (right) are likely to provide suitable habitat for prey species and refuge for various reptile species

3.6.4 Amphibians

According to FrogMAP (ADU, 2012), a continuation of the Southern African Frog Atlas Project of Minter *et al.* (2004), 13 amphibian species have been confirmed to occur within QDGC 2628AA (Appendix F). While no species were recorded during the time of the survey and due to the lack of permanent water in the study area, only one species, *Amietophrynus gutturalis* (Guttural Toad), was given a high probability of utilizing the site during the summer months since this species readily adapts to suburban gardens.

3.6.5 Lepidoptera

South Africa is home to about 666 species of butterflies (Woodhall, 2005). Butterflies, like most invertebrates, are highly sensitive to environmental change, making them more vulnerable to the presence of toxins in the ecosystem. The most significant causes of habitat loss for butterflies include invasive alien vegetation, changing fire regimes, agricultural activities, urbanisation, plantation forestry, increased grazing and road construction (Henning *et al.*, 2009).

According to Henning *et al.* (2009), 211 Lepidoptera species have been recorded from the Gauteng Province, of which six are species of conservation concern (Table 4). Due to the high level of habitat transformation, none of these species are likely to occur in the study area.

Table 4: Threatened butterfly species in Gauteng Province, their conservation status, habitat requirements and likelihood of occurring in the study area

Scientific Name	Conservation	Habitat requirements	Likelihood of occurring in
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	Status		the study area
<i>Aloeides dentatis dentatis</i>	Vulnerable	Known only from Roodepoort and Heidelberg and found in Carletonville Dolomite Grassland	Zero
<i>Chrysoritis aureus</i>	Vulnerable	Near Heidelberg. Species require a very stable environment consisting of south facing well-drained slopes	Zero
<i>Lepidochrysops praeterita</i>	Endangered	Only found in a few koppies and rocky areas between Potchefstroom and the North West Province	Zero
<i>Orachrysops mijburghii</i>	Vulnerable	Occurs in Central Free State Grassland and Dry Highveld Grassland Bioregions where it is restricted to a few south-facing grassy slopes	Zero
<i>Metisella meninx</i>	Vulnerable	Species inhabits marshes in wetlands located in open grasslands. The presence of the host plant, <i>Leersia hexandra</i> is essential	Zero
<i>Platylesches dolomitica</i>	Vulnerable	In Gauteng recorded from Carletonville and Hillshaven and is a habitat specialist of dolomite ridges in bushveld	Zero

4. CONCLUSION

The study area falls within the Soweto Highveld Grassland vegetation type which is located within the Grassland biome. Soweto Highveld Grassland is classified as Endangered according to Mucina & Rutherford (2006) due to large scale transformation through mining, cultivation and urban sprawl. Furthermore, Soweto Highveld Grassland is also listed as a Vulnerable ecosystem in terms of Section 52 of NEMBA (Government Gazette, 2011). The original extent of the ecosystem was 1 451 000ha with about 54% natural area currently remaining, none of which is formally protected.

The study area was found to be highly disturbed and dominated by alien plant species such as *Bidens pilosa*, *Pennisetum clandestinum* and *Eucalyptus* sp. with isolated specimens of only two indigenous plant species, *Acacia karroo* and *Hyparrhenia hirta* recorded. The area was also used as a dumping site for building rubble, garden refuse and domestic waste while major roads like the R21 and houses further prevents the movement of biodiversity to and from the study area.

Literature surveys revealed that at least 16 plant species of conservation concern have been recorded in QDGC2628AA although due to the high level of disturbance none of the species are expected to occur within the study area.

Due to the high level of disturbance, lack of indigenous vegetation and close proximity of roads and houses, faunal diversity is very low within the study area and although this survey was conducted during late winter, it is not expected that faunal diversity will be significantly higher during summer.

Therefore the study area was considered to be of low ecological importance due to the extensive infestations by alien species, lack of indigenous vegetation, close proximity of major roads and dumping of building rubble, garden refuse and domestic waste.

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APPENDICES

APPENDIX A	Methodology
APPENDIX B	Mammal species occurring within QDGC 2628AA, with national and global conservation status, and probability of occurring on site and habitat preference
APPENDIX C	Bird species of conservation concern recorded in QDGC 2628AA
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APPENDIX A: METHODOLOGY

FLORA

Desktop analysis and literature review

The preliminary desktop studies entailed a literature survey of all plant species occurring in the QDGC2628AA according to the Plants of Southern Africa online checklist (SANBI, 2009). Additional data such as habitat preference and species descriptions were gathered for all plants of conservation concern which were included in the list. Background information on the regional vegetation was gathered using GIS and Mucina and Rutherford (2006).

Field survey

A one day field survey was undertaken on the 29th of August 2013. The description of the regional vegetation relied on literature from Mucina and Rutherford (2006). Plant names follow Van Wyk and Malan (1997), Van Wyk and Van Wyk (1997), Van Wyk and Smith (2005) Pooley (1998), Henderson (2001), Schmidt *et al*, (2002), Van Oudtshoorn (2004) and Manning (2009). The South African National Red List status follows the latest update <http://redlist.sanbi.org> (2012).

During the site visit, an overview of the study site was obtained from aerial images as well as vehicle based surveys but due to the lack of indigenous vegetation, the survey was conducted throughout the study area.

FAUNA

Since the focus of the preliminary surveys was to determine the vegetation communities and presence of specified plant species of conservation concern and thus was conducted late in the summer when most faunal species are inactive, no detailed faunal surveys were conducted. These detailed surveys will be conducted during the early summer surveys after sufficient rain has fallen in the study area.

APPENDIX B: MAMMAL SPECIES OCCURRING IN QDGC 2628AA, WITH NATIONAL AND GLOBAL CONSERVATION STATUS AND HABITAT PREFERENCE

CR = Critically Endangered; EN = Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern; DD = Data Deficient; Pr = Protected; En = Endemic; NBM = Non-breeding Migrant

Scientific Name	Common name	SA	IUCN	Habitat	Likelihood of occurring in study area
<i>Mus musculus</i>	House Mouse	0	LC	Widespread	Highly Likely
<i>Rattus rattus</i>	Black Rat, House Rat	0	LC	Widespread	Highly Likely
<i>Canis mesomelas</i>	Black-backed Jackal	LC	LC	Savanna, shrubland, grassland, drier areas, omnivore, extreme generalist	Low
<i>Vulpes chama</i>	Cape Fox, Silver Fox	LC	LC	Savanna, shrubland, grassland, desert, omnivorous, small vertebrates and invertebrates	Low
<i>Caracal caracal</i>	Caracal, African Caracal	LC	LC	Savanna, shrubland, eats small mammals and birds	Low
<i>Felis nigripes</i>	Black-footed Cat	LC	VU	Savanna, shrubland, desert, short-grass specialist feeding on small mammals, reptiles, birds and invertebrates	Low
<i>Felis silvestris</i>	Wild Cat, Wildcat	LC	LC	Savanna, shrubland, desert, broad habitat, small mammals, reptiles, birds and invertebrates	Low
<i>Leptailurus serval</i>	Serval	NT	LC	Savanna, grassland, bogs, marshes, swamps, moist savanna, tall grass, small mammals, reptile, fruit, invertebrates, fish	Low
<i>Atilax paludinosus</i>	Marsh Mongoose, Water Mongoose	LC	LC	Coastline, rocky shores, intertidal, estuarine, brackish, bogs, marshes, swamps, freshwater and saltwater, eats invertebrates and small vertebrates	Low
<i>Cynictis penicillata</i>	Yellow Mongoose	LC	LC	Savanna, shrubland, grassland, desert, insectivorous	Low
<i>Herpestes sanguineus</i>	Slender Mongoose	LC	LC	Savanna, desert, urban areas, invertebrates and small vertebrates	Low
<i>Ichneumia albicauda</i>	White-tailed Mongoose	LC	LC	Savanna, urban areas, grasslands, invertebrates and small vertebrates	Low

Scientific Name	Common name	SA	IUCN	Habitat	Likelihood of occurring in study area
<i>Mungos mungo</i>	Banded Mongoose	LC	LC	Savanna, social, termites and beetle larvae, other invertebrates	Low
<i>Suricata suricatta</i>	Meerkat, Slender-tail	LC	LC	Savanna, shrubland, grassland, desert, invertebrates, small vertebrates	Low
<i>Ictonyx striatus</i>	Zorilla, Striped Pole Cat	LC	LC	Savanna, grasslands, desert, forest, insects and mince, reptiles	Low
<i>Poecilogale albinucha</i>	African Striped Weasel	DD	LC	Grassland, savanna, shrubland, birds and eggs	Low
<i>Genetta genetta</i>	Common Genet	LC	LC	Forest, savanna, omnivorous	Low
<i>Nycteris thebaica</i>	Egyptian Slit-faced Bat	LC	LC	Caves and subterranean habitats, savanna, fynbos, aerial, man-made structures, insectivore	Low
<i>Epomophorus wahlbergi</i>	Wahlberg's Epauletted Fruit Bat	LC	LC	Savanna, urban areas, frugivore, tree roosting	Low
<i>Rhinolophus blasii</i>	BLASIUS' HORSESHOE Bat	VU	LC	Grassland, caves and subterranean habitats, woodland, savanna, aerial insectivore.	Low
<i>Rhinolophus clivosus</i>	Geoffroy's Horseshoe Bat	NT	LC	Grassland, caves and subterranean habitats, savanna, shrubland, fynbos, woodland, succulent and Nama karoo, aerial insectivore.	Low
<i>Rhinolophus darlingi</i>	Darling's Horseshoe Bat	NT	LC	Grassland, caves and subterranean habitats, savanna, woodland savanna, aerial insectivore.	Low
<i>Rhinolophus simulator</i>	Bushveld Horseshoe Bat	LC	LC	Grassland, caves and subterranean habitats, savanna, riverine savanna, aerial insectivore.	Low
<i>Eptesicus hottentotus</i>	Long-tailed House Bat	LC	LC	Savanna, nama karoo, riverine forest, aerial insectivore, roosts in rock crevices, caves and mine tunnels	Low
<i>Kerivoula lanosa</i>	Lesser Woolly Bat	NT	LC	Savanna, riparian woodland, insectivore, roosts in old weaver nests	Low
<i>Myotis tricolor</i>	Cape Hairy Bat	NT	LC	Forest, shrubland, savanna, grassland, mountains, aerial insectivore, lives in caves	Low
<i>Myotis welwitschii</i>	Welwitsch's Bat	NT	LC	Savanna, insectivore, roosts in shrubs and trees	Low
<i>Pipistrellus nanus</i>	Banana Bat	LC	LC	Savanna, plantations, close to water, insectivore, roosting in banana and strelitzia leaves	Low

Scientific Name	Common name	SA	IUCN	Habitat	Likelihood of occurring in study area
<i>Pipistrellus zuluensis</i>	Aloe Bat	LC	LC	Savanna, insectivore, found roosting amongst dead aloe leaves	Low
<i>Atelerix frontalis</i>	Southern African Hedgehog	NT	LC	Dry habitats with groundcover for nesting, nocturnal	Low
<i>Crocidura maquassiensis</i>	Makwassie Musk Shrew	VU	LC	Montane grassland, rocky areas, coastal forest, garden, terrestrial	Low
<i>Crocidura mariquensis</i>	Swamp Musk Shrew	DD	LC	Bogs, marshes, swamps, peatlands, marshy areas in savannas, terrestrial, nocturnal	Low
<i>Crocidura silacea</i>	Lesser Gray-brown Musk Shrew	DD	LC	Coastal forest, grassland and rocky areas, woodland, terrestrial, nocturnal	Low
<i>Suncus varilla</i>	Lesser Dwarf Shrew	DD	LC	Terrestrial, nocturnal, Broad tolerance but may be dependent on termite mounds	Low
<i>Lepus microtis</i>	African Savanna Hare	0	LC	Grazer, savanna, arable land, desert	Low
<i>Lepus saxatilis</i>	Scrub Hare, Savannah Hare	LC	LC	Arable land, savanna, grassland, desert, grazer	Low
<i>Elephantulus brachyrhynchus</i>	Short-snouted Elephant Shrew	DD	LC	Heavy cover in grass and scrubs	Low
<i>Elephantulus myurus</i>	Eastern Rock Elephant Shrew	LC	LC	Shrubland, grassland, crevices and crannies	Low
<i>Graphiurus microtis</i>	Small-eared Dormouse	0	LC	Savanna and woodland habitats	Low
<i>Gerbilliscus leucogaster</i>	Bushveld Gerbil	DD	LC	Sandy soils	Low
<i>Thallomys paedulus</i>	Acacia Rat	LC	LC	Widespread	Low
<i>Dendromys mesomelas</i>	Brant's Climbing Mouse	LC	LC	Rank grassland and forest edges, Tall grass and shrub, eats insects and grass seeds	Low
<i>Mystromys albicaudatus</i>	White-tailed Mouse	EN	EN	Temperate, sandy soils with good cover	Low
<i>Steatomys krebsii</i>	Kreb's Fat Mouse	LC	LC	Temperate, sandy substrates, wide tolerance	Low
<i>Steatomys pratensis</i>	Fat Mouse	LC	LC	Grassland, temperate, savanna, sandy substrate, river fringes	Low

Scientific Name	Common name	SA	IUCN	Habitat	Likelihood of occurring in study area
<i>Taphozous mauritanus</i>	Mauritian Tomb Bat	LC	LC	Savanna, desert, urban areas, invertebrates and small vertebrates	Medium
<i>Scotophilus dinganii</i>	African Yellow Bat	LC	LC	Urban areas, savanna, mixed bushland, aerial insectivore, roosts in roofs/crevices	Medium
<i>Tadarida aegyptiaca</i>	Egyptian Free-tailed Bat	0	LC	Savanna, urban areas, all vegetation types,	Medium
<i>Eidolon helvum</i>	Straw-coloured Fruit Bat	LC	NT	Varied, coastal, magrove and riverine forests, wooded city parks	Medium
<i>Pipistrellus capensis</i>	Cape Serotine	LC	LC	Urban areas, aerial insectivore, roosts in man-made structures, crevices of plants	Medium
<i>Crocidura cyanea</i>	Reddish-gray Musk Shrew	DD	LC	Broad habitat tolerance, terrestrial, nocturnal	Medium
<i>Cryptomys hottentotus</i>	African Mole Rat/Common mole-rat	LC	LC	Subterranean, widespread	Medium
<i>Aethomys ineptus</i>	Tete Veld Aethomys	LC	LC	Rocky crevices and piles of boulders	Medium
<i>Desmodillus auricularis</i>	Cape Short-eared Gerbil	LC	LC	Compact soil, nocturnal, in semi-arid karroid grassland	Medium
<i>Gerbilliscus brantsii</i>	Highveld Gerbil	LC	LC	This species is found in the subtropical and wooded grasslands of most South Africa (excluding some of the south), western Zimbabwe, Botswana, central and eastern Namibia, southeastern Angola and southwestern Zambia. There is a record from northern Mozambique.	Medium
<i>Mastomys coucha</i>	Southern African Mastomys	LC	LC	Widespread, nocturnal	Medium
<i>Mastomys natalensis</i>	Natal Mastomys	LC	LC	Cosmopolitan, nocturnal	Medium
<i>Rhabdomys pumilio</i>	Four-striped Grass Mouse	LC	LC	Temperate, grassland with good cover, diurnal	Medium
<i>Saccostomus campestris</i>	Pouched Mouse	LC	LC	Savanna, shrubland, grassland, temperate, nocturnal seed eater	Medium

Scientific Name	Common name	SA	IUCN	Habitat	Likelihood of occurring in study area
<i>Panthera pardus</i>	Leopard	LC	NT	Forest, savanna, desert, predated small to medium mammals	Zero
<i>Hyaena brunnea</i>	Brown Hyaena	NT	NT	Savanna, grasslands, urban areas, scavenger	Zero
<i>Proteles cristata</i>	Aardwolf	LC	LC	Savanna, shrubland, grassland, eats termites	Zero
<i>Aonyx capensis</i>	African Clawless Otter	LC	LC	Permanent streams and rivers, coastline, rocky shores,, frshwater and marine, crustaceans and fish	Zero
<i>Lutra maculicollis</i>	Spotted-necked Otter	NT	LC	Aquatic areas, natural and man-made, fish, crab, frogs, in low densities	Zero
<i>Mellivora capensis</i>	Honey Badger	NT	LC	Habitat varied, rain forests to arid deserts, solitary carnivores	Zero
<i>Alcelaphus buselaphus</i>	Lichtenstein's Hartebeest	LC	LC	Grassland, temperate areas, shrublands, karroid semi arid areas and coastal shrubland.	Zero
<i>Antidorcas marsupialis</i>	Springbok	LC	LC	Arid regions and dry open grassland, savanna, open plains, mixed feeder	Zero
<i>Connochaetes gnou</i>	Black Wildebeest	LC	LC	Temperate grasslands, selective grazer in open areas with short grass, open plains.	Zero
<i>Connochaetes taurinus</i>	Common Wildebeest	LC	LC	Savanna, short grass grazer, prefers open savanna woodlands/bushveld	Zero
<i>Damaliscus pygargus</i>	Blesbok	LC	LC	Grassland, grazers with a preference for shortgrass	Zero
<i>Ourebia ourebi</i>	Oribi	EN	LC	Grassland, Lowlands and montane grasslands, open grasslands with gentle topography at lower altitudes, selective feeders.	Zero
<i>Pelea capreolus</i>	Grey Rhebok, Common Rhebok	LC	LC	Savanna, grassveld and renosterveld, hilly and mountainous terrain, ecotonal	Zero
<i>Raphicerus campestris</i>	Steenbok	LC	LC	Savanna, shrubland, grassland, drier areas	Zero
<i>Redunca fulvorufula</i>	Southern Mountain Reedbuck	LC	LC	Temperate grassland habitats, selective grazer	Zero
<i>Sylvicapra grimmia</i>	Common Duiker, Grey Duiker	LC	LC	Widespread, thickets, savanna, widespread, karroid, forest and savanna	Zero

Scientific Name	Common name	SA	IUCN	Habitat	Likelihood of occurring in study area
<i>Syncerus caffer</i>	African Buffalo	LC	LC	Savanna, temperate shrublands, bulk feeder occurring throughout savannas lowveld and Eastern Cape thickets	Zero
<i>Tragelaphus oryx</i>	Common Eland, Eland	LC	LC	Woodlands and woodland mosaics, grasslands and thickets	Zero
<i>Tragelaphus scriptus</i>	Bushbuck	LC	LC	Closed canopy forests, thickets and woodlands, coastal sand forests	Zero
<i>Sauromys petrophilus</i>	Roberts's Flat-headed Bat	LC	LC	Savanna, shrubland, aerial insectivore, roosts in rock fissures and exfoliated rock	Zero
<i>Procavia capensis</i>	Rock Hyrax, Rock Dassie	LC	LC	Krantzes and rocky outcrops throughout the fynbos, karroid habitats, generalist herbivore	Zero
<i>Pronolagus randensis</i>	Jameson's Red Rock Hare	LC	LC	Grassland, rocky highveld grassland, slopes of rocky outcrops	Zero
<i>Equus quagga</i>	Plains Zebra, Burchells Zebra	0	LC	Savanna, temperate grasslands, grasslands or open woodlands near water. Prefers short grasses and flat to gentle hills.	Zero
<i>Ceratotherium simum</i>	Southern White Rhino	LC	NT	Temperate grasslands, short rass areas in savanna and busgveld, prefers woody cover, water, bulk grazer	Zero
<i>Diceros bicornis</i>	Southern-central Black Rhino	VU	CR	Savanna, bushveld habitats of Limpopo, Mpumalanga and KZN, prefers dense cover and permanent water, browser	Zero
<i>Papio ursinus</i>	Grey-footed Chacma Baboon	LC	LC	Savanna and grassland, forest edges, omnivore	Zero
<i>Graphiurus platyops</i>	Rock Dormouse	DD	LC	Temperate, rocky areas	Zero
<i>Hystrix africaeaustralis</i>	Cape Porcupine	LC	LC	Arable land, savanna, grassland, temperate, desert, throughout southern Africa	Zero
<i>Aethomys namaquensis</i>	Namaqua Rock Rat	LC	LC	Rocky outcrops and koppies	Zero
<i>Dasymys incomtus</i>	African Marsh Rat /Water Rat	NT	LC	Bogs, marshes, swamps, fens, peatlands, nocturnal, semi-aquatic	Zero

Scientific Name	Common name	SA	IUCN	Habitat	Likelihood of occurring in study area
<i>Otomys angoniensis</i>	Angoni Vlei Rat	LC	LC	Woody savanna, tall grasses and shrubs, shrub dominated wetlands, bogs, marshes swamps, fens, peatlands with good grass cover	Zero
<i>Otomys irroratus</i>	Southern African Vlei Rat	LC	LC	Mesic grassland and mountain fynbos habitat	Zero
<i>Pedetes capensis</i>	Springhaas, Springhare	LC	LC	Sandy, hard soils, cultivated areas or open shrublands, deserts	Zero
<i>Orycteropus afer</i>	Aardvark, Antbear	LC	LC	Savanna, shrubland, grassland, vital association between ants and termites	Zero

APPENDIX C: BIRD SPECIES RECORDED IN THE STUDY AREA

Scientific Name	Common Name
<i>Bostrychia hagedash</i>	Hadedda Ibis
<i>Ploceus cucullatus</i>	Village Weaver
<i>Saxicola torquatus</i>	African Stonechat
<i>Spilopelia senegalensis</i>	Laughing Dove
<i>Threskiornis aethiopicus</i>	African Sacred Ibis
<i>Trachyphonus vaillantii</i>	Crested Barbet
<i>Acridotheres tristis</i>	Common Myna
<i>Urocolius indicus</i>	Red-faced Mousebird

APPENDIX D: BIRD SPECIES OF CONSERVATION CONCERN OCCURRING WITHIN QDGC 2628AA, NATIONAL AND GLOBAL CONSERVATION STATUS

VU = Vulnerable; NT = Near Threatened; LC = Least Concern; En = Endemic

Scientific name	Common Name	Regional conservation	National Conservation	Habitat requirements
<i>Botaurus stellaris</i>	Eurasian Bittern	CR	LC	Tall, dense emergent vegetation in interior of seasonal and permanent large wetlands
<i>Charadrius pallidus</i>	Chestnut-banded Plover	NT	NT	Natural and man-made salt pans; rare at freshwater habitats
<i>Ciconia nigra</i>	Black Stork	NT	LC	Dams, pans, floodplains, flooded grassland, associated with mountainous areas
<i>Circus macrourus</i>	Pallid Harrier	NT; NBM	NT	Grasslands associated with pans or floodplains; also croplands
<i>Circus maurus</i>	Black Harrier	NT; En	VU	Dry grassland, Karoo scrub, agricultural fields and high-altitude grasslands; intolerant of burnt areas
<i>Circus ranivorus</i>	African Marsh-Harrier	VU	LC	Almost exclusively inland and coastal wetlands
<i>Coracias garrulus</i>	European Roller	LC; NBM	NT	Open, broadleaved and Acacia woodlands with grassy clearings
<i>Crex crex</i>	Corn Crake	VU; NBM	LC	Rank grassland and savanna, grassland bordering marshes and streams incl long grass areas of seasonally flooded grassland and occasionally wet clay patches and soft mud fringing ponds
<i>Eupodotis caerulescens</i>	Blue Korhaan	NT; En	NT	Flat and undulating terrain in grassland and Nama Karoo, where rainfall 300-1 000 mm; often on damp ground; sometimes attracted to burnt areas; favours short vegetation

Scientific name	Common Name	Regional conservation	National Conservation	Habitat requirements
<i>Falco biarmicus</i>	Lanner Falcon	NT	LC	Most frequent in open grassland, open or cleared woodland, and agricultural areas. Breeding pairs favour habitats where cliffs available as nest and roost sites, but will use alternative sites (eg trees, electricity pylons, buildings) if cliffs absent
<i>Falco naumanni</i>	Lesser Kestrel	VU; NBM	LC	Warm, dry, open or lightly wooded environments; concentrated in grassy Karoo, w fringes of grassland biome and se Kalahari; generally avoids foraging in transformed habitats but occurs in some agricultural areas, incl croplands in fynbos and renosterveld of W Cape
<i>Falco peregrinus</i>	Peregrine Falcon	NT	LC	Resident birds mostly restricted to mountainous, riparian or coastal habitats, where high cliffs provide br and roosting sites; breeding pairs prefer habitats that favour specialised, high-speed, aerial hunting, e.g. high cliffs overlooking vegetation with raised and/or discontinuous canopy, or expanses of open water
<i>Glareola nordmanni</i>	Black-winged Pratincole	NT; NBM	NT	Open grassland, edges of pans and cultivated fields, but most common in seasonally wet grasslands and pan systems
<i>Gorsachius leuconotus</i>	White-backed Night-Heron	VU	LC	Clear and slow-flowing perennial rivers and streams with overhanging vegetation, in woodland and forest. Sometimes along vegetated watercourses in open country. Also lakes, dams and marshes with overhanging vegetation, mangrove swamps and, occasionally, reedbeds
<i>Gyps coprotheres</i>	Cape Vulture	VU; En	VU	Wide habitat range; cliffs
<i>Hieraaetus ayresii</i>	Ayres's Hawk-Eagle	NT	LC	Dense woodland and forest edge, often in hilly country ^{6,15,18,26} . In Zimbabwe, frequently in treed suburbia outside br season ^{15,20} . Often roosts in Eucalyptus stands ¹⁰
<i>Hydroprogne caspia</i>	Caspian Tern	NT	LC	Along coast, mostly in sheltered bays and estuaries; inland, at large water bodies, both natural and man-made, with preference for saline pans and large impoundments

Scientific name	Common Name	Regional conservation	National Conservation	Habitat requirements
<i>Leptoptilos crumeniferus</i>	Marabou Stork	NT	LC	Both aquatic and terrestrial habitats, favouring open and semi-arid areas; largely absent from forest areas and true desert; common at wetlands, incl dams, pans and rivers, and in wildlife reserves and ranching areas
<i>Limosa limosa</i>	Black-tailed Godwit	Rare	0	A wide variety of habitats, even small highveld pans ¹⁹ . Primarily inland, favouring lake margins, marshes, swamps and irrigated lands where substratum soft enough to allow probing ¹⁶ . Also at coastal wetlands, incl estuaries, sheltered embayments ¹⁶ and saltpans ¹⁷ .
<i>Mirafra cheniana</i>	Melodious Lark	NT; En	NT	Grassland dominated by <i>Themeda triandra</i> ; avoids wet lowlands, favouring fairly short grassland (< 0.5 m), with open spaces between tussocks, at 550-1 750 m altitude, with annual rainfall 400-800 mm
<i>Mycteria ibis</i>	Yellow-billed Stork	NT; NBM	LC	Wetlands, incl alkaline and freshwater lakes, rivers, dams, pans, flood plains, marshes, flooded grassland and small pools or streams
<i>Oxyura maccoa</i>	Maccoa Duck	Rare	DD	Prefers permanent wetlands in open grassland and semi-arid country (incl fynbos, succulent Karoo, Nama Karoo) that support rich concentrations of benthic invertebrates. Breeding habitat usually contains stands of young, emergent vegetation, mainly rushes and sedges ⁴⁸ . In KwaZulu-Natal, br recorded only at farm dams ¹⁵ .
<i>Pelecanus onocrotalus</i>	Great White Pelican	NT	LC	Shallow lakes, flood plain pans, estuaries and dams; sheltered coastal bays and lagoons; roosts on dry land in open areas, usually on islands or peninsulas where access by terrestrial predators limited
<i>Pelecanus rufescens</i>	Pink-backed Pelican	VU	LC	Wide range of wetlands, incl lakes, dams and slow-flowing rivers, saline pools, lagoons, estuaries and sheltered bays
<i>Phoeniconaias minor</i>	Lesser Flamingo	NT	NT	Primarily open, eutrophic, shallow wetlands; breeds on saline lakes and saltpans
<i>Phoenicopterus roseus</i>	Greater Flamingo	NT	LC	Large, shallow, eutrophic wetlands, salt pans, saline lakes, coastal mudflats
<i>Podica senegalensis</i>	African Finfoot	VU	LC	Mostly quiet, wooded streams and rivers flanked by thick riparian vegetation and overhanging trees. Also dam verges, especially with sufficient overhanging vegetation and reed cover

Scientific name	Common Name	Regional conservation	National Conservation	Habitat requirements
<i>Polemaetus bellicosus</i>	Martial Eagle	VU	NT	Open woodland, arid and mesic savanna, forest edges
<i>Pterocles gutturalis</i>	Yellow-throated Sandgrouse	NT	#N/A	Inhabits short, open grassy plains, particularly on relatively moist, cotton-clay-like soils, usually near seasonal rivers or swamps, or on seasonal flood plains where pioneer plant communities provide an abundant source of food. Also, readily occupies fallow fields in cultivated areas and recently burnt ground ^{11,14,15,17} .
<i>Rostratula benghalensis</i>	Greater Painted-snipe	NT	LC	Waterside habitats with substantial cover
<i>Sagittarius serpentarius</i>	Secretarybird	VU	VU	Open grassland (< 0.5 m) with scattered trees, shrubland, open Acacia and bushwillow (<i>Combretum</i> spp) savanna; absent from dense woodland and rocky hills
<i>Tyto capensis</i>	African Grass-Owl	VU	LC	Treeless areas associated with damp substrata, mainly marshes and vleis. Favours patches of tall, rank grass, sedges or weeds. Also areas with dense ground cover in scattered thorn scrub, low fynbos and renosterveld, usually close to water and among thick stands of grass (<i>Stenotaphrum</i> sp) and sedge (<i>Juncus</i> sp)

APPENDIX E: REPTILE SPECIES RECORDED IN QDGC 2628AA AS WELL AS THEIR CONSERVATION STATUS, HABITAT REQUIREMENTS AND LIKELIHOOD OF OCCURRING IN THE STUDY AREA

CR = Critically Endangered; EN = Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern; En = Endemic; NBM = Non-breeding Migrant

Scientific Name	Common name	RSA	IUCN	Habitat requirements	Likelihood of occurring in study area
<i>Boaedon capensis</i>	Brown House Snake	NE	NE	Wide range of habitats and tolerant to human activities	High
<i>Lycodonomorphus inornatus</i>	House Snake	NE	NE	Limited to temperate parts of the subregion and occur in moist savanna, lowland forest, grassland and fynbos	High
<i>Trachylepis capensis</i>	Cape Skink	NE	NE	Habitat generalist	High
<i>Agama aculeate distanti</i>	Ground Agama	LC	NE	Semi-desert and sanded savanna	Low
<i>Agama atra</i>	Southern Rock Agama	NE	NE	Lives in colonies on rocky outcrops throughout SA except in sandy areas in the Northern Cape, some parts of Gauteng, Mpumalanga and KwaZulu-Natal	Low
<i>Aparallactus capensis</i>	Black-headed Centipede-eater	NE	NE	Varied, highveld, montane grassland, savanna and coastal bush	Low
<i>Homoroselaps dorsalis</i>	Quill-snouted Snakes	NE	NE	Restricted to sandy substrates in the northern half of southern Africa, have patchy distribution	Low
<i>Chamaeleo dilepis dilepis</i>	Common Flap-neck Chameleon	NE	NE	Prefers savanna	Low
<i>Crotaphopeltis hotamboeia</i>	Herald Snake	NE	NE	Savanna and open woodland	Low
<i>Dasypeltis scabra</i>	Rhombic Egg-eater	NE	LC	Absent only from closed canopy and desert areas	Low
<i>Duberria lutrix</i>	Common Slug-eater	NE	NE	Savanna, coastal bush and fynbos	Low
<i>Gonionotophis capensis capensis</i>	File Snake	NE	NE	Occurs in lowland forests and moist savanna in the eastern half of southern africa	Low
<i>Lamprophis aurora</i>	Aurora House Snake	NE	NE	Restricted to the southern and eastern parts of South Africa	Low
<i>Lycodonomorphus rufulus</i>	Common Water Snake	NE	NE	Small streams, pans and vleis	Low

Scientific Name	Common name	RSA	IUCN	Habitat requirements	Likelihood of occurring in study area
<i>Lycophidion capense capense</i>	Common Wolf Snake	LC	NE	Variety of habitats including lowland forest, fynbos, moist savanna, grassland and karoo scrub	Low
<i>Philothamnus hoplogaster</i>	Green Water Snake	NE	NE	Varied, coastal bush, fynbos, arid and mesic savanna	Low
<i>Psammophis crucifer</i>	Crossed Whip Snake	NE	NE	Highveld and montane grassland, entering fynbos	Low
<i>Pseudaspis cana</i>	Mole Snake	NE	NE	Sandy scrubland in SW Cape, highveld grassland, mountainous and desert areas	Low
<i>Chamaesaura aenea</i>	Grass Lizards	NE	NE	Very habitat specific and restricted to montane and highveld grassland and fynbos on rocky hillsides. Limited to the eastern and southern parts of Africa	Low
<i>Cordylus vittifer</i>	Common Girdled Lizard	NE	NE	Lives in cracks on small rocky outcrops	Low
<i>Aspidelaps scutatus scutatus</i>	Shield Cobra	NE	NE	Occurs in sandy and stony regions in the Northwest, Limpopo, northern Gauteng and Mpumalanga	Low
<i>Hemachatus haemachatus</i>	Rinkhals	NE	LC; En	Grassland	Low
<i>Naja mossambica</i>	Mozambique Spitting Cobra	NE	NE	Savanna, cleared areas in former forest	Low
<i>Lygodactylus capensis</i>	Common Dwarf Gecko	NE	NE	Prefers well wooded savanna	Low
<i>Pachydactylus affinis</i>	Transvaal Gecko	NE	NE	Rocky outcrops and termite mounds in grassland	Low
<i>Pachydactylus capensis</i>	Cape Gecko	LC	NE	Varied, karroid veld, grassland	Low
<i>Gerrhosaurus flavigularis</i>	Yellow-throated Plated Lizard	NE	NE	Varied, montane and highveld grassland, savanna, bushveld and coastal forest	Low
<i>Nucras lalandii</i>	Delalande's Sandveld Lizard	NE	En	Montane and temperate grassland	Low
<i>Acontias gracilicauda</i>	Burrowing Skink	NE	NE	Distribution linked to soil type, need sandy substrates. Absent from eastern Free State, south and western KZN and central North West	Low
<i>Afroablepharus wahlbergii</i>	Snake-eyed Skinks	NE	NE	Restricted to the northern and eastern parts of southern Africa (Limpopo)	Low
<i>Trachylepis punctatissima</i>	Speckled Rock Skink	NE	NE	Prefers rocky areas	Low
<i>Afrotyphlops bibronii</i>	Typical Blind Snake	NE	NE	Found mainly in the eastern half of southern Africa	Low

Scientific Name	Common name	RSA	IUCN	Habitat requirements	Likelihood of occurring in study area
<i>Varanus niloticus</i>	Water Monitor	NE	NE	Rivers, pans and major lakes	Low
<i>Bitis arietans arietans</i>	Puff Adder	NE	NE	Absent only from desert, dense forest and mountain tops	Low
<i>Causus rhombeatus</i>	Rhombic Night Adder	NE	NE	Mesic savanna	Low
<i>Amblyodipsas polylepis polylepis</i>	Common Purple-glossed Snake	NE	NE	Savannas	Medium
<i>Atractaspis bibronii</i>	Southern Stiletto Snake	NE	NE	Varied, highveld grassland and semi- desert to coastal bush	Medium
<i>Homoroselaps lacteus</i>	Spotted Harlequin Snake	NT	LC; En	Fynbos, costal forest, moist savanna and grassland	Medium
<i>Prosymna sundevallii</i>	Shovel-snouts	NE	NE	Widely distributed over much of southern Africa	Medium
<i>Psammophis brevirostris</i>	Short-snouted Grass Snake	NE	NE	Habitat generalist, widespread and common throughout SA	Medium
<i>Psammophis subtaeniatus</i>	Western Stripe-bellied Sand Snake	NE	NE	Distributed widely over most of southern Africa and are common in a variety of habitats including grassland, savanna, bushveld and succulent karoo	Medium
<i>Psammophylax rhombeatus rhombeatus</i>	Spotted Skaapsteker	NE	NE	Highveld grassland, mesic thicket, fynbos, karroid areas	Medium
<i>Psammophylax tritaeniatus</i>	Striped Skaapsteker	LC	LC	Open grassland and savanna	Medium
<i>Elapsoidea sundevallii media</i>	Highveld Garter Snake	NE	NE	Eastern parts of southern Africa from Mozambique to the Eastern Capre Province	Medium
<i>Leptotyphlops scutifrons conjunctus</i>	Peter's Worm Snake	NE	NE	Varied, grassland, coastal bush, mesic and arid savanna	Medium
<i>Leptotyphlops scutifrons</i>	Peter's Worm Snake	NE	NE	Varied, grassland, coastal bush, mesic and arid savanna	Medium
<i>Trachylepis varia</i>	Variable Skink	LC	NE	Varied, grassland to arid and mesic savanna	Medium

APPENDIX E: AMPHIBIAN SPECIES RECORDED IN QDGC 2628AA AS WELL AS THEIR CONSERVATION STATUS AND HABITAT REQUIREMENTS

CR = Critically Endangered; EN = Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern; En = Endemic;

Scientific name	Common name	RSA	IUCN	Preferred habitat
<i>Amietophrynus gutturalis</i>	Guttural Toad	LC	LC	Around open pools, dams, vleis and other semi-permanent bodies of water in grassland, thicket and savanna; suburban gardens and farmland
<i>Amietophrynus rangeri</i>	Raucous Toad	LC	LC	Rivers and streams in grassland and fynbos; frequently in gardens and farmland
<i>Schismaderma carens</i>	Red Toad	LC	LC	Widespread in savanna and woodland, readily adapts to human habitation
<i>Kassina senegalensis</i>	Bubbling Kassina	LC	LC	Grassland around vleis and pans; breeds in temporary and permanent water bodies including vleis, marshes, pans, ponds and dams
<i>Phrynobatrachus natalensis</i>	Snoring Puddle Frog	LC	LC	Margins of permanent and temporary water bodies including shallow marshes, lakes, rivers, streams and pools; also semi-desert scrub, arid and humid savanna, agricultural land and forest clearings
<i>Xenopus laevis</i>	Common Platanna	LC	LC	Restricted to aquatic habitats but opportunistic and can be found in any form of wetland
<i>Amietia angolensis</i>	Common River Frog	LC	LC	Banks of slow-moving streams or other permanent bodies of water in a wide variety of wetland habitats in grassland, savanna and forest edge

Scientific name	Common name	RSA	IUCN	Preferred habitat
<i>Amietia fuscigula</i>	Cape River Frog	LC	LC	Widespread around permanent rivers and streams in grassland, fynbos and Karoo scrub including farm dams and other artificial water bodies
<i>Cacosternum boettgeri</i>	Boettger's Caco	LC	LC	Variety of habitats in Nama Karoo, succulent Karoo, grassland and thicket favouring open areas and especially abundant in grassland areas; occasionally forest clearings
<i>Pyxicephalus adspersus</i>	Giant Bullfrog	LC; Pr	LC	Fossorial, breeding in seasonal, shallow, grassy pans, vleis and other rain-filled depressions in open, flat areas of grassland or savanna; Nama Karoo and thicket at the limits of its range
<i>Strongylopus fasciatus</i>	Striped Stream Frog	LC	LC	Open, grassy areas near dams, ponds or streams in forest, thicket, grassland and savanna, sometimes parks and gardens
<i>Tomopterna cryptotis</i>	Tremelo Sand Frog	LC	LC	Variety of habitats in savanna and grassland
<i>Tomopterna natalensis</i>	Natal Sand Frog	LC	LC	Variety of habitats in savanna and grassland; breeds in shallow permanent furrows, canals or streams in grassland and agricultural land