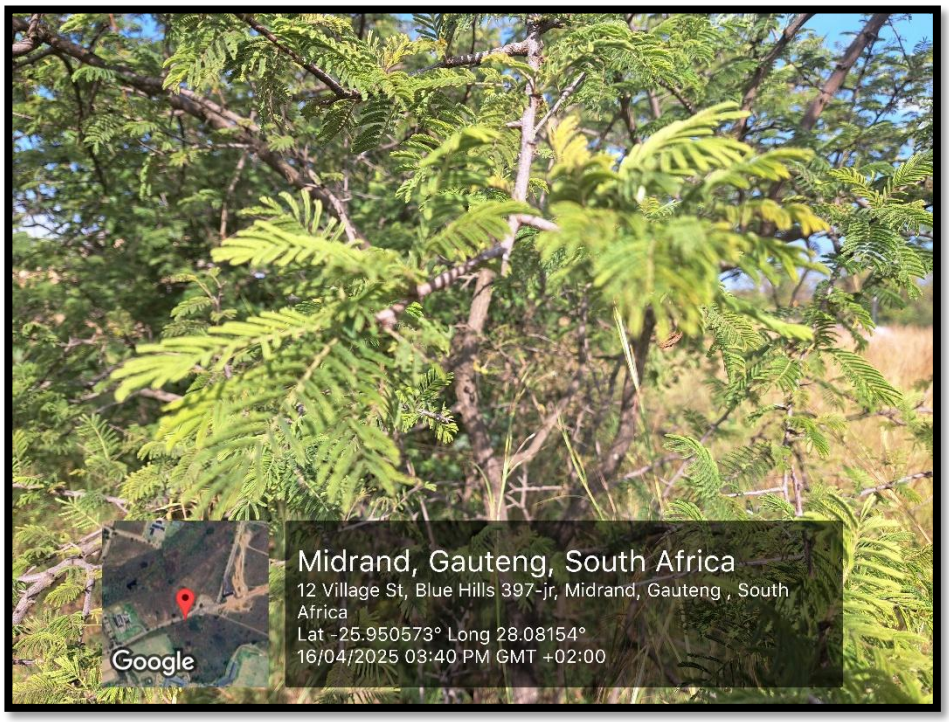
ECOLOGICAL SPEACIALIST REPORT

THOMATREE FAMILY
The Last Standing Tree

ECOLOGICAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED DEVELOPMENT OF A HOUSING PROJECT BY INGOGENIX PROPRIETY LIMITED SITUATED ON PORTION 23 OF THE FARM NEWLANDS 757-J.R. LOCATED IN MIDRAND WITHIN THE CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY.



Prepared by: ThomaTree Family (Pty)Ltd

Author: Khantshi N (SACNASP Reg. no. 122250)

DATE: 29 April 2025

Prepared by:
ThomaTree Family (PTY) LTD
76 Kempton Road, Unit 11 Legae Complex Kempton Park 1619 **South Africa**
Phone: +27 79 681 0419
thomatree@gmail.com

Prepared for:

Tshikovha Climate Change and Sustainability Advisory Firm (Pty) Ltd

Details of EAP

Thindeka Sibanda
thindeka@climateadvocates.co.za
076 972 8662

	Contact details : Khantshi Ndivhuho Mobile: +27 79 681 0419 Khantshin@thomatree.co.za
Prepared by:	Khantshi Ndivhuho
Date:	29 April 2025

DECLARATION OF INDEPENDENCE

I, Khantshi Ndivhuho, declare that I:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Khantshi Ndivhuho (SACNASP 122250)

29/ 04 / 2025

PRIMARY AUTHOR SPECIALIST INFORMATION

Khantshi Ndivhuho of ThomaTree Family hold an Honours Degree in Environmental Science from the University of Venda, he has experience in biodiversity assessment & management, and ecological research. He is a registered professional for Land Rehabilitation Society of South Africa and South African Council for Natural Scientist Professions **122250**.

DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Name of organization	Tshikovha Climate Change and Sustainability Advisory Firm (Pty) Ltd
Contact Person	Thindeka Sibanda
Contact Details	thindeka@climateadvocates.co.za 076 972 8662

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLE

ABBREVIATIONS

BGIS	Biodiversity Geographical Information System
CARA	Conservation of Agricultural Resources
CBA	Critical Biodiversity Area
CR	Critically Endangered
DEA	Department of Environmental Affairs
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EN	Endangered
ESA	Ecological support area
MM	Millimetres
NEMA	National Environmental Management Act, 107 of 1998
NEMBA	National Environmental Management Biodiversity Act, 10 of 2004
ONA	Other Natural Area
PA	Protected Area
PRECIS	Pretoria Computerised Information System
QDGC	Quarter Degree Grid Cell
SANBI	South African National Biodiversity Institute
SARCA	Southern African Reptile Conservation Assessment
SFSD	Strategic Framework for Sustainable Development
VM	Virtual Museum
VU	Vulnerable
Ha	Hectare
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
MSDF	Municipal Spatial Development Framework
NWA	National Water Act (Act 36 of 1998)
OHS	Occupational Health and Safety Act (Act 85 of 1998)
RSA	Republic of South Africa
SDF	Spatial Development Framework

TERM	DEFINITION
Alien species	Taxa in a given area, whose presence there, is due to the intentional or accidental introduction as a result of human activity.
Avifauna	The birds of a particular region, habitat, or geological period.
Azonal	Water-logged and salt-laden habitats require specially adapted plants to survive in these habitats. Consequently, the vegetation deviates from the typical surrounding zonal vegetation and are considered to be of azonal character (Mucina and Rutherford, 2006).
Biodiversity	Biodiversity is the variability among living organisms from all sources including inter alia 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.
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	Species of conservation concern are those species 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 provincially protected 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.
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 *et al.*, 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.
Ecosystem	Organisms together with their abiotic environment, forming an interacting system, inhabiting an identifiable space.
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.
Endemic	Naturally only found in a particular and usually restricted geographic area or region.

Exotic species	Taxa in a given area, whose presence there, is due to the intentional or accidental introduction as a result of human activity.
Fauna	The animals of a particular region, habitat, or geological period.

Flora	Flora is the plant life occurring in a particular region or time, generally the naturally occurring or indigenous—native plant life
Forb	A herbaceous plant other than grasses.
Habitat	Type of environment in which plants and animals live.
Herpetofauna	The reptiles and amphibians of a particular region, habitat, or geological period.
Indigenous	Any species which occurs naturally in South Africa.
In situ	"In the place" In Situ conservation refers to on-site conservation of a plant species where it occurs. It is the process of protecting an endangered plant or animal species in its natural habitat. The plant(s) are not removed but conserved as they are. Removal and relocation could kill the plant and therefore in situ conservation is preferred/ enforced.
Invasive species	Naturalised alien species that have the ability to reproduce, often in large numbers. Aggressive invaders can spread and invade large areas.
Mammals	A warm-blooded vertebrate animal of a class that is distinguished by the possession of hair or fur, females that secrete milk for the nourishment of the young, and (typically) the birth of live young.
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 *et al.*, 2009).

Plant community	A collection of plant species within a designated geographical unit, which forms a relatively uniform patch, distinguishable from neighboring patches of different vegetation types. The components of each plant community are influenced by soil type, topography, climate and human disturbance. In many cases there are several soil types within a given plant community (Gobbat *et al.*, 2004).
Protected Plant	According to Provincial Nature Conservation Ordinances or Acts, 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. Red data plants *now termed Plants of Conservation Concern.*
Reptile	A vertebrate animal of a class that includes snakes, lizards, crocodiles, turtles, and tortoises. They are distinguished by having a dry scaly skin and typically laying soft-shelled eggs on land.
Species diversity	A measure of the number and relative abundance of species.
Species richness	The number of species in an area or habitat.
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 *et al.,* 2009)
Transformation	The removal or radical disturbance of natural vegetation, for example by crop agriculture, plantation forestry, mining or urban development. Transformation mostly results in a serious and permanent loss of biodiversity and fragmentation of ecosystems, which in turn lead to the failure of ecological processes. Remnants of biodiversity may survive in transformed landscapes.

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".
Vulnerable	A taxon is Vulnerable when it is not Critically Endangered or Endangered but meets any of the five IUCN criteria for Vulnerable and are therefore facing a high risk of extinction in the wild in the future (Raimondo *et al.*, 2009)

1. INTRODUCTION

1.1. Background

ThomaTree Family was appointed by Tshikovha Climate Change and Sustainability Advisory Firm (Pty) Ltd to conduct Ecological Impact Assessment for the proposed development of a housing project by Ingogenix propriety limited situated on portion 23 of the farm Newlands 757-J.R. Located in Midrand within the city of Johannesburg Metropolitan Municipality.

Terrestrial Survey was conducted, primarily focussed on the project area footprint. Furthermore, the identification and description of any sensitive receptors were recorded across the project area, and the manner in which these sensitive receptors may be affected by the activity were also studied.

This report, should inform and guide the Environmental Assessment Practitioner (EAP), enabling informed decision making as to the ecological viability of the proposed development.

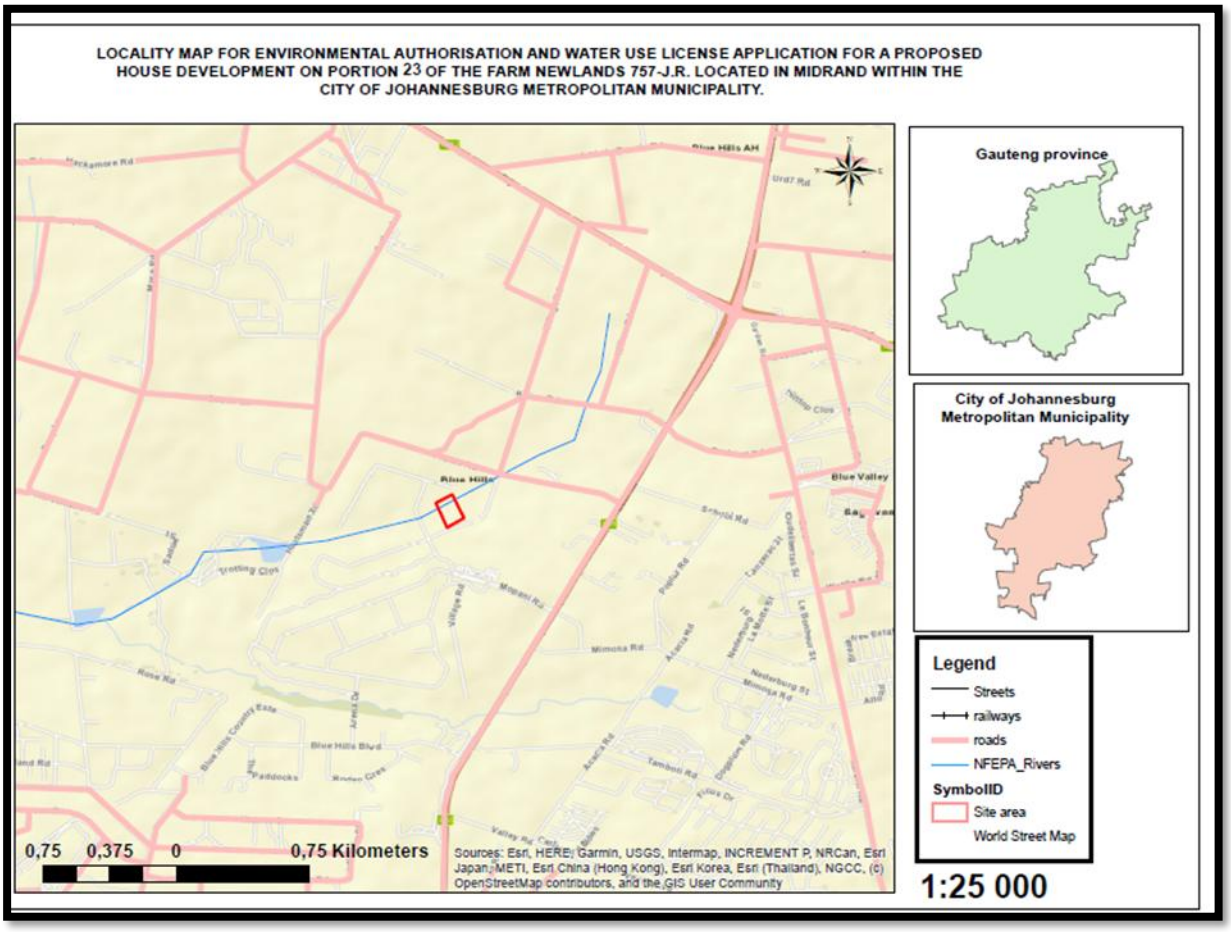


Figure 1:Locality Map

1.2. Terms of reference

The terms of reference for this study are limited to a Terrestrial Biodiversity Assessment with the following objectives:

- Investigation of the Ecological sensitivity of the proposed area
- Site Vegetation Classification Mapping.
- Determination of potential Ecological Impacts and Assessment, and
- Desktop Study Report showing comprehensive Desktop investigation of the site.

1.3. Specialist Report Requirements

With reference to Appendix 6 of the EIA regulations as amended (2017) as amended. The specialist declaration is included on this report and details of the specialists are included above.

2. KEY LEGISLATIVE REQUIREMENTS

The legislation, policies and guidelines listed below are. applicable to the current project in terms of biodiversity and ecological support systems. The list below, although extensive, may not be exhaustive and other legislation, policies and guidelines may apply in addition to those listed below.

Explanation of certain documents, organisations or legislation is provided (below Table 1) where these have a high degree of relevance to the project and/or are referred to in this assessment.

Table 1: List of key legislative requirements relevant to biodiversity & Limpopo conservation plan.

Legislation/Policy	Description
The Convention of Biological Diversity (Rio de Janeiro, 1992).	The purpose of the Convention on Biological Diversity is to conserve the variability among living organisms, at all levels (including diversity between species, within species and of ecosystems). Primary objectives include (i) conserving biological diversity, (ii) using biological diversity in a sustainable manner and (iii) sharing the benefits of biological diversity fairly and equitably.

South African Constitution 108 of 1996	The Constitution is the supreme law of the land and includes the Bill of rights which is the cornerstone of democracy in South Africa and enshrines the rights of people in the country. It includes the right to an environment which is not harmful to human health or well-being and to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures.
Strategic Framework for	The development of a broad framework for sustainable development was initiated to provide an overarching
Sustainable Development in South Africa	and guiding National Sustainable Development Strategy. The Draft Strategic Framework for Sustainable Development (SFSD) in South Africa (September 2006) is a goal orientated policy framework aimed at meeting the Millennium Development Goals. Biodiversity has been identified as one of the key crosscutting trends in the SFSD. The lack of sustainable practices in managing natural resources, climate change effects, loss of habitat and poor land management practices were raised as the main threats to biodiversity.

National Environmental Management Act 107 of 1998	This is a fundamentally important piece of legislation and effectively promotes sustainable development and entrenches principles such as the 'precautionary approach', 'polluter pays' principle, and requires responsibility for impacts to be taken throughout the life cycle of a project NEMA provides the legislative backing (Including Impact Assessment Regulations) for regulating development and ensuring that a risk-averse and cautious approach is taken when making decisions about activities.

Environmental Impact Assessment (EIA) regulations	New regulations have been promulgated in terms of Chapter 5 of NEMA and were published on 07 April 2017 in Government Notice No. R. 326. Development and land use activities which require Environmental Authorisation in terms of the NEMA EIA Regulations, 2017, are in Listing Notice 2 R 984 Activity 16: "The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan"
National Environmental Management: Biodiversity Act No 10 of 2004	The Biodiversity Act provides listing threatened or protected ecosystems, in one of four categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Protected (Government Gazette,
	2011). The main purpose of listing threatened ecosystems is to reduce the rate of ecosystem and species extinction and includes the prevention of further degradation and loss of structure, function and composition of threatened ecosystems.
Conservation of Agricultural Resources Act 43 of 1967	The intention of this Act is to control the over-utilization of South Africa's natural agricultural resources, and to promote the conservation of soil and water resources and natural vegetation. The CARA has categorised a large number of invasive plants together with associated obligations of the land owner, including the requirement to remove categorised invasive plants and taking measures to prevent further spread of alien plants.
National Forest Act 84 of 1998	The protection, sustainable management and use of forests and trees within South Africa are provided for under the National Forests Act (Act 84 of 1998).

National Environmental Management: Protected Areas Act 57 of 2003	This Act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. It also seeks to provide for the sustainable utilization of protected areas and to promote participation of local communities in the management of protected areas.
United Nations Convention to Combat Desertification	South Africa has responded to the UN Convention to Combat Desertification by developing a National Action Plan. The aim of the NAP is to implement at current and future policies that affect natural resource management and rural development, and establish partnerships between government departments, overseas development agencies, the sector and NGOs

2.1. National Level

- Constitution of the Republic of South Africa (Act 108 of 1996). The Bill of Rights, in the Constitution of South Africa states that everyone has a right to a nonthreatening environment and requires that reasonable measures be applied to protect the environment. This protection encompasses preventing pollution and promoting conservation and environmentally sustainable development.
- The National Environmental Management: Biodiversity Act (NEM:BA) No. 10 of 2004: specifically, the management and conservation of biological diversity within the RSA and of the components of such biological diversity;
- National Forests Act, 1998 (Act 84 of 1998), specifically with reference to Protected Tree species;
- National Biodiversity Assessment (NBA): The National Biodiversity Assessment (NBA) was completed as a collaboration between the South African National Biodiversity Institute (SANBI), the Department of Environmental Affairs (DEA) and other stakeholders, including scientists and biodiversity management experts throughout the country over a three-year period (Driver at al., 2012). The purpose of the NBA is to assess the state of South Africa's biodiversity with a view to understanding trends over time and informing policy and decision making across a range of sectors (Driver at al., 2012).

2.2. Provincial and Municipal Level

In addition to national legislation, South Africa's nine provinces have their own provincial biodiversity legislation, as nature conservation is a concurrent function of national and provincial government in terms of the Constitution (Act 108 of 1996).

2.2.1. Gauteng Conservation Plan

Gauteng is the smallest of South Africa's nine provinces and is generally regarded as the economic powerhouse of South Africa. It is the most densely populated province in the country with the highest population growth rate and the demand for urban land in this rapidly urbanising province is therefore high

Despite its small size (approximately 18 178 km²), Gauteng is rich in biodiversity. The province is situated within both the savanna and grassland biomes, with approximately 80% of its area designated as Highveld Grassland, one of the two richest primary grasslands in the world, that is also particularly poorly conserved (< 2% protected) (Low & Rebelo 1996; Mucina & Rutherford 2006). An estimated 2183 plant taxa (SANBI 2013), 125 mammal species (Low & Rebelo 1996), 488 bird species (South African Bird Atlas Project 2), 21 amphibian species (Whittington-Jones et al. 2009) and 92 reptile species (Whittington-Jones et al. 2008) occur in Gauteng. At least 11 taxa are endemic to the province.

3. LIMITATIONS AND ASSUMPTION

The following limitations should be noted for the assessment:

- Due to the nature of most biophysical studies, it is not possible to cover every square metre of a given study site. Due to factors such as thick grass swards or vegetation stands, must be stated that due to thick undergrowth and limitations to a study of this nature, it is conceivable that a small individual red-listed, orange listed or protected plants may have been overlooked.
- Detailed Braun-Blanquet plots were not surveyed; rather, species observed were recorded in each vegetation unit using a rapid visual assessment of presence/absence of species.
- Results are based on short term research of both fauna and flora species as by request from the client was to conduct the survey as soon as possible and therefore cannot be a true reflection of the full ecological status of the site;
- All species included in the fauna species was augmented with those that are likely to occur in the area based on their distribution and habitat preferences. This represents sufficient conservative and cautions approach which takes the study limitations into account;
- Any comments or observations made in this regard are based on observations, literature review, the expert knowledge and relevant professional experience of the specialist; and

- ThomaTree Family reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

4.1. Location

The proposed development is situated within the Jurisdiction of the City of Johannesburg Metropolitan Municipality in Midrand Gauteng Province. The proposed site lies in the Blue Hills Equestrian Estate, near the R55 in Midrand. The area is zoned for residential housing making it suitable for this type of development. The footprint of the site is 50 hectares; however, the house development will cover 1,1754 ha. The residential project aims to build a house with a total floor area of 1,643 square meters on a plot that is currently undeveloped. The coordinates of the site are: 250 32'02''S & 280 4' 32''E

4.2. Climatic Conditions

The proposed location has the climatic conditions that are categorized as mild and moderate. In Midrand, the quantity of rainfall during summers surpasses that of winters. According to Koppen and Geiger, this climate is classified as Cwb. The mean yearly temperature recorded in Midrand is 16.6˚C as per available data. Annually, approximately 678mm of precipitation descends.

5. METHODS

5.1 Field survey

A field survey was performed in 16 April 2024 by a specialist ecologist where the Ecological aspects of the survey area were evaluated. The timing of the study represented early wet-season conditions which was optimal. During the field survey, the proposed development site was covered on foot and within vehicles and a series of georeferenced photographs were taken of the habitat attributes that would serve to drive the results and conclusions. The field survey focused on a classification of the flora, vegetation structure and position in the landscape as well as the actual and potential presence of Red Data species (also referred to as Red-Listed species), which are species of conservation concern in South African (either classified as threatened, protected by NEMBA (Republic of South Africa 2004) or other legislations applicable provincially or nationally).

The SANBI red list database (www.redlist.sanbi.org, accessed April 2024) was accessed to evaluate the conservation status of species, and cross-checked with a list of red data species in Gauteng obtained from GDARD. An analysis of the diversity and ecological integrity of the habitats present on site was also performed as well as

the boundaries of wetland and riparian areas, determined by the presence of a suite of species associated with moist soils or wetland habitats. The boundaries of the wetlands were marked by GPS and mapped, supplemented by delineation of wetland boundaries using colour aerial imagery.

5.1.1 Floral community structures & general site survey.

A site survey was undertaken during April 2024 to determine the ecological status of the proposed development and the surrounding area. A reconnaissance „walkabout" was initially undertaken to determine the general habitat types found throughout the study area and, following this, specific study sites were chosen that were representative of the habitats found within the area - special emphasis was placed on potential areas that may support RDL species.

5.1.2 Vegetation surveys.

Vegetation surveys were undertaken by first identifying different vegetation units and then analysing the floral species communities and composition. Thorough site searches within these designated survey areas were undertaken to identify any protected species or the potential occurrence of any protected species. This site was investigated to also identify the occurrence of the *dominant* plant communities, species and habitat diversities and present ecological condition.

The site of the proposed area was classified as falling entirely within the Egoli Granite Grassland vegetation unit, dominated by a dense stand of the small tree Acacia caffra Woodland. Other tree, shrubs and grass species present on site was: -

- Schoenoplectus corymbosus–
- Eragrostis lehmanniana–
- Elephantorrhiza elephantina–
- Stoebe vulgaris.
- Ziziphus zeyheriana
- Hyparrhenia hirta Grass.
- Acacia caffra Woodland.
- Berkheya radula Wetland.
- Southern Cattail.

5.2 Desktop survey

5.2.1 Literature study

As mentioned above, much of the approach for this survey is based upon the National Requirements for Biodiversity Assessments. The 2014 GDARD Regulations were used to guide the study. The level of this study does not warrant intensive sampling but rather serves to combine the aspects of the regional vegetation unit (obtained from Mucina and Rutherford 2006) with the field study in order to formulate a series of conclusions and any subsequent recommendations. The guidelines for delineation of wetlands and riparian areas (DWAF 2008) was used to guide the

wetland delineation, as well as habitat descriptions of species obtained from field guides (Chippendall 1955, Letty 1962, Tainton et al. 1976, Onderstall 1984, Pooley 1993, 1998, Bromilow 1995, B van Wyk and van Wyk 1997, Braam van Wyk 2000, Henderson 2001, van Oudtshoorn 2006, Kirbie 2013) and the SANBI redlist website. It must be stated that evaluation of species of concern was considered only AFTER the field study which served to identify the potential for occurrence. Therefore, all species identified under the above-mentioned references were not necessarily analysed in detail. Species nomenclature was updated to reflect the revisions on the Plants of South Africa database (POSA, www.posa.sanbi.org). The applicability of the information obtained from the literature sources was evaluated for the study area and the subsequent recommendations are to be used by the client in order to drive the development process in accordance with the relevant legislation. The Gauteng Conservation plan (C-plan V3.3) was used to initially evaluate ecologically sensitive areas. Ground truthing and the use of recent satellite imagery were used to assist in the characterisation of the study area. In addition, a historical overview of the site was generated for the purposes of comparison with the field study taken place in 2022, in order to provide a comparative baseline to the current ecological status of the study area.

5.3. Purpose and Scope

The standard impact assessment methodology may be used in the capture of generic anticipated impacts and potential mitigation measures for Environmental Impact Report (EIR). The methodology described herein complies with the requirements of the EIA Regulations as amended (07 April 2017), promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

6. RESULTS

6.1 DESCRIPTION OF STUDY AREA

The georeferenced photographs served to assist in both the site characterisation as well as the sensitivity analysis. The specialist coverage was considered to be excellent, considering the small size of the site. All areas of the site were clearly visible.

The study area was classified as falling entirely within the Egoli Granite Grassland vegetation unit, the attributes being listed in Table 2. The vegetation unit has been classified as Endangered due to the high levels of fragmentation as well as low protection levels (Mucina & Rutherford 2006). It is not resilient to high levels of disturbance and continues to come under severe pressure from the expansion of high-density development.

Conservation planning in Gauteng is accomplished through a spatial decision-support tool, C-Plan v3.3. Under C-Plan, certain categories of land important for conservation are mapped across the province, based on a range of spatial data.

(GDARD 2011). The categories of land important to conservation are Ecological Support areas and Critical Biodiveirsty Areas, described below.

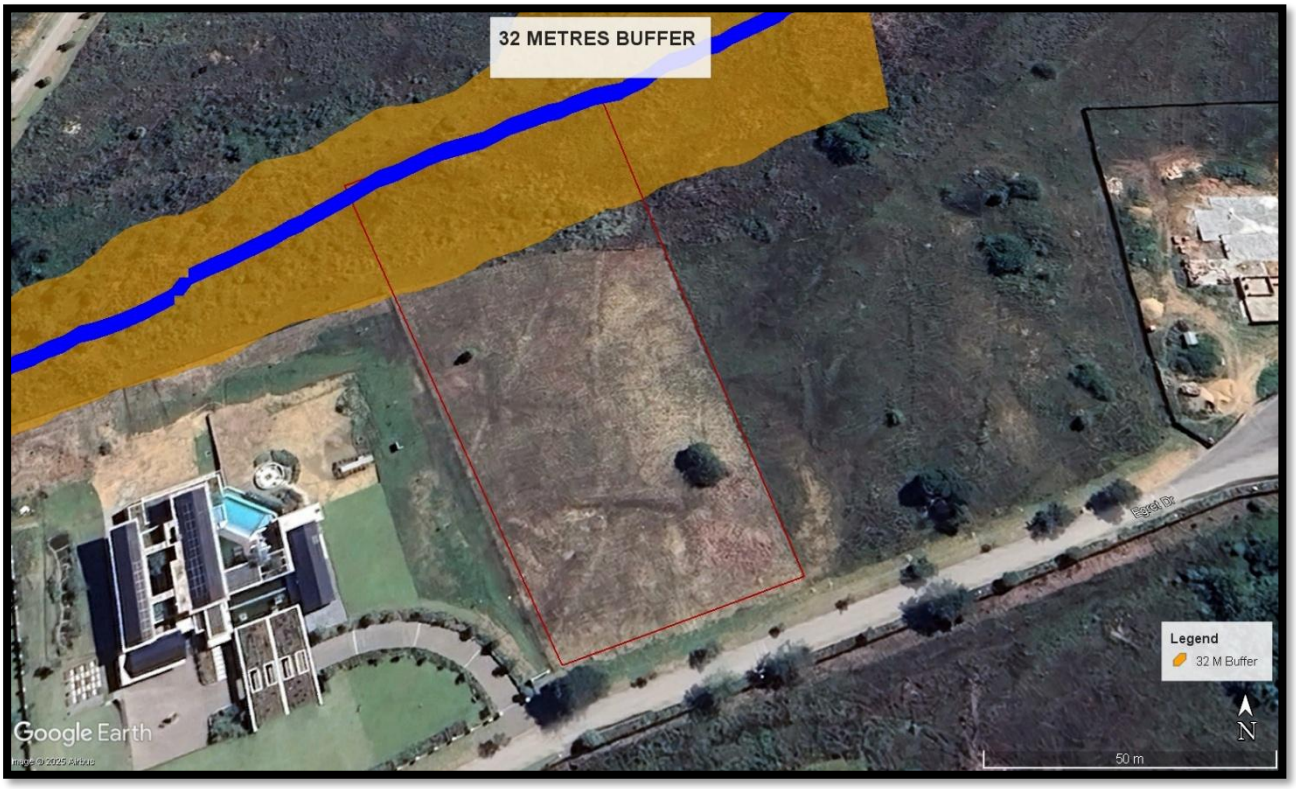


Figure 2: Proposed 32 metres buffer zone within the proposed site.

Table 2: Attributes of the Egoli Granite Grassland

Name of vegetation type	Egoli Granite Grassland
Code	Gm 10
Conservation Target (percent of area) from NSBA	24%
Protected (percent of area) from NSBA	2.5% (+0.8%)
Remaining (percent of area) from NSBA	31.8%
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	1093.19
Name of the Biome	Grassland Biome
Name of Bioregion	Mesic Highveld Grassland Bioregion
Red/Orange listed plants	Alepidea attenuata Cineraria longipes

	Crinum bulbispermum Crinum macowanii Eucomis autumnalis Gnaphalium nelsonii Gunnera perpensa Hypoxis hemerocallidea Ilex mitis var. mitis Kniphofia typhoides Lepidium mossii Nerine gracilis Pearsonia bracteata
Proportion protected	~2% including the recently declared Crocodile River Reserve

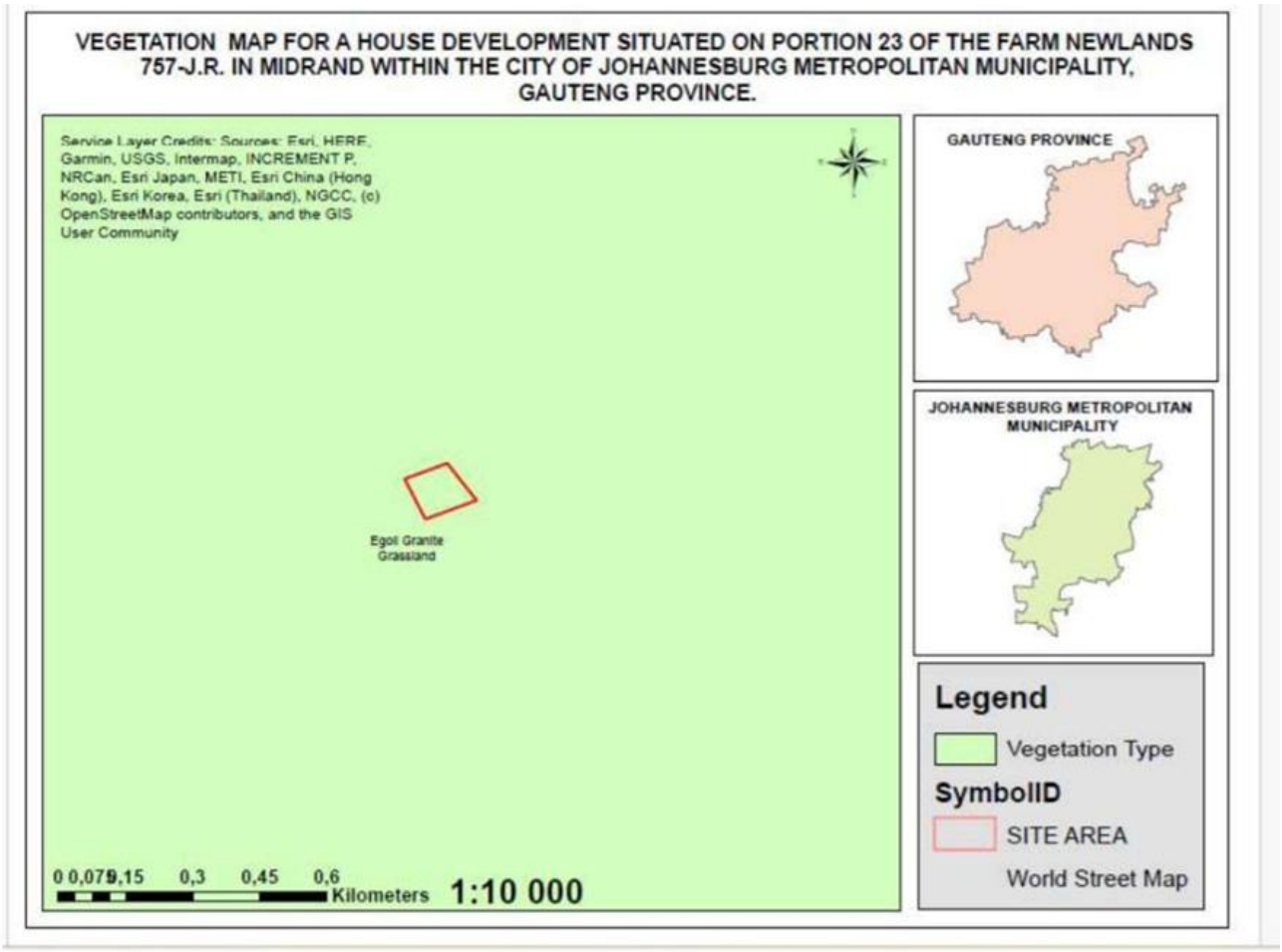


Figure 3: Vegetation Classification Map

6.2 VEGETATION CLASS: Egoli Granite Grassland Gm 10

The vegetation type found on the adjacent site represents characteristics of Egoli Granite Grassland vegetation unit (SVcb9, Mucina & Rutherford 2009). This is representative of the vegetation that was present on the Holding 4 Sonnedal AH, Cosmo City Ext 56 within the jurisdiction of the City of Johannesburg Metropolitan Municipality Gauteng Province. This richness in plant species and plant communities offers habitat for a variety of fauna and consequently resulting in high flora and fauna (biodiversity) richness, therefore leading to high conservation value. The construction site have been recognized and identified as Critical Biodiversity Area and a watercourse on site, implying great conservation need in this vegetation Part of Randjesfontein farm, is located in one of these threatened ecosystems, namely the Critical Biodiversity Area 2 and is Identified as CBA 2, By Cities' Geographic Information System.

This vegetation type consisted of a short sward of Egoli granite grassland species, typical of disturbed areas, and formed the whole proportion of the development site. Soils were shallow, and the sites fell largely into crest and midslope positions in the landscape. It is characterised by low basal cover, and dominated by grasses such as *Eragrostis curvula*, *E. chloromelas*, *E. racemosa*, *Hyparrhenia hirta Cynodon dactylon*, *Paspalum* spp, and *Melanis repens*, all characteristic of shallow soils and disturbance (Figure 3). Soil cover was low with soil movement evident in the form of deposits of sand in micro-depressions.

Forbs are similarly dominated by pioneer species, with some remnants of grassland flora, including *Vernonia oligilocephala*, *Felicia* sp., and large stands of the encroacher shrub *Stoebe plumosa* (formerly *Serephium plumosum* - bankruptbush). *Campinoclinium macrocephalum* (pompom weed), a category 1 invader under the conservation of agricultural resources act (CARA) is present at high densities in the lower-lying areas of the grassland, with individuals scattered throughout the grassland.

The Declining species *Hypoxis hemerocallidea* is present in fairly high densities throughout the grassland. Several other species of *Hypoxis*, notable *Hypoxis iridifolia,* were also observed.

6.3. Vegetation & Habitats

Floral diversity was determined by desktop study of different habitats within the physiographic zones represented in the study area (Deal et al. 1989). In order to attain scientifically reliable results, obviously distinct vegetation communities were searched from different literatures. The vegetation units of Mucina & Rutherford (2006) are used as reference but where necessary communities are named according to a unit's diagnostic floral feature and/or topographical setting or other biophysical features (or a combination of several descriptive features). By using the

available literature, stratification of vegetation communities was possible. A thorough desktop research was intensively searched for important species and the potential for Red Data Listed (RDL) and other important species were established and cross referenced with PRECIS Data for the relevant quarter degree grid/s (POSA) as obtained from the SANBI data base. The aim was to identify different vegetation types and to establish their integrity and representation in the study area.

6.4. Terrestrial Fauna

The fauna investigation is based on a desktop study and environmental screening tool verified by cross reference with available habitats of the study area in order to establish the faunal potential. All fauna that were observed during field survey and floral surveys were also recorded. However, selected survey sites were searched for fauna and habitats were identified during the vegetation studies so as to establish the faunal potential of a particular area.

6.5. Ecological importance and sensitivity rating of habitats

By considering the results of all the above investigations, the authors allocate a qualitative sensitivity rating to the habitat that were identified, based upon its ecological importance and biodiversity value. A qualitative method was chosen at the first stage of assessment instead of a quantitative method in order to simplify the procedure of assessment. In order to simplify the decision-making process, a scale of ***Low, Medium, High*** and ***Very High*** is used, based upon biodiversity value and ecological functions. This method is used as a first level of expressing the sensitivity of a specific component and is not used in comparative assessments of alternatives where a quantitative approach will be more appropriate.

Table 3: **Ecological Importance/Biodiversity Value Sensitivity**

Ecological Importance of Terrestrial and Riparian Communities	**Sensitivity Rating**
A unique habitat that serve as habitat for rare/endangered species or perform critical roles.	*Low*
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.	*Medium*

Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact such as erosion low.	*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*

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 spatial databases (SANBI"s SIBIS and BGIS databases). The lists provided 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 conservation status of each species is also listed, based on the IUCN Red List Categories and Criteria version 3.1 (2010) 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.

6.6. Description of the CBAs

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

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

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

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

Table 4: A framework for linking spatial planning categories (CBAs) to land-use planning and decision-making guidelines based on a set of high-level land biodiversity management objectives.

CBA category	Land Management Objective
PA & CBA 1	**Natural landscapes**: • Ecosystems and species fully intact and undisturbed • These are areas with high irreplaceability or low flexibility in terms of meeting biodiversity pattern targets. If the biodiversity features targeted in these areas are lost, then targets will not be met. • These are landscapes that are at or past their limits of acceptable change.

CBA 2	**Near-natural landscapes**: • Ecosystems and species largely intact and undisturbed. • Areas with intermediate irreplaceability or some flexibility in terms of area required to meet biodiversity targets. There are options for loss of some components of biodiversity in these landscapes without compromising our ability to achieve targets. • These are landscapes that are approaching but have not passed their limits of acceptable change.

CBA category	**Land Management Objective**
Ecological Support Areas (ESA)	**Functional landscapes**: • Ecosystems moderately to significantly disturbed but still able to maintain basic functionality. • Individual species or other biodiversity indicators may be severely disturbed or reduced. • These are areas with low irreplaceability with respect to biodiversity pattern targets only.
Other Natural Areas and (ONA) Transformed	**Production landscapes**: manage land to optimize sustainable utilization of natural resources.

In terms of the City of Johannesburg Biodiversity Sector plan, part of the proposed site is mapped as ecological Support Areas (ESAs). Ecological Support Areas are split based on land cover- ESA 1 being in a largely natural state and ESA 2 areas important for maintaining landscape connectivity.

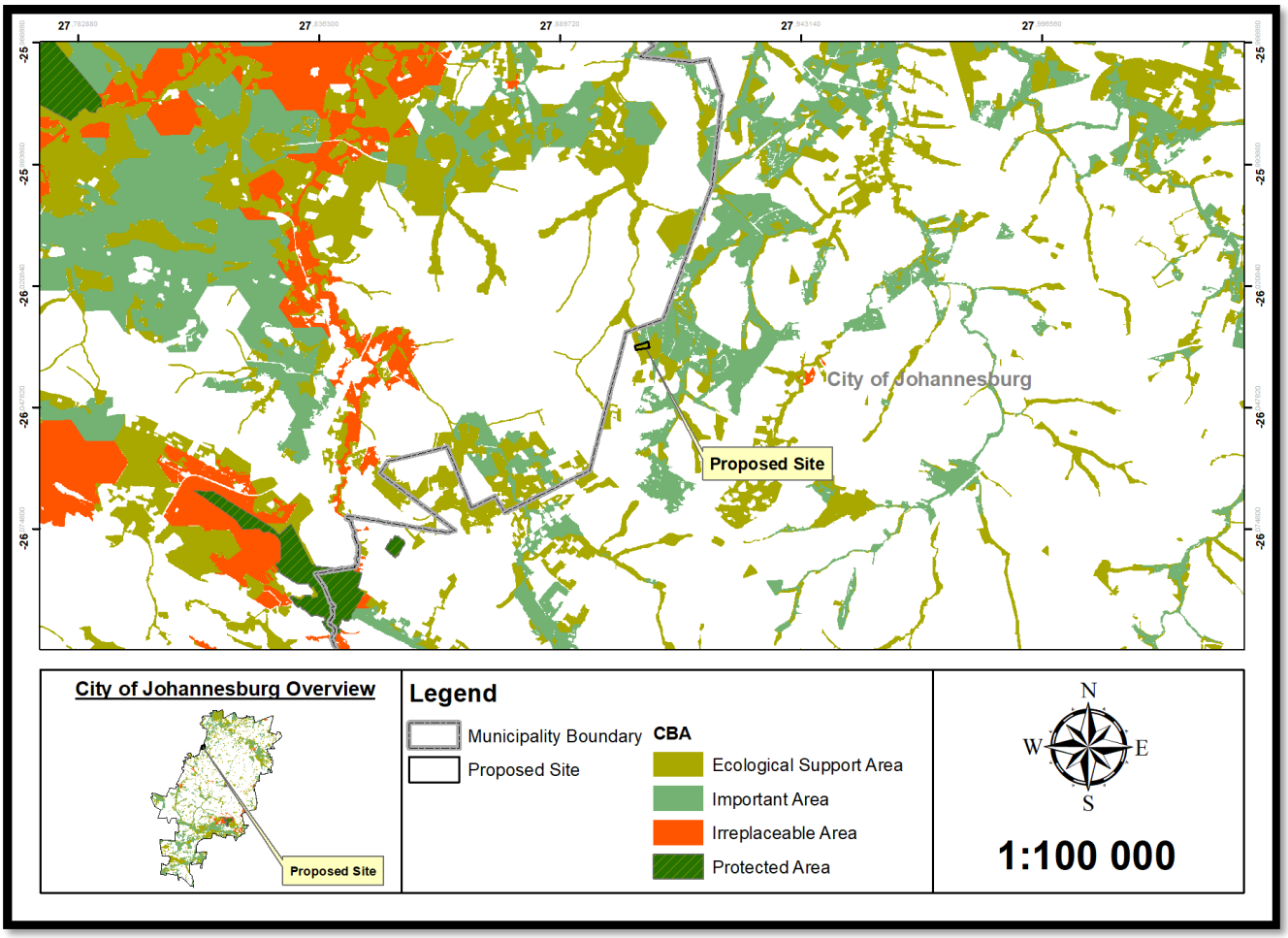


Figure 4: Site location in relation to the KZN CBA

6.7. Relevant Aspects of the Development

Information provided to the consultant indicates that the development of the housing will involve the following activities and the construction of the following infrastructures:

- Access Roads
- Power, water and sewer reticulation
- Several temporary activities will take place during construction.

6.8. Features noticed during the site survey

The proposed site gives a feel of the grassland biome. This is because the site is dominated by the grassland with the dense bushes. The site was surveyed during the wet season, and it was easy to identify vegetation.

- Natural Grassland
- Vegetation Associated with wetland
- Protected Trees (African potato) Hypoxis hemerocallidea.

6.8.1. Natural grassland

The natural grassland exist on the foot of the hill has species such as Alloteropsis semialata, Andropogon appendiculatus, Andropogon schirensis, Brachiaria serrata, Ctenium concinnum, Cymbopogon caesius, Cynodon hirsutus, Digitaria tricholaenoides, Eragrostis racemose, Festuca scabra, Harpochloa falx, Heteropogon contortus, Hyparrhenia hirta, Loudetia simplex, Melinis nerviglumis, Microchloa caffra, Monocymbium ceresiiforme, Setaria nigrirostris, Themeda triandra, Trachypogon spicatus and Tristachya leucothrix. Small shrubs of Solanum mariantanum, Grewia occidentalis, Ziziphus mucronata, Rubus rigidus, Berkheya setifera, Dicoma anomala, Helichrysum rugulosum, Dicoma zeyheri and Rhus discolour scattered on this vegetation.

Sensitivity aspects

- The natural grassland vegetation has an ecological functioning of medium - High;
- The suitability of this community for Red Data/protected species is considered low.

Figure 5: Picture Showing Natural Grassland

6.8.2. Vegetation Associated with wetland

Figure 6: Picture showing Vegetation Associated with wetland

Wetlands in Midrand, South Africa, are typically characterized by a mix of both grass and sedge species, often including hydrophytic plants that are adapted to wetland environments, according to the City of Ekurhuleni. Specific examples include Leersia hexandra, Setaria sphacelata, and Eucalyptus camaldulensis (a non-native invasive species).

Dominant Vegetation:

Wetland vegetation in Midrand is predominantly composed of grasses and sedges, with a height usually less than 1 meter.

Hydrophytic Plants:

These are plants that thrive in wetland environments and are crucial for the ecological function of the wetland

6.8.3. Protected Trees (African potato) Hypoxis hemerocallidea.

One threatened or protected species was confirmed during the survey, Hypoxis hemerocallidea (declining). The species observed in relatively large numbers scattered throughout the grassland. The species is classified as Orange List by GDARD, and no sensitivity mapping is required for individuals or populations of this species (GDARD 2012). few individuals were recorded within the proposed development site.

A second possible red data species was observed. A plant of the genus Thesium was recorded; however, the species could not be adequately confirmed. Several species of Thesiumare listed as declining, and therefore this species should be confirmed, if necessary, by a specialist botanist. The individual occurred outside the proposed development footprint of the site.

Figure 7: Picture showing protected plant on site *Hypoxis hemerocallidea.*

Table 6: List of Protected tree species (according to national provincial regulations) that have a distribution that include the project site.

Common Name	Scientific Name	TOPS (NEMBA)	Likelihood of Occurrence
African Potato	*Hypoxis hemerocallidea.*	Protected	Confirmed

Sensitivity aspects

- The protected trees have high ecological functioning
- The suitability of this community for Red Data/protected species is considered medium to high.
- protected species were recorded in the area.

6.9. Alien invasive plants

Declared weeds and invaders have the tendency to dominate or replace the herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of natural ecosystems. Therefore, it is important that all these transformers be eradicated and controlled by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species (Henderson, 2001). According to the published Alien and Invasive Species regulations in terms of section 97(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) four categories of problem plants are identified as:

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

Table 7 lists the alien species as well as the various NEMBA categories for the alien species recorded during the survey.

Table 7: Alien species recorded in the study area.

Scientific name	Common name	NEMBA Category
Datura ferox	Large apple thorn	b
Lantana camara	Bird's brandy; cherry pie; tick-berry	1b

Figure 8: *Lantana camara,* Bird's brandy; cherry pie; tick-berry 1b

Figure 9: Picture showing Syringa *Melia azedarach*

7. IMPACT ASSESSMENT

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

In terms of the activities involved in the development of a housing specific risks stem from the following activities.

Table 8: Impact Associated with Construction phase

ACTIVITY	IMPACT
CONSTRUCTION PHASE	
Site Clearance	• Disturbance of flora • Soil compaction and Soil erosion • Potential damage to Paleontological items • Noise • Air pollution
Construction Machinery refueling and maintenance	• Oil and fuel spillages. • Oil and fuel leach into ground water. • Contamination of valuable top soil.

Table 5: Assessment of impacts on natural vegetation and habitats as well as fauna, including proposed mitigation measures.

Aspect	Impact relevance	Significance before mitigation	Recommendations and Mitigation	Significance after mitigation
Vegetation and habitats	Loss of vegetation	High	Conserve the natural habitats with a ***High*** sensitivity rating (dolerite ridge) Conserve solitary large indigenous trees where possible within the development land.	Low
	Loss of important species	High	Conserve the natural habitats with a ***High*** sensitivity rating (as above). No important species are present on the sites.	Low
	Loss and fragmentation of habitat	High	Conserve the natural habitats with a ***High*** sensitivity rating. Implement an alien vegetation control programme. Spoil material may not be pushed into the surrounding natural environment or buffer zone.	High
Fauna	Loss and fragmentation of habitat	High	Conserve the natural habitats with a ***High*** sensitivity rating. Promote the planting of indigenous trees where possible within the development land. Reptiles and/or subterranean vertebrates that are unearthed during construction must be allowed to escape to the surrounds or must be relocated by a specialist. No-one is allowed to kill snakes or any other wild animals. Poaching of wild animals is illegal and individuals found guilty of this activity must be prosecuted. "Problem animals" must be removed by a specialist that deals therewith. Excavations must be inspected daily in order to rescue trapped animals.	Low
Ecology	Impairment of ecological functions	High	By implementing all the above mitigation measures the ecological functions of the natural habitat near to the site will not be significantly affected. Prevent soil erosion. Provide sanitation and solid waste removal to the community.	Low Low

7. MITIGATION

7.1 Mitigation Measures for Impacts on Vegetation Communities.

The following mitigation measures must be taken into account during development should there be such kind of resources to be taken care of during development.

Figure 10: The Impact Mitigation Hierarchy (DEA et al., 2013)

7.2. Recommended mitigation and rehabilitation measures include the following:

- Due to the sensitivity of the soil layer, and the associated high risk of erosion, the construction should be undertaken during the dry season in order to prevent all run-off and erosion.
- Dumping areas should completely avoid any trees, where possible (especially any protected tree species);
- Where possible, existing routes and walking paths must be made use of, and new routes limited.
- All laydown, storage areas etc. should be restricted to within the project area;
- A qualified environmental control officer must be on site when construction begins to identify species that will be directly disturbed and to relocate fauna/flora that is found during construction (including all reptiles and amphibians).
- All staff and visitors to the site must undergo and extensive induction process and must be made aware of the sensitive nature of the environment and floral species which occur there;
- Rehabilitation of the trenches and access road must be made a priority (and be concurrent). Due to the sensitive nature of the soil layer and extreme risk of erosion, rehabilitation must include re-filling of the open trenches with appropriate rock and soils and suitably compacted. Topsoils must also be utilised, and the area must be re-vegetated with plant and grass species which are endemic to this exact vegetation type; Rehabilitation measures that are implemented must be continually monitored for a minimum period of four years to ensure that proper succession has occurred and that there is no erosion occurring.
- Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species; and
- Compilation of and implementation of an alien vegetation management plan for the entire site.
- Search and rescue of the African Potato before construction.

8. CONCLUSION

Drawing conclusion based on the desktop study, and vegetation survey, it appears that the plants and animals' communities or Terrestrial combined biodiversity on the site were partially disturbed. Therefore, the proposed area for proposed housing is regarded as having a conservation value of Medium.

The proposed development will be located on a thick savannah biome of Egoli Grassland which is having abundant species composition with more herbs and grasses the proposed area is regarded as least threatened. It was confirmed that reptile and mammal species are also likely to be found in the area and no red data species were observed nor are expected to exist in the area.

It is then advised that the proposed mixed-use development may continue provided that the mitigation measures as suggested can be implemented, then the overall impact of the development components would be of low overall significance, and it is unlikely that the development would result in an overall net loss of biodiversity or long term degradation of the receiving environment.

Although the area mapped by GDARD as Critical Biodiversity Areas and Ecological support areas, the on-site study and examination of historical imagery showed extensive disturbance in the past, resulting in reduced ecological functioning and floral diversity of the development site. The bulk of the development footprint will impact on secondary grassland and will have minimal impact on the connectivity of the grasslands, as the shape of the development is longitudinal, the total area is small, and the area runs alongside an existing road and is surrounded on three sides by dense suburban development. Therefore, the overall impact on the grasslands was regarded as low.

Other specific conclusions and recommendations are listed below.

- All licenses must be obtained prior to construction.
- All ablution facilities must be placed far away from the water bodies including their buffer zone.
- Where possible, construction along water bodies should proceed during the dry winter months (low or zero flow periods) in order to limit the potential for erosion linked to high runoff rates; and
- Ensure active re-vegetation of cleared areas not used for construction as being important in-order to limit erosion potential.

9. REFERENCES

Golding, J. S. (Editor). 2002. Southern African Plant Red Data Lists. Southern African Botanical Diversity Network Report no.14. SABONET, PTA. Pp 237.

Hilton-Taylor, C. 2007. IUCN Red List of threatened species. IUCN, Gland, Swit. 61

pp http://invasives.org.za/ http://posa.sanbi.org/searchspp.php

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

IUCN 2010. IUCN Red List of Threatened Species. Version 2010.2. <www.iucnredlist.org>. Downloaded on 16 January 2013.

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

National Forestry Act of 1998 (NFA).

Palgrave, K.C. 1983. Trees of Southern Africa. Struik, Cape Town. Pp 959

PRECIS Data. National Biodiversity Institute of South Africa. Pretoria. 38

R.M. 2004. Technical Report Volume 1: Terrestrial Component. In: South African National Biodiversity Assessment 2004: Priorities for biodiversity conservation in South Africa. Pretoria. SANBI.

Rouget M., Reyers B., Jonas Z., Desmet P., Driver A., Maze K., Egoh B., & Cowling

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

South African National Biodiversity Institute. 2007. National Red Data list of plants. Pretoria.

Strelitzia 19. South African National Biodiversity Institute, Pretoria.

APPENDIX A: MAMMALS THAT ARE LIKELY TO INHABIT THE AREA

Common name	Scientific name
Bos Taurus	Cow
Pronolagus *crassicaudatus*	Rabbit
Capra aegagrus hircus	Goat
Potamochoerus larvatus	Bushpig
Phacochoerus africanus	Warthog
Stigmochelys pardalis	Leopard tortoise
Canis mesomelas	Jackals
Orycteropus afer	Aardvark
Philantomba monticola	Blue duiker
Sylvicapra grimmia	Common duiker
Redunca fulvorufula	Mountain reedbuck
Redunca arundinum	Common reedbuck
Raphicerus campestris	Steenbok

APPENDIX B: LIST OF BIRDS LIKELY TO INHABIT THE AFFECTED AREA

Common group	Common species	Genus	Species
Apalis	Bar-throated	*Apalis*	*thoracica*
Barbet	Black-collared	*Lybius*	*torquatus*
Barbet	Crested	*Trachyphonus*	*vaillantii*
Bishop	Southern Red	*Euplectes*	*orix*
Bokmakierie	Bokmakierie	*Telophorus*	*zeylonus*
Boubou	Southern	*Laniarius*	*ferrugineus*
Bulbul	Dark-capped	*Pycnonotus*	*tricolor*
Bunting	Golden-breasted	*Emberiza*	*flaviventris*
Bush-shrike	Olive	*Telophorus*	*olivaceus*
Bustard	Denham's	*Neotis*	*denhami*
Buzzard	Jackal	*Buteo*	*rufofuscus*
Buzzard	Steppe	*Buteo*	*vulpinus*
Canary	Cape	*Serinus*	*canicollis*
Canary	Yellow-fronted	*Crithagra*	*mozambicus*
Chat	Buff-streaked	*Oenanthe*	*bifasciata*
Cisticola	Croaking	*Cisticola*	*natalensis*
Cisticola	Levaillant's	*Cisticola*	*tinniens*
Cisticola	Pale-crowned	*Cisticola*	*cinnamomeus*
Cisticola	Wailing	*Cisticola*	*Lais*

Cisticola	Wing-snapping	*Cisticola*	*Ayresii*
Cisticola	Zitting	*Cisticola*	*juncidis*

Crow	Pied	*Corvus*	*Albus*
Cuckoo	Black	*Cuculus*	*Clamosus*
Cuckoo	Diderick	*Chrysococcyx*	*Caprius*
Cuckoo	Red-chested	*Cuculus*	*Solitarius*
Dove	Laughing	*Streptopelia*	*Senegalensis*
Dove	Red-eyed	*Streptopelia*	*Semitorquata*
Drongo	Fork-tailed	*Dicrurus*	*Adsimilis*
Duck	African Black	*Anas*	*Sparsa*
Duck	Yellow-billed	*Anas*	*Undulata*
Eagle-owl	Spotted	*Bubo*	*africanus*
Egret	Cattle	*Bubulcus*	*ibis*
Falcon	Amur	*Falco*	*amurensis*
Firefinch	African	*Lagonosticta*	*rubricata*
Fiscal	Common (Southern)	*Lanius*	*collaris*
Flycatcher	Southern Black	*Melaenornis*	*pammelaina*
Flycatcher	Spotted	*Muscicapa*	*striata*
Francolin	Shelley's	*Scleroptila*	*shelleyi*
Goose	Egyptian	*Alopochen*	*aegyptiacus*
Goose	Spur-winged	*Plectropterus*	*gambensis*

Goshawk	African	*Accipiter*	*tachiro*
Grassbird	Cape	*Sphenoeacus*	*afer*
Guineafowl	Helmeted	*Numida*	*meleagris*
Hamerkop	Hamerkop	*Scopus*	*umbretta*

Heron	Black-headed	*Ardea*	*melanocephala*
Ibis	African Sacred	*Threskiornis*	*aethiopicus*
Ibis	Hadeda	*Bostrychia*	*hagedash*
Ibis	Southern Bald	*Geronticus*	*calvus*
Indigobird	Dusky	*Vidua*	*funerea*
Kite	Black-shouldered	*Elanus*	*caeruleus*
Lapwing	Blacksmith	*Vanellus*	*armatus*
Lark	Red-capped	*Calandrella*	*cinerea*
Lark	Rufous-naped	*Mirafra*	*africana*
Longclaw	Cape	*Macronyx*	*capensis*
Mannikin	Bronze	*Spermestes*	*cucullatus*
Martin	Banded	*Riparia*	*cincta*
Martin	Brown-throated	*Riparia*	*paludicola*
Martin	Rock	*Hirundo*	*fuligula*
Masked-weaver	Southern	*Ploceus*	*velatus*
Mousebird	Speckled	*Colius*	*striatus*
Neddicky	Neddicky	*Cisticola*	*fulvicapilla*

Oriole	Black-headed	*Oriolus*	*larvatus*
Paradiseflycatcher	African	*Terpsiphone*	*viridis*
Petronia	Yellow-throated	*Petronia*	*superciliaris*
Pigeon	Speckled	*Columba*	*guinea*
Pipit	African	*Anthus*	*cinnamomeus*

Pipit	Long-billed (Split, see Nicholson's 10877 and Long-billed 10876)	*Anthus*	*similis*
Prinia	Drakensberg	*Prinia*	*hypoxantha*
Prinia	Tawny-flanked	*Prinia*	*subflava*
Puffback	Black-backed	*Dryoscopus*	*cubla*
Quail	Common	*Coturnix*	*coturnix*
Quailfinch	African	*Ortygospiza*	*atricollis*
Reed-warbler	African	*Acrocephalus*	*baeticatus*
Robin-chat	Cape	*Cossypha*	*caffra*
Scrub-robin	White-browed	*Cercotrichas*	*leucophrys*
Secretarybird	Secretarybird	*Sagittarius*	*serpentarius*
Seedeater	Streaky-headed	*Crithagra*	*gularis*
Sparrow	House	*Passer*	*domesticus*
Sparrow	Southern Grey-headed	*Passer*	*diffusus*

Spurfowl	Swainson's	*Pternistis*	*swainsonii*
Starling	Red-winged	*Onychognathus*	*morio*
Stonechat	African	*Saxicola*	*torquatus*
Stork	White	*Ciconia*	*ciconia*
Sunbird	Amethyst	*Chalcomitra*	*amethystina*
Sunbird	Greater Double-collared	*Cinnyris*	*afer*
Sunbird	Malachite	*Nectarinia*	*famosa*
Sunbird	White-bellied	*Cinnyris*	*talatala*
Swallow	Barn	*Hirundo*	*rustica*
Swallow	Greater Striped	*Hirundo*	*cucullata*
Swallow	Lesser Striped	*Hirundo*	*abyssinica*
Swallow	White-throated	*Hirundo*	*albigularis*
Swift	Alpine	*Tachymarptis*	*melba*
Swift	Little	*Apus*	*affinis*
Swift	White-rumped	*Apus*	*caffer*
Tchagra	Black-crowned	*Tchagra*	*senegalus*
Teal	Red-billed	*Anas*	*erythrorhyncha*
Thrush	Kurrichane	*Turdus*	*libonyanus*
Tit	Southern Black	*Parus*	*niger*
Turtle-dove	Cape	*Streptopelia*	*capicola*
Wagtail	Cape	*Motacilla*	*capensis*

Warbler	Dark-capped Yellow	*Chloropeta*	*natalensis*
Waxbill	Common	*Estrilda*	*astrild*
Waxbill	Orange-breasted	*Amandava*	*subflava*
Weaver	Cape	*Ploceus*	*capensis*
Weaver	Village	*Ploceus*	*cucullatus*
White-eye	Cape	*Zosterops*	*virens*
Whydah	Pin-tailed	*Vidua*	*macroura*
Widowbird	Fan-tailed	*Euplectes*	*axillaris*
Widowbird	Red-collared	*Euplectes*	*ardens*

Appendix C: Amphibian species LIKELY TO occur within the affected Area

Scientific name	Common name
Afrana angolensis	Common or Angola River Frog
Amietophrynus garmani	Olive toad
Amietophrynus gutturalis	Guttural Toad
Amietophrynus poweri	Power's Toad