GALAGO ENVIRONMENTAL
Biodiversity & Aquatic Specialists
Vat no: 4080227657
Postnet Suite No 170
Private Bag X1007
Lyttelton, 0140
Fax: 086 675 6136
Cell: 082 322 5688
vanessam@lantic.net
www.galagoenvironmental.co.za

Threatened Avifaunal Habitat Assessment

for

THE NIETGEDACHT EXT 4 TOWNSHIP DEVELOPMENT, GAUTENG PROVINCE

May 2025

Report author: Mr. Rihann F. Geyser (Cert.Sci. Nat)
Report verified/reviewed by: Mr. J.C.P. van Wyk (Pri.Sci.Nat: M.Sc)

DECLARATION OF INDEPENDENCE:

I, Rihann Frans Geyser (690304 5248 084), declare that I:

- am committed to biodiversity conservation but concomitantly recognize the need for economic development. Whereas I appreciate the opportunity to also learn through the processes of constructive criticism and debate, I reserve the right to form and hold my own opinions and therefore will not willingly submit to the interests of other parties or change my statements to appease them
- act as an independent specialist consultant in the field of ornithology
- am subcontracted as specialist consultant by Galago Environmental CC for the proposed Nietgedacht EXT 4 Township development described in this report
- have no financial interest in the proposed development other than remuneration for work performed
- neither have nor will have any vested or conflicting interests in the proposed development
- undertake to disclose to Galago Environmental CC and its client, and the competent authority, any material information that has or may have the potential to influence decisions by the competent authority as required in terms of the Environmental Impact Assessment Regulations, 2014, as amended.

Rihann F. Geyser (Cert.Sci. Nat)
SACNASP number: 134286

VERIFICATION STATEMENT

Mr Rihann F. Geyser is registered as a Certified Natural Scientist with the S.A. Council for Natural Scientific Professions. This communication serves to verify that the avifaunal report compiled by Mr Rihann F. Geyser has been prepared under my supervision, and I have verified the contents thereof.

Declaration of Independence: I, Jacobus Casparus Petrus van Wyk (6808045041084), declare that I:

- am committed to biodiversity conservation but concomitantly recognize the need for economic development. Whereas I appreciate the opportunity to also learn through the processes of constructive criticism and debate, I reserve the right to form and hold my own opinions and therefore will not willingly submit to the interests of other parties or change my statements to appease them
- abide by the Code of Ethics of the S.A. Council for Natural Scientific Professions
- act as an independent specialist consultant in the fields of zoology and ecology
- am subcontracted as specialist consultant by Galago Environmental CC for the proposed Nietgedacht EXT 4 Township development described in this report
- have no financial interest in the proposed development other than remuneration for work performed
- neither have nor will have any vested or conflicting interests in the proposed development
- undertake to disclose to Galago Environmental CC and its client, and the competent authority, any material information that has or may have the potential to influence decisions by the competent authority as required in terms of the Environmental Impact Assessment Regulations, 2014, as amended.

J.C.P. van Wyk
SACNASP number: 400062/09

TABLE OF CONTENTS

FIGURES:

TABLES:

1. INTRODUCTION

Galago Environmental CC. was appointed to undertake a Threatened avifaunal habitat assessment for the proposed Nietgedacht EXT 4 Township development on Portion 39 of the farm Nietgedacht 535 JQ (hereinafter referred to as the study site). This is in accordance with the 2014 EIA Regulations, as amended, emanating from Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998). The study site and the 500 m extended study area (e.s.a.) are hereafter referred to as the study area.

The primary objective was to determine the presence of Threatened avifaunal species and to identify suitable habitat for these species and as a result establish what the nature of the impact will have on these avifaunal species to ensure optimal avifaunal biodiversity for the study area. Direct observations and published data apart, qualitative and quantitative habitat assessments were used to derive the presence /-absence of Threatened avifaunal species.

1.1 Protocol compliance statement

Protocol for faunal specialist assessment

This document is completed as per the "Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species" as set out in Government Notice No 320 (Government gazette 43855) (March 2020). The site sensitivity for the site is given in Figure 1.

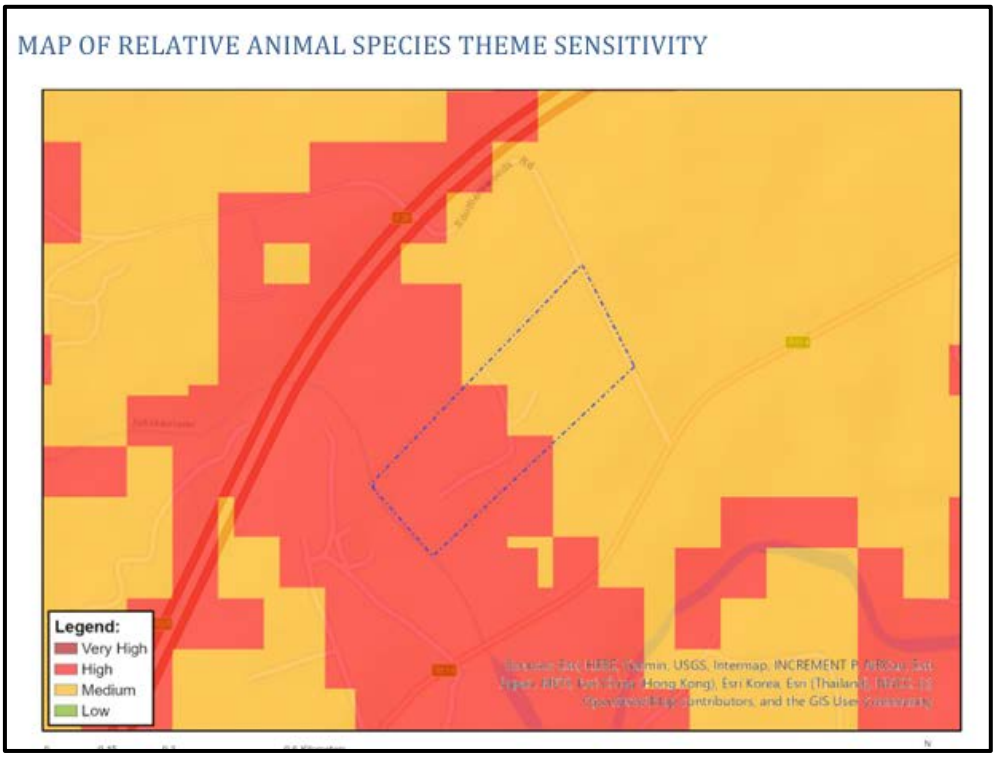

Figure 1: Screening tool information for the site. The study site is situated in a High to Medium Animal Species theme sensitivity area

An important topographical feature along the south-western boundary of the study site is a river with a riparian area forming part of an extensive river and riparian habitat system up and downstream from the study site that could potentially offer suitable foraging and

roosting habitat for Half-collared Kingfisher (*Alcedo semitorquata*) and possible foraging habitat for African Finfoot (*Podica senegalensis*).

The majority of the natural vegetation within the riparian area and on the rest of the study site has already been transformed by past and present human activities; cleared to make room for human development and human related infrastructures, small scale agriculture, alien and invasive vegetation and other such disturbances as ground clearing, fences, power lines, roads and alien vegetation that has taken over most of the fragmented pockets of natural Egoli Granite Grassland vegetation remaining on the study site.

Most of the area surrounding the study site is highly disturbed and consists of mostly the same habitat as that can be found on the study site.

2. SCOPE AND OBJECTIVES OF THE STUDY

- To qualitatively and quantitatively assess the significance of the avifaunal habitat components, and current general conservation status of the property;
- To comment on ecologically sensitive areas;
- To comment on connectivity with natural vegetation and habitats on adjacent sites;
- To provide a list of Threatened avifaunal species that occur or that are likely to occur, and to identify species of conservation importance;
- To highlight potential impacts of the proposed development on the avifauna of the study site, and
- To provide management recommendations to mitigate negative and enhance positive impacts should the proposed development be approved.

3. STUDY AREA

3.1 Locality

The study site lies on Portion 39 of the farm Nietgedacht 535 JQ, Lanseria, City of Johannesburg Metropolitan Municipality, Gauteng. The site is located east of the N14 Road and west of the R114 Road. East of the site is the Southernwoods Road (Figure 2). The study site lies on the northern bank of the Jukskei River and is bordered on the east by the Heron Bridge College. North of the site is the Riverfield Lodge. The study site is about 14 hectares in extent. The study site is spatially defined by the coordinates 25°9486651°S; 27°9622675°E.

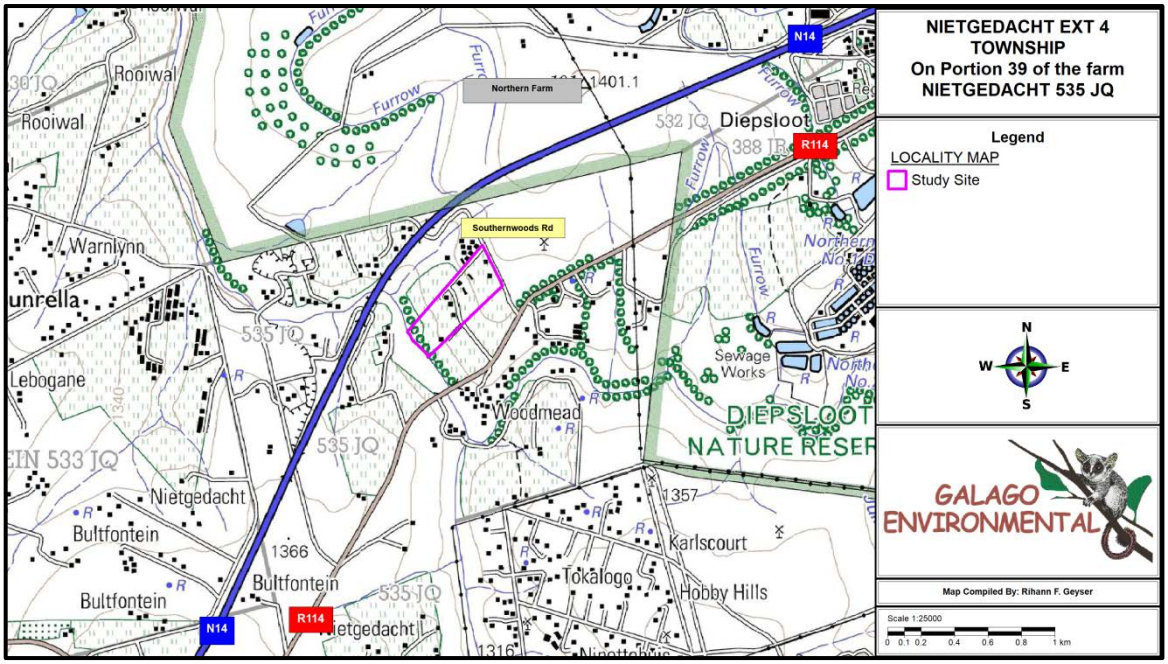

Figure 2: Locality map of the study area

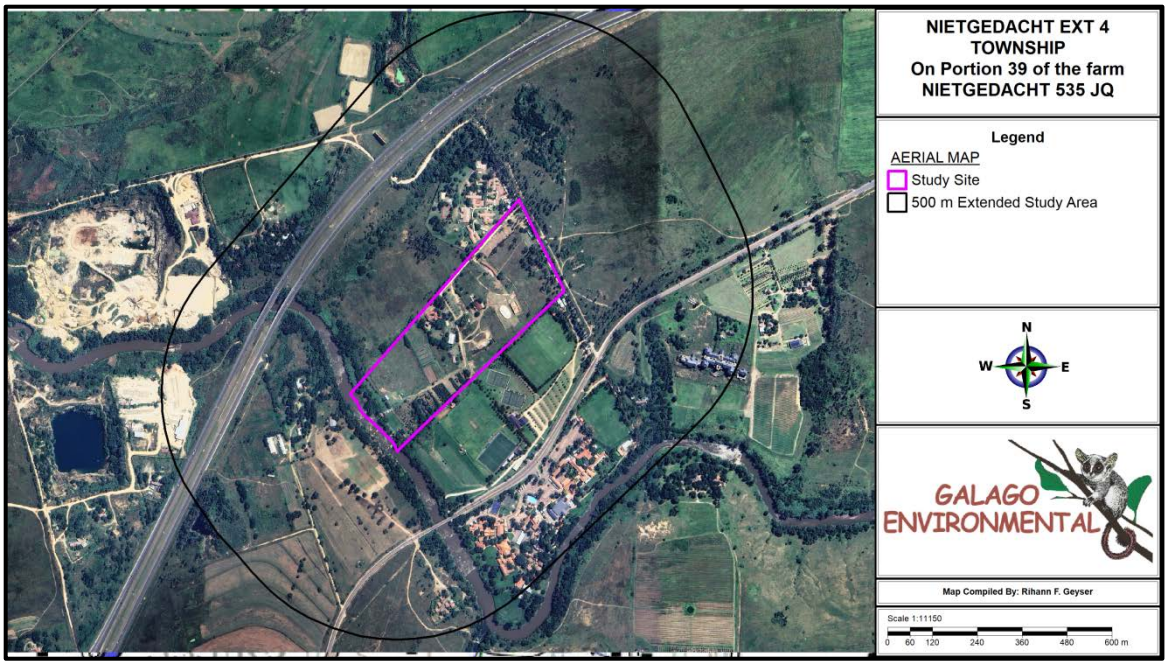

Figure 3: Aerial map of the study area (Google Maps).

Furthermore the study area is situated within the 2527DD (Broederstroom) quarter degree grid cell (q.d.g.c.) and more specifically within the 2555_2755 pentad (SABAP2 protocol. Figure 6). The study site is situated at an altitude of between 1 305 and 1 355 metres above sea level (m a.s.l.) descending from the north-east to the south-west. towards the Jukskei River (Figure 4).

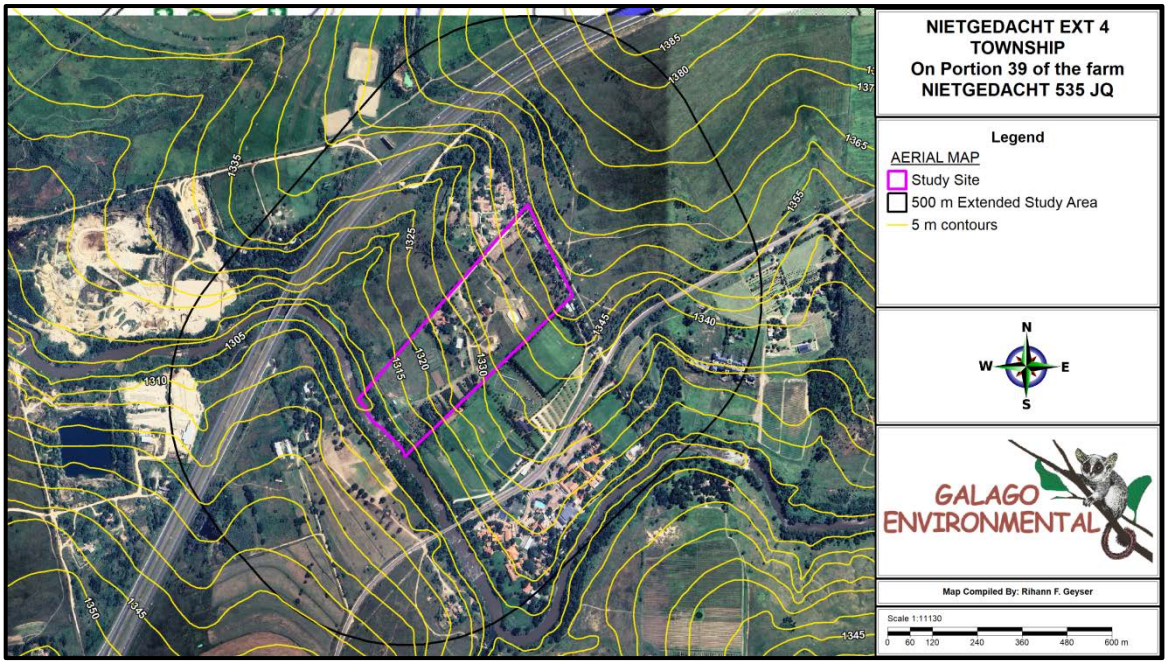

Figure 4: Aerial map of the study site showing the 5 m contour lines of the study area

3.2 Land Use

The study site is occupied by human presence and human related activities.

The largest portion of the study has been transformed by past and present human activities.

3.3 Biophysical Information

3.3.1 Vegetation unit description and landscape features

The study site is situated within the Mesic Highveld Grassland Bioregion of the Grassland Biome, more specifically within the Egoli Granite Grassland (Gm 10) vegetation type according to Mucina and Rutherford (2006)(Figure 5).

There is very little remnants of Egoli Granite Grassland present on site.

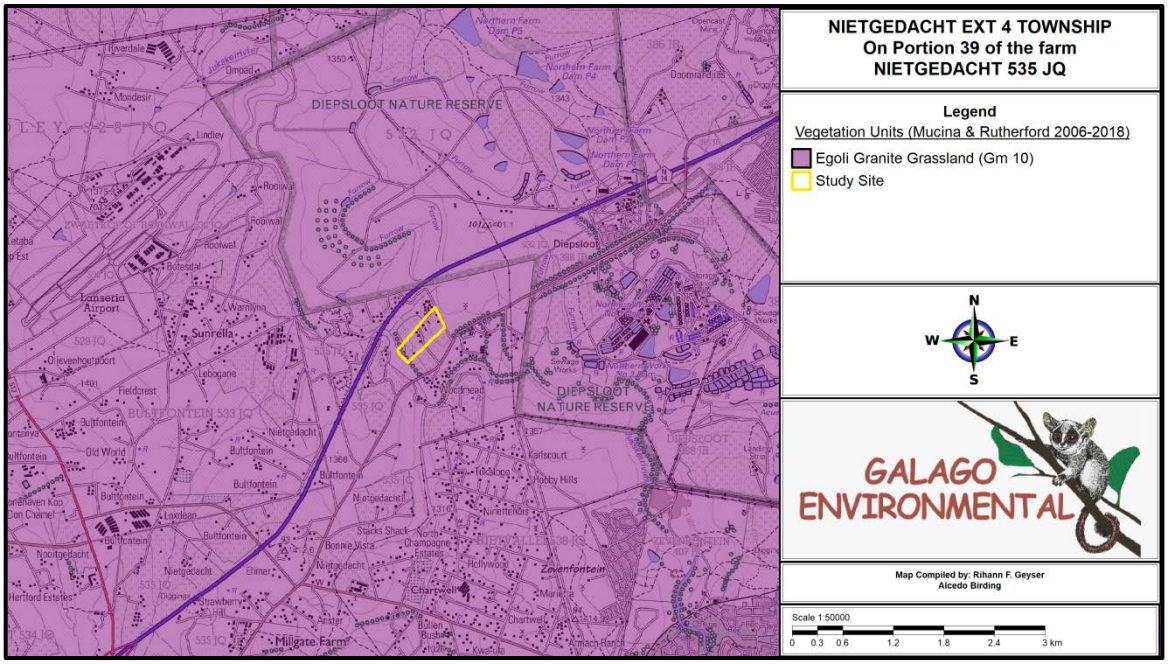

Figure 5: Vegetation types in which the study area is situated (Mucina and Rutherford, 2006 - 2018)

Egoli Granite Grassland (Gm 10)

The landscape consists of moderately undulating plains and low hills supporting tall, usually *Hyparrhenia hirta* dominated grassland, with some woody species on rocky outcrops or rock sheets. The rocky habitat shows a high diversity of woody species, which occur in the form of scattered shrub groups or solitary small trees (Mucina and Rutherford, 2006).

*3.3.2 **Climate***

The study site is situated in a strongly seasonal summer-rainfall region with between 620 to 800 mm of rainfall (average 680 mm) p/a. Winters are very dry with frequent frost especially in the south (northern Johannesburg).

*3.3.4 **Conservation status of habitat***

This habitat type is considered **endangered**. More than two thirds of this vegetation type has undergone transformation mostly by urbanisation, cultivation or by building of roads. The current rate of transformation is threatening most of the remaining unconserved areas.

4. METHODS

A four-hour site visit was conducted on 6 May 2025 to identify possible sensitive areas. During this visit the observed and derived presence of avifaunal species associated with the recognized habitat types of the study site, were recorded on BirdLasser and where possible submitted to the Southern African Bird Atlas Project (SABAP2). This was done with due regard to the well recorded global distributions of Southern African avifauna, coupled to the qualitative and quantitative nature of recognized habitats.

4.1 Field Surveys

Avifaunal species were identified visually, using 10X42 binoculars and where necessary, a 20X-60X spotting scope, by call, and where necessary were verified from Sasol Birds of Southern Africa (Sinclair *et al*., 2020), the Roberts VII Multimedia Birds of Southern Africa, Android Edition, Version 3.14 and the Roberts Bird Guide 2 Android Edition, Version 1.0 bird App's.

The 500 m of adjoining properties or extended study area (e.s.a.) was scanned or surveyed for avifaunal species of conservation concern (SCC) and/or their sensitive habitats.

During the site visit, avifaunal species were identified by visual sightings or aural records along random transect walks that represent all possible avifaunal habitat systems. No trapping or mist netting was conducted, since the terms of reference did not require such intensive work. In addition, avifaunal species were also identified by means of feathers, nests, signs, droppings, burrows or roosting sites. Locals were interviewed to confirm the presence or absences of SCC.

4.2 Desktop Surveys

The presence of suitable habitats was used to deduce the likelihood of presence or absence of Red Data avifaunal species or SCC, based on authoritative tomes, scientific literature, field guides, atlases and databases. This can be done irrespective of season.

The likely occurrence of key avifaunal species was verified according to distribution records obtained during the Southern African Bird Atlas Project 1 (SABAP1) period from 1987 to 1993 (Harrison *et al.* 1997) and the most recent avifaunal distribution data were obtained from the current SABAP2 project (SABAP2; http://sabap2.birdmap.africa) which commenced on 1 July 2007.

The occurrence and historic distribution of all Red Data avifaunal species recorded for the q.d.g.c. 2527DD, were verified from SABAP1 data (Harrison *et al.* 1997) and the current SABAP2 project (SABAP2 data for the 2527DD q.d.g.c. and for the 2555_2755 pentad) (sabap2.adu.org.za). The reporting rate for each Threatened avifaunal species likely to occur on the study site, based on Harrison *et al*. (1997), was scored between 0 – 100% and was calculated as follows: Total number of cards on which a species was reported during the SABAP1 and, Red Data species only for the current SABAP2 project period X 100 ÷ total number of cards for the particular q.d.g.c. (Harrison *et al*., 1997) and pentad(s) (SABAP2). It is important to note that a q.d.g.c. (SABAP1 Protocol) covers a large area: for example, q.d.g.c. 2527DD covers an area of ±27 X 25 km (±693 km²) (15 minutes of latitude by 15 minutes of longitude, 15' x 15') and a pentad (SABAP2 Protocol) and area of ±8 X 7.6 km (5 minutes of latitude by 5 minutes of longitude, 5' x 5') (Figure 5) and it is possible that suitable habitat will exist for a certain Red Data avifaunal species within this wider area surrounding the study site. However, the specific habitat(s) found on site may not suit the particular Red Data species, even though it has been recorded for the q.d.g.c. or pentad. For example, the Cape Vulture occurs along the Magaliesberg but will not favour the habitat found within the Pretoria CBD, both of which are in the same q.d.g.c. Red Data avifaunal species were selected and categorised according to the latest International Union for the Conservation of Nature (IUCN), Barnes (2000) and Taylor *et al.* (2015) as follow:

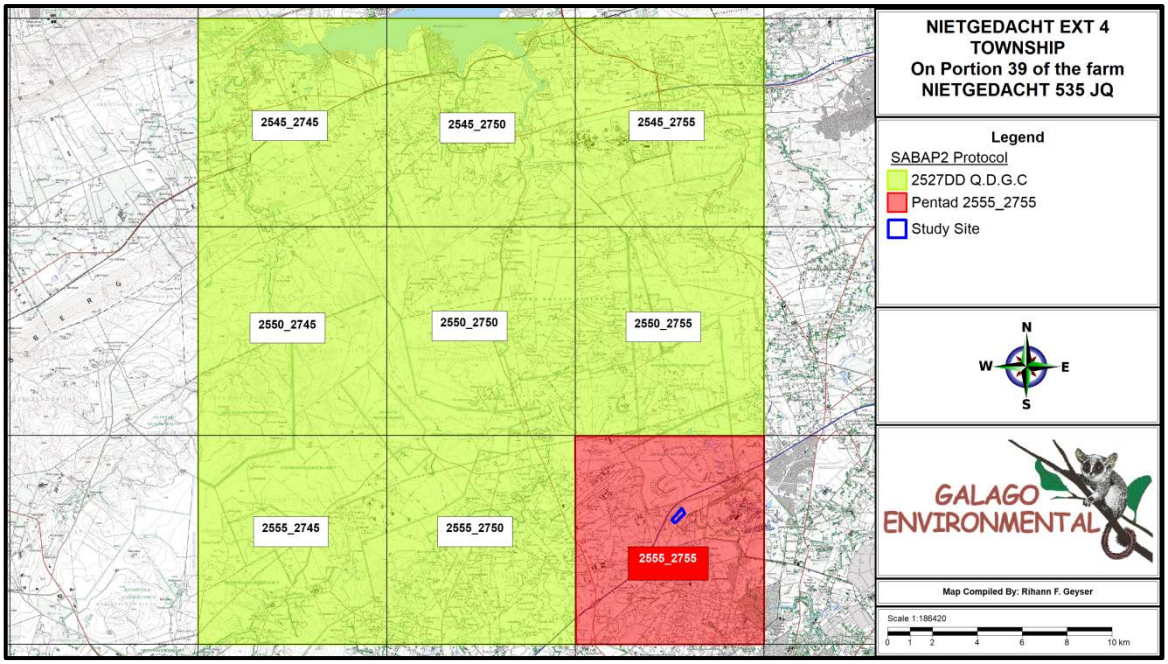

Figure 6: The 2527DD q.d.g.c. (15 minutes of latitude by 15 minutes of longitude, 15' x 15') is divided in nine smaller grids (5 minutes of latitude by 5 minutes of longitude, 5' x 5') of which each represent a pentad. The pentad in red represents the pentad in which the study site is situated.

Red Data avifaunal species were selected and categorised according to the latest International Union for the Conservation of Nature (IUCN), Barnes (2000) and Taylor *et al.* (2015) as follow:

Red Data avifaunal classification and recommendations for SCC:

Critically Endangered:	This category is at the very sharp end of conservation, species that are facing an extremely high risk of extinction in the wild in the immediate future. It is the highest risk category assigned to a species and represented by thirteen (13) species, an alarming fourfold increase since the 2000 assessment (Barnes, 2000). No further loss of natural habitat should be permitted as the species is on the brink of extinction, and all other known subpopulations have been lost. The subpopulation in question is likely to be newly discovered and the only remaining subpopulation of this species.
Endangered:	Species that are facing a very high risk of extinction in the wild in the near future and is represented by 37 species dominated by seabirds and large raptors including vultures. If these species are not properly protection, they will become critically endangered and eventually get extinct. No further loss of habitat should be permitted as the species is likely to go extinct in the near future if current pressures continue. All remaining subpopulations have to be conserved if this species is to survive in the long term.
Vulnerable:	Species that are facing a high risk of extinction in the wild in the medium term future and is represented by 34 species.

	This species either constitutes less than 1 000 individuals or is known from a very restricted range. No further loss of habitat should be permitted as the species' status will immediately become either Critically Endangered or Endangered, should habitat be lost. The species is approaching extinction but there are still a number of subpopulations in existence. No further loss of habitat is recommended since this will increase the extinction risk of the species.
Near Threated:	Species that are facing a risk of extinction in the medium-long term and is represented by 46 species. No loss of habitat in recommended.
Least Concern:	Species that are not facing an eminent threat of extinction during the next five years.

4.3 Specific Requirements

During the site visit, the study site was surveyed visually and its habitats assessed for the potential occurrence of Threatened avifaunal or SCC, according to the National Web Based Environmental Screening Tool (2021) of the Department of Environment, Forestry and Fisheries (DEFF) as well as for any other Red Data avifaunal species according to Taylor *et al* (2015).

The following avifaunal species of conservation concern was flagged for the footprint area according to the National Screening Tool.

- African Finfoot (*Podica senegalensis*)
- African Grass Owl (*Tyto capensis*)
- Caspian Tern (*Hydropogne caspia*)
- Yellow-billed Stork (*Mycteria ibis*)

4.4 Impact Assessment Criteria

Direct, indirect and cumulative impacts of the issues identified through the scoping study, as well as all other issues identified in the EIA phase will be assessed in terms of the following criteria:

» The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.

» The **extent,** wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being site specific or within 100 metres of the site boundaries, 2 = local (site + immediate surrounds) Impact might occur during the construction phase, 3 = regional, beyound 5km of the Landfill site and within the provincial boundaries 4 = national, beyond provincial boundaries, but within national boundaries and a score of 5 being international or beyond the national boundaries).

» The **duration**, wherein it will be indicated whether:

- the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;

- the lifetime of the impact will be of a short duration (2 years) impact might occur during the construction phase - assigned a score of 2;
- medium- to long term (Impact might occur during the operational phase/life of the activity – 40years) – assigned a score of 3;
- long term, impact ceases after operational phase/life of the activity > 40 years - assigned a score of 4; or
- permanent or impact in perpetuity- assigned a score of 5;

» The **consequences (magnitude)**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment (Bio-physical and/or social functions and/or processes will remain unaltered), 2 is minor and will not result in an impact on processes (Bio-physical and/or social functions and/or processes might be negligibly altered), 4 is low and will cause a slight impact on processes (Bio-physical and/or social functions and/or processes might be slightly altered), 6 is moderate and will result in processes continuing but in a modified way (Bio-physical and/or social functions and/or processes might be notably altered), 8 is high (processes are altered to the extent that they temporarily cease) (Bio-physical and/or social functions and/or processes might be considerably altered), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes (Bio-physical and/or social functions and/or processes might be severely altered).

» The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 0–5, 0 Zero probability, where 1 is very improbable (< 5% chance of the potential impact occurring), 2 is improbable or low probability (some possibility, but low likelihood, 5% - 25% chance of the potential impact occurring), 3 is medium probable (distinct possibility; 25% - 75% chance of the potential impact occurring), 4 is highly probable (most likely; 75% -95% chance of the potential impact occurring) and 5 is definite (impact will occur regardless of any prevention measures; >95% chance of the potential impact occurring).

» The **irreplaceable** loss of resources. Irreplaceable will be estimated on a scale of 0–5, 0 Zero Irreplaceable, where 1 is very low potential for loss of irreplaceable resources, 2 low potential for loss of irreplaceable resource, 3 moderate potential for loss of irreplaceable resource, 4 high potential for loss of irreplaceable resource and 5 definite potential for loss of irreplaceable resource.

» The **reversibility** of impact. Reversibility will be estimated on a scale of 0–5, 0 no impact, where 1 impact will be reversible (Reversible), 2 high potential that impact might be reversed (High Reversibility), 3 moderate potential that impact might be reversed (Moderate Reversibility) 4 low potential that impact might be reversed (low irreversibility) and 5 impact cannot be reversed (Irreversible).

» the **significance Score**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and

» the **status**, which will be described as either positive, negative or neutral.

» the degree to which the impact can be reversed.

» the degree to which the impact may cause irreplaceable loss of resources.

» the *degree* to which the impact can be *mitigated.*

Once the Environmental Risk Ratings have been evaluated for each potential environmental impact, the **significance** is calculated by combining the criteria in the following formula:

SS (Significance Score) = (magnitude + duration + extent + irreplaceable + reversibility) x probability.

SS= (M+D+E+I+ R) P

S = Significance Score

M = Magnitude

D = Duration

E = Extent

I = Irreplaceable

R = Reversibility

P = Probability

The maximum Significance Score value is 150.

The Significance Score is then used to rate the Environmental Significance of each potential environmental impact. The Environmental Significance rating process is completed for all identified potential environmental impacts both before and after implementation of the recommended mitigation measures.

Scale used for the evaluation of the Environmental Significance Ratings

Significance Score	Environmental Significance	Description / criteria
125 – 150	**Very high (VH)**	An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.
100 – 124	**High (H)**	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.
75 – 99	**Medium-high (MH)**	If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be relooked at.
40 – 74	**Medium (M)**	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.
<40	**Low (L)**	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.
+	**Positive impact (+)**	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project.

5. RESULTS

5.1 Avifaunal Habitat Assessment

Five major avifaunal habitat systems were identified within the study area (Figure 7). A short description of each habitat type follows, ranked from most to least important. These habitat systems are as follows:

- River and riparian vegetation
- Drainage line
- Mixed alien and Indigenous vegetation
- Disturbed grassland, fallow fields and pastures
- Disturbed and Transformed Area

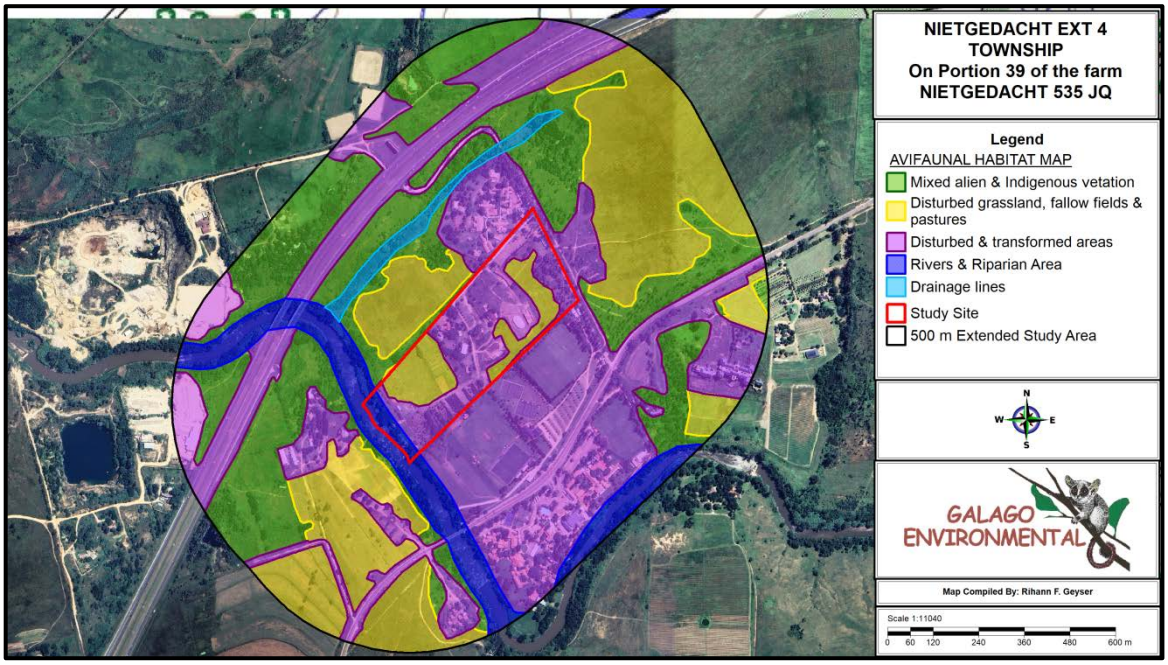

Figure 7: **Avifaunal habitat systems identified on the study site and within the study area.**

A short description of each habitat system follows, ranked from most to least important.

River and riparian vegetation:
The south-western boundary of the study site borders the Jukskei River which later runs into the Crocodile River further to the north of the study site.

This habitat consists of a River with open riparian vegetation (Figure 8).

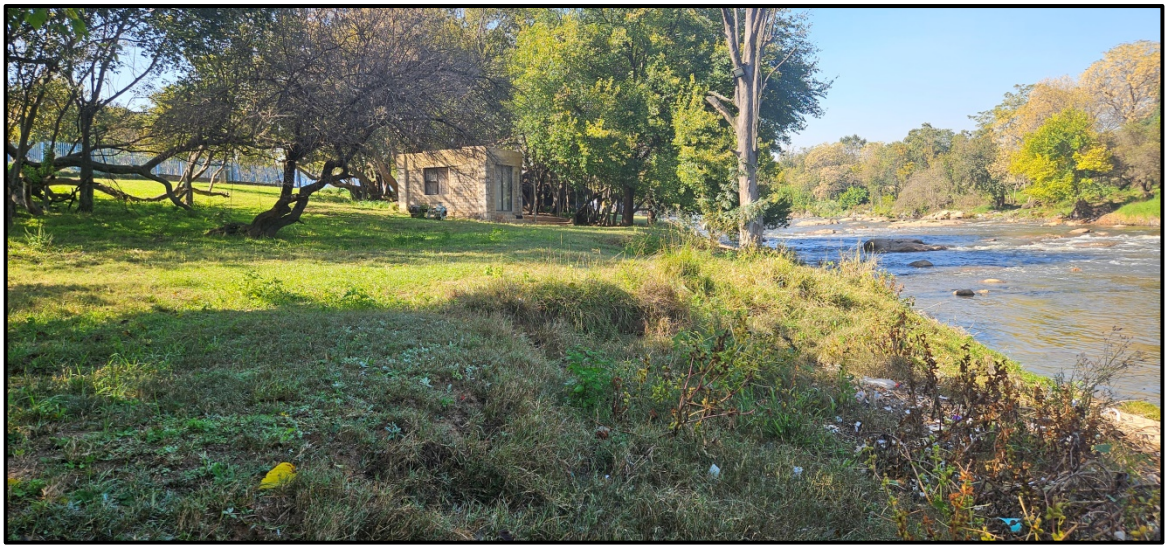

Figure 8: Riparian area along the banks of the Jukskei River in the south-western border of the study site.

The riparian vegetation mainly consists of large exotic trees such as *Populus spp* (Popular), *Melia azedarach* (Seringa), *Morus spp* (Mulberry), *Salix babylonica* (Weeping Willow) and *Acacia mearnsii* (Wattle) and to lesser extent indigenous trees. Most of the riparian vegetation along the Jukskei River have been cleared or were washed away by seasonal floods.
The river and riparian vegetation of the Jukskei River will favour a variety of woodland arboreal passerines that favour dense riparian vegetation such as such as drongos, warblers, flycatchers, shrikes, thrushes, robin-chats, boubous, sunbirds, waxbills and weavers, and such arboreal non-passerines as cuckoos, woodpeckers and doves and some birds of prey species such as sparrow-hawks that breed in the dense and tall riparian vegetation and forage on fruits, vertebrates and invertebrates. Due to the nature of the river fish are likely to be found and will thus attract avifaunal species that feed on them such as small herons and kingfishers. Frogs and crabs are also likely to be found and will attract avifaunal species that feed on them, such as kingfishers, herons and Hamerkop. Birds such as bishops, weavers, cisticolas and warblers will breed in the reeds growing in the spruit and feeding on insects that live within the reeds and semi-aquatic vegetation.

The river, with its riparian vegetation offers ideal habitat for avifaunal species that favour this habitat such as kingfishers and ducks such as the African Black Duck. At least two Red Data avifaunal species, the Half-collared Kingfisher and African Finfoot will also favour this habitat for foraging, roosting and/or breeding purposes.

Sensitivity: The river and riparian area as delineated by an aquatic specialist together with a 50 m buffer zone from the edge of the riparian area should be regarded as of high sensitivity.

Drainage lines:
A drainage line is situated outside the boundary and to the north of the study site running parallel to the N14 highway.

This is a non-permanent wetland system and only receives water in the rainy season during summer. In general the vegetation growing within this drainage line mainly consists of alien aquatic and semi-aquatic vegetation. Only the more common semi-aquatic bird species are expected to occur within the vegetation that grows within and

along the drainage line. These include cisticolas, warblers, bishops and widowbirds, which will breed in this vegetation.

Sensitivity: Although this habitat has a low sensitivity with regards to avifaunal species the drainage lines form corridors for the movement of species, which include pollinators of plant species, and as a result this habitat system is considered highly sensitive and should be excluded from development.

Mixed alien and Indigenous Vegetation:
Most areas within the study area consist of mixed alien and indigenous vegetation dominated by alien and exotic trees such as *Populus spp* (Popular), *Melia azedarach* (Seringa), *Morus spp* (Mulberry), *Acacia mearnsii* (Wattle) and other invasive vegetation (Figure 9).

Figure 9: Mixed alien and indigenous vegetation

This habitat system will favour avifaunal species typically associated with a woodland habitat and more specifically mixed alien and indigenous vegetation. This area generally includes a variety of arboreal passerines such as drongos, warblers, flycatchers, shrikes, sunbirds, waxbills and weavers and arboreal non-passerines such as doves, cuckoos and woodpeckers.

Rural and suburban gardens have created an evergreen habitat for many bird species, where birds can hide, breed and forage for food. Natural predators such as snakes and smaller wild-cat species, which largely are persecuted by man, have been driven out of these areas, making it a relatively safe environment for birds apart from domestic cats and dogs. Many bird species have adapted to human-altered areas and these species are mainly the more common bird species found within southern Africa.

Large gardens with open lawns also create ideal habitat for ground-feeding birds. These lawns are usually well watered and the ground soft, making it easy for birds that probe in the ground with their beaks in search of worms and other ground-living insects. There is usually water present, in the form of irrigation systems, ponds, manmade dams such as at golf courses, water features and/or swimming pools. The interest in birds among the public has grown and bird feeders are today a normal feature in most gardens. Certain exotic trees reach considerable heights in gardens, which allow birds to nest in them and thereby be protected from predators.

Fruit-bearing trees are also an important food supply for many bird species. Most of these bird species are not habitat specific and, due to their high level of adaptability, are also not threatened.

Sensitivity: Many indigenous avifaunal species has adapted to exotic trees and garden vegetation and as a result has increased their distribution range due the presence of these trees. Bush encroachment in previously open grassland areas has changed the species composition from grassland avifaunal species to woodland dominant species. This habitat system is constantly changing. This habitat can be regarded as of low sensitivity.

Disturbed grassland, fallow fields and pastures:
Large areas within the study area consist of open, mainly disturbed granite grassland. These areas forms part of the Egoli Granite Grassland vegetation unit within the study area and is spread over the study area (Figure 10).

Figure 10: Disturbed grassland on the study site

The presence and abundance of bird species in this habitat will vary from season to season - lush and green in summer after summer rains and dry, brown, frosted or burnt during winter. The habitat favours ground-living bird species, such as lapwings, francolins, pipits, longclaws, larks and chats. These birds hunt for insects and/or breed on the ground, in burrows in the ground, or between the grasses. Weavers and widowbirds make use of such habitat for feeding on ripe seeds during late summer and early winter when the grass is not burnt, and widowbirds and cisticolas will also breed in the tall grass during summer. Species such as weavers and bishops that breed in the wetland habitat during summer will also make use of the open grassland habitat for feeding during winter after the grasses have seeded. Aerial feeding birds such as martins, swifts and swallows will also hunt for insects over the grasslands.

Sensitivity: This habitat system form part of the Egoli Granite Grassland vegetation unit (Mucina and Rutherford, 2006) which is considered as an **endangered** vegetation unit. In terms of avifaunal biodiversity, only the more common avifaunal species associated with open grassland are likely to make use of this habitat system. The avifaunal species expected to occur within this habitat system are habitat specific and will rarely make use of other habitat systems surrounding the open grassland areas. It is unlikely that any Red Data avifaunal species will make use of this habitat system within the boundaries of study area on a permanent basis as more suitable habitat exists for these species in areas surrounding the study area. This habitat system is highly fragmented and largely

disturbed by past and present human related disturbances and can be regarded as of low sensitivity in terms of avifaunal biodiversity.

Disturbed and Transformed Areas:
The rest of the study area is disturbed and consists of development and human related infrastructure as well as areas that has been transformed by past and present human activities. In general, these areas include built-up areas interspaced with garden vegetation, graded areas, roads, areas with severe dumping, alien vegetation and areas that has been cleared or graded (Figure 11).

Figure 11: One of the disturbed and transformed area on the study site

Sensitivity: Only the more common avifaunal species that are able to adapt to areas changed by man will make use of this habitat system. None of these species that occur within this habitat system are threatened. This habitat can be regarded as of low sensitivity.

5.2 Red Data Avifaunal Species

The following Red Data avifaunal species were recorded for the 2527DD q.d.g.c. according to the SABAP1 data (Harrison *et al.* 1997) and the current SABAP2 data more specifically the 2555_2755 pentad in which the study area is situated (sabap2.adu.org.za May 2025) (Table 1). These species include species that were assessed as threatened during the 2000 assessment (Barnes, 2000) but are now assessed as least concern (**LC**) according to the 2015 assessment (Taylor *et al*, 2015).

Table 1: Red Data avifaunal species recorded during the SABAP1 and SABAP2 periods for the 2527DD q.d.g.c.

SCIENTIFIC NAME	ENGLISH NAME*	Reporting Rate (%)**		
		SABAP1	SABAP2	Pentad
Oxyura maccoa	Maccoa Duck (**LC/NT**)	**1(n=5)**	**1(n=18)**	**1(n=13)**
Coracias garrulus	European Roller (**LC/NT**)	**<1(n=2)**	**<1(n=10)**	**<1(n=5)**
Alcedo semitorquata	Half-collared Kingfisher (**NT/NT**)	**2(n=8)**	**2(n=51)**	**2(n=20)**
Tyto capensis	African Grass Owl (**VU/VU**)	**4(n=16)**	**1(n=20)**	**1(n=12)**
Eupodotis senegalensis	White-bellied Korhaan (**VU/VU**)	**2(n=10)**	**1(n=22)**	**<1(n=1)**
Anthropoides paradiseus	Blue Crane (**VU/NT**)	**2(n=8)**	**<1(n=13)**	**0**
Crex crex	Corn Crake (**VU/LC**)	**0**	**<1(n=1)**	**<1(n=1)**
Podica senegalensis	African Finfoot (**VU/VU**)	**<1(n=1)**	**<1(n=6)**	**<1(n=1)**

SCIENTIFIC NAME	ENGLISH NAME*	Reporting Rate (%)**		
		SABAP1	SABAP2	Pentad
Rostratula benghalensis	Greater Painted-snipe (NT/VU)	<1(n=1)	<1(n=11)	1(n=7)
Sterna caspia	Caspian Tern (NT/VU)	<1(n=1)	2(n=62)	<1(n=1)
Gyps africanus	White-backed Vulture (VU/EN)	3(n=13)	1(n=19)	0
Gyps coprotheres	Cape Vulture (VU/EN)	34(n=156)	16(n=455)	1(n=9)
Circus ranivorus	African Marsh Harrier (VU/EN)	2(n=7)	<1(n=6)	1(n=6)
Aquila verreauxii	Verreaux's Eagle (LC/VU)	7(n=30)	1(n=30)	<1(n=3)
Polemaetus bellicosus	Martial Eagle (VU/EN)	1(n=5)	<1(n=3)	<1(n=1)
Aquila rapax	Tawny Eagle (VU/EN)	0	<1(n=2)	0
Sagittarius serpentarius	Secretarybird (NT/VU)	3(n=14)	<1(n=9)	<1(n=1)
Falco naumanni	Lesser Kestrel (VU/LC)	1(n=5)	1(n=17)	1(n=12)
Falco vespertinus	Red-footed Falcon (LC/NT)	0	1(n=21)	2(n=21)
Falco biarmicus	Lanner Falcon (NT/VU)	3(n=13)	2(n=45)	3(n=30)
Falco peregrinus	Peregrine Falcon (NT/LC)	<1(n=2)	1(n=29)	1(n=14)
Egretta vinaceigula	Slaty Egret (LC/NA)	0	2(n=61)	0
Phoenicopterus ruber	Greater Flamingo (NT/NT)	0	2(n=71)	<1(n=2)
Phoenicopterus minor	Lesser Flamingo (NT/NT)	0	<1(n=10)	0
Geronticus calvus	Southern Bald Ibis (VU/VU)	0	<1(n=2)	<1(n=2)
Pelecanus onocrotalus	Great White Pelican (NT/VU)	0	<1(n=4)	0
Mycteria ibis	Yellow-billed Stork (NT/EN)	1(n=4)	1(n=38)	<1(n=2)
Anastomus lamelligerus	African Openbill (NT/LC)	0	<1(n=1)	<1(n=1)
Ciconia nigra	Black Stork (NT/VU)	1(n=5)	<1(n=13)	<1(n=1)
Ciconia abdimii	Abdim's Stork (LC/NT)	4(n=16)	2(n=48)	1(n=9)
Leptoptilos crumeniferus	Marabou Stork (NT/NT)	<1(n=2)	<1(n=5)	<1(n=1)
Mirafra cheniana	Melodious Lark (NT/LC)	1(n=4)	1(n=19)	<1(n=5)
Buphagus erythrorhynchus	Red-billed Oxpecker (NT/LC)	0	1(n=25)	0
	TOTOAL:	23	33	26

*Red data status according to Barnes (2000)/Red Data status according to Taylor *et al* (2015)
Latest bird names according to BirdLife South Africa Checklist of Birds in South Africa (2017)
**The reporting rate of SABAP1 and SABAP2 is calculated as follows: Total number of cards on which a species was reported X 100 ÷ total number of cards for a particular quarter degree grid cell.
The reporting rate for each species is the percentage for the q.d.g.c. according to the SABAP 1 atlas (Harrison *et al.* 1997) (and the current SABAP2) data and is represented by colour codes as follows: Yellow = Very Low, Light Orange = Low, Dark Orange = Medium and Red = High. The colour codes of the SABAP2 reporting rate indicate the following; Red = decrease in reporting rate, Green = increase in reporting rate and Blue= stable reporting rate compared to the SABAP1 data.
Red Data avifaunal species categories: **EX**= Extinct (regionally), **CR** = Critically Endangered **EN** = Endangered, **VU =** Vulnerable, **NT =** Near-threatened, **LC =** Least Concern, **DD =** Data Deficient, **NR =** Not Recognised by BirdLife International, **NA** = Not Assessed (Taylor *et al* 2015).
Adhoc or **ind** = species seen incidentally while passing through the pentad. **"n"** = the number of times a certain species was recorded within a pentad since 1 July 2007.

A total of 33 Threatened avifaunal species have been recorded within the 2527DD q.d.g.c. during the SABAP1 period (Harrison *et al*. 1997) and the current SABAP2 period combined, 23 species during the SABAP1 period, 33 species during the current SABAP2 period and 26 species for the pentad (SABAP2) in which the study area is situated (sabap2.adu.org.za May 2025)(Table 1).

A total of 36% (n=12) of the Threatened avifaunal species or SCC recorded for the 2527DD q.d.g.c. indicate a decrease in reporting rate, 36% (n=12) species an increase in reporting rate and 29% (n=9) species remains stable.

5.4 Summary of the Red Data avifaunal species

Table 2 provides a list of the Threatened avifaunal species recorded for the 2527DD q.d.g.c. according to the SABAP1 data (Harrison *et al.* 1997) and the current SABAP2 data and an indication of their likelihood of occurrence within the study area based on actual sightings, habitat assessment and food availability.

Table 2: Red Data avifaunal species assessment for the study site and study area according to the SABAP1 and SABAP2 data for the 2527DD q.d.g.c.

SPECIES NAME**	PRESENCE OF SUITABLE HABITAT AND HABITAT REQUIREMENTS	LIKELIHOOD OF OCCURRENCE ON STUDY SITE
Oxyura maccoa (Maccoa Duck) (**LC/NT**)	**NONE** Prefers permanent wetlands in open grassland and semi-arid country (including fynbos, succulent Karoo, Nama Karoo) that support rich concentrations of benthic invertebrates (Hockey et al, 2005). Breeding habitat usually contains stands of young, emergent vegetation, mainly rushes and sedges (Hockey et al, 2005) and prefers small, shallow and nutrient-rich inland freshwater water bodies and will also take advantage of farm dams and man-made artificial impoundments and wetlands such settling ponds at sewer farms (Johnsgard and Carbonell, 1996). Maccoa Ducks will made use larger water bodies with deeper water (Berruti et al. 2005). In KwaZulu-Natal, breeding recorded only at farm dams (Hockey et al, 2005).	Highly unlikely Due to a lack of suitable breeding and foraging habitat.
Coracias garrulus (European Roller) (**LC/NT**)	**NONE** Closed to very open savanna. Most common in open, broadleaved and *Acacia* woodlands with grassy clearings; least common in areas with less-developed woody cover (Hockey *et al*, 2005).	Unlikely Might only pass through the area on rare occasions to and from more suitable habitat surrounding the study site.
*Alcedo semitorquata** (Half-collared Kingfisher) (**NT/NT**)	**YES** Half-collared Kingfishers are strictly water-associated kingfishers, requiring fast-flowing perennial streams and rivers and estuaries, usually offering secluded conditions and dense marginal overhanging vegetation (Maclean, 1993 & Turpie, 2005) They also frequents well-vegetated banks of lakes, dams, estuaries and coastal lagoons (Fry *et al*. 1988) and occasionally forages in salt water in the Eastern Cape Province (Maclean, 1993). They occur from sea-level to 2 000 m a.s.l. and are most frequent in broken escarpment terrain (Clancey and Herremans, 1997). This species is timid and inconspicuous, remains motionless for long periods, and is easily overlooked and is usually encountered single or in pairs (Taylor *et al*., 2015) and usually perches low down on the banks of rivers and streams, often on exposed roots, fallen trees over the river, as well as exposed rock and low overhanging tree branches. Despite its reported shyness it also occurs along small dams and wooded streams and canals in urban and suburban areas Taylor *et al*., 2015). Nests are constructed in vertical sand/earth banks usually 1.0 – 1.5 m (0.3 – 4.5 m) high, facing the water and with overhanging vegetation or tree roots to provide	Likely The river and riparian vegetation offers suitable foraging and roosting habitat for this species but no suitable breeding habitat were identified.

SPECIES NAME**	PRESENCE OF SUITABLE HABITAT AND HABITAT REQUIREMENTS	LIKELIHOOD OF OCCURRENCE ON STUDY SITE
	concealment (Tarboton *et al*. 1987, Tarboton, 2011, Taylor *et al*. 2015 & Harrison *et al.* 1997) Half-collared Kingfishers requires at least 1 km up and down stream of undisturbed river and riparian vegetation while breeding. Nesting tunnels may be used for successive broods and in successive years and egg-laying takes place from September to October, and occasionally in other months (Tarboton, 2011) if conditions are suitable. This species is largely sedentary but probably undergoes local movements off the central plateau with the decline of river run-off in the dry winter months (Clancey and Herremans, 1997). Their diet mainly consists of small fish (30-70 mm) as well as crabs, amphibians and aquatic invertebrates (Fry *et al.* 1988).	
*Tyto capensis** (African Grass Owl) (**VU/VU**)	**NONE** African Grass Owl are more concentrated in areas with rainfall between 700 and 800 mm per year (Tarboton and Erasmus, 1998) and have been recorded at altitudes from sea-level to 1 900 m a.s.l. Occurs predominately in tall, rank grass or sedges associated with damp substrates such as permanent and non-perennial wetlands and streams (Tarboton et al., 1987 & Kemp 2005). Breeds mainly in permanent and seasonal vleis, which it vacates while hunting or during post-breeding although it will sometimes breed in any area of long grass, sedges or even weeds (Van Rooyen, pers comm.) and not necessarily associated with wetlands (Tarboton *et al*. 1987) although this is more the exception than the rule. It constructs a series of tunnels, caves and landing platforms around the nest and roost, and therefore requires tall grass that offers concealment from above, and has relatively rigid but pliable blades, such as the grass species *Imperata cylindrica* (Taylor *et al*., 2015). Along wetland edges, African Grass Owls may roost in close proximity to Marsh Owls, but are often outnumbered 10:1 by that species. The peak breeding season is from February to April which coincides with maximum grass cover (Taylor *et al*., 2015). Foraging mainly confined to tall grassland next to their wetland vegetation and rarely hunts in short grassland, wetlands or croplands nearby (Barnes, 2000). Mainly restricted to wet areas (marshes and vleis) where tall dense grass and/or sedges occur. Prefers permanent or seasonal vleis and vacates the latter when these dried up or are burnt. Roosts and breeds in vleis but often hunt elsewhere e.g. old lands and disturbed grassland although this is suboptimal habitat conditions (Tarboton *et al*. 1987). Being opportunistic hunters responsive to rodent outbreaks, African Grass Owls may hunt or even breed in sub-optimal habitats in years of high rodent abundance which include such habitats as sparse woodland (Mendelsohn, 1989), scattered thorn scrub with dense ground cover, old fields (Tarboton et al., 1987 & Kemp 2005) and planted pastures (CA Whittington-Jones pers obs in Taylor *et al*., 2015). In the Western Cape populations	<u>Highly unlikely</u> No suitable breeding, roosting and foraging habitat were identified on and surrounding the study site

SPECIES NAME**	PRESENCE OF SUITABLE HABITAT AND HABITAT REQUIREMENTS	LIKELIHOOD OF OCCURRENCE ON STUDY SITE
	are found in low fynbos or renosterveld usually close to water and among thick stands of grass (*Stenotaphrum* sp) and sedge (*Juncus* sp)(Hockey et al, 2005). African Grass Owls in atypical habitats may represent wandering non-breeding adults or dispersing immature birds (Taylor *et al*., 2015).	
*Eupodotis senegalensis** (White-bellied Korhaan) (**VU/VU**)	**NONE** Occurs in fairly tall, dense grassland, especially sour and mixed grassland, in open or lightly wooded, undulating to hilly country. In winter, occasionally on modified pastures and burnt ground (Harrison *et al.* 1997a).	Highly unlikely Due to a lack of suitable breeding and foraging habitat. Scarce in Gauteng and secretive resident; widespread (Marais & Peacock, 2008)
*Anthropoides paradiseus** (Blue Crane) (**VU/NT**)	**NONE** Midlands and highland grassland, edge of karoo, cultivated land and edges of vleis (Maclean, 1993). Nests in both moist situations in vleis which have short grass cover and in dry sites far from water, usually exposed places such as on hillsides; forages in grassland and cultivated and fallow lands; roosts communally in the shallow water of pans and dams (Tarboton *et al*. 1987). Short dry grassland, being more abundant and evenly disturbed in the eastern "sour" grassland, where natural grazing of livestock is the predominant land use. Prefers to nest in areas of open grassland (Barnes, 2000) In the fynbos biome it inhabit cereal croplands and cultivated pastures and avoids natural vegetation. By contrast, it is found in natural vegetation in the Karoo and grassland biomes, but it also feeds in crop fields (Harrison *et al*. 1997a).	Highly unlikely Due to a lack of suitable breeding and foraging habitat. Localised but common in the south-eastern Gauteng (Marais & Peacock, 2008)
*Podica senegalensis** (African Finfoot) (**VU/CU**)	**SUBOPTIMAL** Occurs single or in pairs on clear perennial rivers and streams flanked by thick riparian bush vegetation with overhanging trees, shrubbery and reeds (Urban *et al*., 1986, Barnes and Parker, 2000). Avoids both stagnant and very fast-flowing turbulent waters, with a preference for perennial to ephemeral watercourses and clear to silted water (Hockey *et al*., 2005). Generally keeps to secluded, shady areas and seldom found far from shoreline vegetation; occasionally in mangroves, at the edges of dense papyrus beds and along vegetated verges of dams (Urban *et al*., 1986). Water temperature might be an important factor as finfoots plumage is probably not waterproof (Harrison *et al*. 1997a). Finfoots hunt aquatic invertebrates and small vertebrates while swimming or walking along riverbanks and roost at night in riverine vegetation or on branches overhanging water. Their nest is built in tangles of flood debris caught among branches overhanging water or among driftwood or reeds (Tarboton, 2011).	Unlikely This species is only likely to move along the Jukskei River on rare occasions. High human presence and disturbance on and surrounding the study site and along the banks of the Jukskei River and lack of dense riparian vegetation has a negative effect on this species. Scarce in Gauteng and secretive resident; widespread (Marais & Peacock, 2008)
Crex crex (Corn Crake) (**VU/LC**)	**NONE** Rank grassland and savanna, dry grassland bordering marshes and streams, including long grass areas of seasonally flooded grassland and,	Highly unlikely Due to a lack of suitable foraging habitat

SPECIES NAME**	PRESENCE OF SUITABLE HABITAT AND HABITAT REQUIREMENTS	LIKELIHOOD OF OCCURRENCE ON STUDY SITE
	occasionally, wet clay patches and soft mud fringing ponds. In Acacia savanna, occurs mostly where trees are small and scattered, and grass dense often tussocky, 0.7 – 1.5 m tall (Hockey *et al*. 2005).	Rare summer visitor. Widespread but elusive (Marais & Peacock, 2008).
Rostratula benghalensis (Greater Painted-snipe) (**NT/VU**)	**NONE** Dams, pans and marshy river flood plains. Favours waterside habitat with substantial cover and receding water levels with exposed mud among vegetation, departing when water recedes beyond the fringes of vegetation. Rare in seasonally flooded grassland and palm savanna (Hockey *et al*. 2005).	Highly unlikely Due to a lack of suitable foraging habitat Uncommon visitor and resident (Marais & Peacock, 2008)
Sterna caspia (Caspian Tern) (**NT/VU**)	**SUBOPTIMAL** Occurs 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. Coastal breeding habitat primarily offshore islands, but with increasing use of sandy beaches and islands in saltworks, where protection is offered. Inland, breeds on small, low islets in pans and dams (Hockey *et al*. 2005).	Highly unlikely Due to a lack of suitable foraging and breeding habitat. Only likely to move up and down the Jukskei River on very rare occasions. Non-breeding winter visitor to large water bodies in Gauteng (Marais & Peacock, 2008)
Gyps africanus (White-backed Vulture) (**VU/EN**)	**NONE** Their presence is dependent on the availability of food. Lightly wooded arid savanna, including Mopane *Colophospernum mopane* woodland; but absent from forest, true deserts, and the treeless grass- and shrubland of the south and central Karoo (Hockey *et al*. 2005).	Highly unlikely Due to a lack of suitable foraging and breeding habitat. Only likely to move through the area on rare occasions.
*Gyps coprotheres** (Cape Vulture) (**VU/EN**)	**NONE** They mostly occur in mountainous country, or open county with inselbergs and escarpments; less commonly as visitors to savannah or desert (Maclean, 1993). Forage over open grassland, woodland and agricultural areas; usually roosts on cliffs, but will also roost on trees and pylons (Barnes, 2000). It is reliant on tall cliffs for breeding but it wanders widely away from these when foraging. It occurs and breeds from sea level to 3 100 m.a.s.l. Current distribution is closely associated with subsistence communal grazing areas characterised by high stock losses and low use of poisons and, to a lesser extent, with protected areas (Harrison *et al*. 1997a), but their presence is ultimately dependent on the availability of food. Gyps vultures are unique among extant vertebrates in being obligate scavengers. They feed typically in large groups, on large mammalian carcasses, both wild and domestic, (Mundy et al., 1992 & Piper in Hockey *et al*., 2005). Cape Vulture avoids forest and dense woodland likely due to difficulties in locating and accessing suitable carcasses in such habitat (Schultz 2007 in Taylor *et al*., 2015). Recent research has emphasised the important ecological role played by these birds in carcass removal, e,g. related to disease control (Ogada *et al*., 2012).	Highly unlikely Due to a lack of suitable foraging and breeding habitat, lack of food availability and human related disturbance on and surrounding the study site. Only likely to pass through the area on very rare occasions to and from more suitable habitat and food availability. Breeds in Magaliesberg; uncommon wanderer elsewhere; mostly SW & NW Gauteng (Marais & Peacock, 2008)

SPECIES NAME**	PRESENCE OF SUITABLE HABITAT AND HABITAT REQUIREMENTS	LIKELIHOOD OF OCCURRENCE ON STUDY SITE
*Circus ranivorus** (African Marsh Harrier) (**VU/EN**)	**NONE** This species is dependant almost exclusively dependent on permanent wetlands both inland and coastal wetlands for breeding, feeding and roosting. It also hunts over drier floodplains, grassland, croplands and Fynbos where it preys mainly on small rodents as well as birds, reptiles, frogs and insects (Simmons in Hockey *et al*. 2005). Most highveld wetlands > 100 ha support a breeding pair (Tarboton & Allan 1984). Nests are usually placed in extensive reedbeds often high above water although breeding has been recorded in adjacent sedges, Fynbos, scrub and agricultural field, but these are considered to be rare occurrences (Kemp and Kemp, 2006). Forages over reeds, lake margins, floodplains and occasionally even woodland. Almost entirely absent from areas below 300 mm of rainfall (Harrison et al., 1997a). Marsh, vlei, grassland (usually near water); may hunt over grassland, cultivated lands and open savanna (Maclean, 1993). May utilise small wetlands 1-2 ha in extent for foraging, but larger wetlands are required for breeding (Barnes, 2000). Breeding adults are largely sedentary (Simmons in Hockey *et al*. 2005) with pairs often retaining the same territory year after year (Simmons, 1990) while juveniles disperse widely.	Highly unlikely There are no suitable foraging, breeding or roosting habitat for this species on the study site. Declining resident of large vleis, occurs mainly in south-eastern Gauteng (Marais & Peacock, 2008)
Aquila rapax (Tawny Eagle) (**VU/EN**)	**NONE** Occurs in lightly wooded savannah and thornveld as well as semi-desert but they are absent from dense forests and highlands (Simmons in Hockey *et al*. 2005). Able to colonise Nama Karoo and treeless grasslands by breeding on pylons and alien trees (Hockey *et al*. 2005). Adults maintain a year-round territory of approximately 70 km² (Tarboton & Allan, 1984) but do respond to temporarily favourable environmental conditions, or biological phenomena such as irruption of Red-billed Quelea (*Quelea quelea*) or Armoured Ground Crickets (*Acanthoplus discoidalis*). Their prey and feeding habits are similar to that of Bateleur (*Terathopius ecaudatus*), with scavenging and piracy being two of the most important foraging strategies (Watson *et al*., 1983). Breeding takes place during winter.	Highly unlikely There are no suitable foraging, breeding or roosting habitat for this species on the study site. Only likely to move through the area on very rare occasions. Uncommon. NW & NE Gauteng (Marais & Peacock, 2008)
Aquila verreauxii (Verreaux's Eagle) (**LC/VU**)	**NONE** Verreaux's Eagles prefer mountains and rocky areas with cliffs (Hockey *et al*. 2005). They are solitary nesters and build a massive stick structure on rocky outcrops or cliffs and more rarely in trees or on power pylons (Taylor *et al*., 2015) or tall telecommunication towers on top of mountains such as the Magaliesburg, Wonderboom, Gauteng (pers obs). Juveniles disperse from breeding areas, while adults show a strong fidelity to their breeding territories and the availability of prey seems to play a large role in breeding timing of and breeding density (Gargett & Mundy, 1990). They mainly breed from April with a single nestling fledging in October/November (Davies & Allan, 1997). Verreaux's Eagles feeds mainly on Rock Hyrax	Highly unlikely Due to a lack of suitable foraging and breeding habitat, lack of food availability and human related disturbance on and surrounding the study site. Only likely to pass through the area on very rare occasions to and from more suitable habitat and food availability.

SPECIES NAME**	PRESENCE OF SUITABLE HABITAT AND HABITAT REQUIREMENTS	LIKELIHOOD OF OCCURRENCE ON STUDY SITE
	(*Procavia capensis*) although it is an opportunistic predator that will also prey on medium-sized mammals, large birds and carrion (Simmons in Hockey *et al*. 2005). Predation of hyrax varied from 70-180 hyraxes per pair per year and has been estimated to exceed 350 elsewhere (Gargett & Mundy, 1990). Paradoxically, the breeding performance of Verreaux's Eagle shows an inverse relationship with rainfall (Allan, 1988), as more hyraxes become available to eagles when they are forced to move further from their refuges to find food during drought (Davies, 1994) and probably also during the winter season. Populations do not show good correlation with fluctuation in hyrax numbers because the eagles are able to switch to alternative prey items when hyraxes are scarce. Birds in the Strandveld on the West Coast rely heavily on Augulate Tortoises (*Chersina angulata*) and Molerats (*Cryptomus* & *Bathyergus* spp)(M Murgatryd unpubl. data). Mammals consists of between 81-99% of the prey remains found at 73 nests in western South Africa, with Rock Hyrax (*Procavia capensis*) being more important in Karoo (89%, n = 3 623) than in the Eastern Cape grassland-savanna (62%, n = 1 370) or fynbos (49%, n = 755). Other mammalian prey include Vervet Monkey (*Cercopithecus aethiops*), Chacma Baboon (*Papio ursinus*), canerats (*Thryonomys* spp), Dune Mole Rat (*Bathyergus suillus*) bushbabies (*Galago* spp), bush squirrels (*Paraxerus* spp), hares (*Lepus* spp), rabbits (*Pronolagus* spp), African Porcupine (*Hystrix africaeaustralis*), African Wild Cat (*Felis lybica*), Grey Duiker (*Sylvicapra grimmia*), Klipspringer (*Oreotragus oreotragus*), Mountain Reedbuck (*Redunca fulvorfula*) and Springbok (*Antidorcas marsupialis*). Avian prey mostly consists of guineafowl, francolins and bustards, but also Egyptian Goose, Cape Vulture chicks, herons, Southern Bald Ibis chicks, Western Cattle Egret, Kelp Gull, doves (taken in flight) and (rarely) chickens. One juvenile repeatedly took fledgling Cape Cormorants from nest ledges at Cape Point, Western Cape. Occasionally takes snakes and lizards, especially monitor lizards (*Varanus* spp); also tortoises, broken open by dropping them from air onto rocks (Hockey *et al*. 2005).	
Polemaetus bellicosus (Martial Eagle) (**VU/EN**)	**NONE** Martial Eagles tolerates a wide range of vegetation types but seem to favour arid and mesic savannah but are also regularly found at forest edges and in open shrubland (Simmons in Hockey *et al*. 2005). They will occupy most habitats provided there are adequate tall trees or pylons for nesting and perching (Machange *et al*., 2005). They rarely occur in mountainous areas. Martial Eagles are known to nest on human-made structures, such as pylons and wind-pumps, and in alien trees (Tarboton & Allan, 1984). The ability to nest on such structures may have increased densities in natural treeless parts of the Karoo, Namaqualand and Kalahari (Machange *et al*., 2005). In extensive areas of good natural habitat,	<u>Highly unlikely</u> Due to a lack of suitable foraging and breeding habitat, lack of food availability and human related disturbance on and surrounding the study site. Only likely to pass through the area on very rare occasions to and from more suitable habitat and food availability. Uncommon local

SPECIES NAME**	PRESENCE OF SUITABLE HABITAT AND HABITAT REQUIREMENTS	LIKELIHOOD OF OCCURRENCE ON STUDY SITE
	such as the Kruger National Park (Kemp & Kemp, 1974), immatures are uncommon while adults and juveniles are seen regularly (Kemp & Begg, 2001), suggesting that breeding pairs dominate the best habitat and immatures have to disperse elsewhere to mature. Declining sightings in the Kruger National Park suggests that adult recruitment may be falling because dispersal areas for immatures have become population sinks with reduced survival and therefore falling recruitment (Taylor *et al*., 2015). They are found in open grassland, scrub, Karoo, agricultural lands and woodland, It relies on large trees (or electricity pylons) to provide nest sites (Barnes, 2000) as well as windmills and even cliffs in treeless areas . It occurs mainly in flat country and is rarer in mountains, and it also avoids extreme desert, and densely wooded and forested areas (Harrison *et al*. 1997a & Barnes, 2000).	resident (Marais & Peacock, 2008)
*Sagittarius serpentarius** (Secretarybird) (**NT/VU**)	**NONE** Secretarybirds prefers open grassland and scrub, with ground cover shorter than 50 cm and with scattered trees as roosting or nesting sites, shrubland, open *Acacia* and *Combretum* savannah (Hockey *et al*. 2005). They avoid forests, densely wooded areas, Mountain Fynbos, very rocky, hilly and mountainous woodland areas (Hockey *et al*. 2005 & Barnes, 2000). They can found from sea-level to montane grassland over 2 000 m a.sl. They normally occur single or in pairs, although groups of up to 50 have been recorded at waterholes in arid areas (Herholdt & Anderson, 2006). Nests are large, stick platforms usually built on top of isolated small to medium-sized flat-crowned *Vachellias* (*Acacia*) trees and will also make use of alien pines or wattles where indigenous thorny trees are not available (Tarboton, 2011) and such adaptive trails indicate that they may have the potential to exploit marginal conditions and therefor recover rapidly from population decline (Barnes, 2000) Nesting density only about 150 km^2/pair (n = 4, Kemp, 1995). Secretarybirds are indiscriminate predators of a great variety of small animals. The majority of the diet consists of invertebrates particularly Orthoptera (grasshoppers, locusts and crickets but will also prey on small mammals, birds, and their eggs, reptiles (including tortoises), amphibians and rodents (Taylor *et al*., 2015). Small prey items, include small tortoises, that is swallowed whole and larger items are held down with their feet and torn up with bill. They are attracted to recently burnt areas to feed on animals killed by fire, but does not eat carrion.	Highly unlikely Due to a lack of suitable habitat and the disturbance on and surrounding the study site. Uncommon in open areas within Gauteng (Marais & Peacock, 2008)
*Falco naumanni** (Lesser Kestrel) (**VU/LC**)	**NONE** Non-breeding Palaearctic migrant. Forages preferentially in pristine open grassland but also hunts in converted grassland such as small scale pastures provided the conversion is not as total as in plantation forestry or in areas of consolidated agricultural monoculture (Barnes, 2000; Hockey *et al*. 2005) such as maize, sorghum, peanuts, wheat, beans and other crops (Tarboton & Allan 1984)	Unlikely This species was assessed as regionally Vulnerable in the 2000 (Barnes, 2000) assessment, but it is now assessed as regionally Least

SPECIES NAME**	PRESENCE OF SUITABLE HABITAT AND HABITAT REQUIREMENTS	LIKELIHOOD OF OCCURRENCE ON STUDY SITE
	where they hunt for large insects and small rodents, but avoid wooded areas except on migration. They roost communally in tall trees, mainly *Eucalyptus*, in urban areas (Barnes, 2000), often in towns or villages, but also in farm lands (pers. obs). Favour a warm, dry, open or lightly wooded environment, and are concentrated in the grassy Karoo, western fringes of the grassland biome and southeast Kalahari. Generally avoids foraging in transformed habitats but occurs in some agricultural areas, including croplands, in fynbos and renosterveld of the Western Cape (Hockey *et al*. 2005). Large numbers congregate in sweet and mixed grasslands of the highveld regions.	Concern because it no longer approaches any of the thresholds for Vulnerable (Taylor *et al*., 2015)
Falco vespertinus (Red-footed Falcon) (**LC/NT**)	**NONE** Gregarious; on non-breeding grounds (southern Africa), spends much of day in air, often at high altitude, but lower in mornings and evenings when hawking emergent insects. Frequently perches on dead trees, telephone poles and wires, and fence lines. Aggregates in late evening at communal roosts, sometimes containing 1 000+ birds. Settles at dusk, dispersing to foraging area at first light. In east of region, small numbers associate with large flocks of Amur Falcons and/or Lesser Kestrels. Flight graceful, with much gliding and soaring. European breeding population reduced by habitat loss and pesticide spraying.	Highly unlikely Due to a lack of suitable foraging habitat. Only likely to move through the area on rare occasions to and from more suitable foraging habitat surrounding the study site or during migration.
*Falco biarmicus** (Lanner Falcon) (**NT/VU**)	Most frequent in open grassland, open or cleared woodland, and agricultural areas. Breeding pairs generally favour habitats where cliffs are available as nest and roost sites, but will use alternative sites such as trees, electricity pylons and building ledges if cliffs are absent (Hockey *et al*. 2005). Mountains or open country, from semi desert to woodland and agricultural land, also cities (Maclean, 1993), even on forest-grassland ecotones. Generally a cliff nesting species and its wider distribution is closely associated with mountains with suitable cliffs. Able to breed on lower rock faces than Peregrine Falcon *Falco peregrinus* and also utilises the disused nests of other species, such as crows, other raptors and storks, on cliffs, in trees and on power pylons, and also quarry walls (Tarboton *et al*. 1987). Generally prefers open habitats e.g. alpine grassland and the Kalahari, but exploits a wide range of habitats – grassland, open savanna, agricultural lands, suburban and urban areas, rural settlements – in both flat and hilly or mountainous country. Also breeds in wooded and forested areas where cliffs occur (Harrison *et al*. 1997a).	Highly unlikely Due to a lack of suitable breeding habitat. Uncommon resident in open areas in Gauteng (Marais & Peacock, 2008)
Falco peregrinus (Peregrine Falcon) (**NT/LC**)	**NONE** Resident *F. p. minor* mostly restricted to mountainous riparian or coastal habitats, where high cliffs provides breeding and roosting sites. Breeding pairs prefer habitats that favour specialised, high speed, aerial hunting, e.g. high cliffs overhanging vegetation with raised and/or discontinuous canopy (e.g. forest, fynbos, woodland), or expanses of open water. Also uses quarries and dam walls, and	Unlikely This species was assessed as regionally Near Threatened in the 2000 (Barnes, 2000) assessment, but given its vast global range, adaptability to

SPECIES NAME**	PRESENCE OF SUITABLE HABITAT AND HABITAT REQUIREMENTS	LIKELIHOOD OF OCCURRENCE ON STUDY SITE
	frequents city centres, e.g. Cape Town, where tall buildings substitute for rock faces. Migrant *F. p. calidus* in more open country, often coastal, even roosting on ground on almost unvegetated salt flats.	urban environments and inaccessible breeding sites it is now considered as regionally Least Concern (Taylor *et al*., 2015)
*Phoenicopterus roseus** (Greater Flamingo) (**NT/NT**)	**NONE** Greater Flamingos occur in large flocks of up to tens of thousands, often with Lesser Flamingos. Movements take place at mostly at night and in response to inundation of ephemeral pans (Simmons in Hockey *et al*. 2005). Little is known regarding regional movements but apparent large influxes from East Africa occur during the breeding season, particularly to Sue Pan in Botswana (McCulloch & Borello, 1998). They feed on brine shrimps, brine flies, molluscs and diatoms by wading in water, bill upside down, filtering food from mud (Simmons in Hockey *et al*. 2005). Their main breeding sites in southern Africa are Etosha Pan and Sue Pan, but occasionally breeds at number of smaller wetlands in South Africa (Anderson, 2000) although these breeding attempts are often unsuccessful (Simmons in Hockey *et al*. 2005). Most of the recruitment to the South African population originates from Sua Pan. Breeding has been successful in South Africa at Lake St Lucia, De Hoop Vlei, Bredasdorp and several wetlands in the Northern Cape (Taylor *et al*., 2015). The species is a colonial nester, with hundreds to thousands of nests per colony and breeds in summer, after breeding areas are flooded (Taylor *et al*., 2015). Breeds at recently flooded, large, eutrophic wetlands (favoured foraging habitat), shallow salt pans; at other times, at coastal mudflats, inland dams, sewage treatments works, small ephemeral pans and river mouths (Hockey *et al*. 2005). Usually breeds colonially on mudflats in large pans (Harrison *et al*. 1997). Also in shallow pans, especially saline pans when they have water; also occasionally on other bodies of shallow water such as dams and vleis (Tarboton *et al.* 1987). Large bodies of shallow water, both inland and coastal; prefers saline and brackish water (Maclean 1993). Occasionally forages along sandy coasts.	Highly unlikely Due to a lack of suitable habitat. Mainly restricted to the south-eastern Gauteng (Marais & Peacock, 2008)
*Phoenicopterus minor** (Lesser Flamingo) (**NT/NT**)	**NONE** Primarily open, shallow eutrophic, wetlands and coastal lagoons and may occur on water bodies which are more saline and more alkaline than those used by *Phoenicopterus ruber* (Greater Flamingo). Breeds on saline lakes, salt pans and mudflats far out in pans and lakes (Harrison *et al*. 1997a). Non-breeding birds aggregate at coastal mudflats, salt works and sewage treatment works where salinities are high. Small, ephemeral freshwater wetlands very important for birds dispersing from breeding grounds (Hockey *et al*., 2005). Shallow pans, especially saline pans when they contain water (Tarboton *et al.*, 1987). Large brackish or saline inland and coastal waters (Maclean, 1993).	Highly unlikely Due to a lack of suitable habitat. Mainly restricted to the south-western and south-eastern Gauteng (Marais & Peacock, 2008)

SPECIES NAME**	PRESENCE OF SUITABLE HABITAT AND HABITAT REQUIREMENTS	LIKELIHOOD OF OCCURRENCE ON STUDY SITE
Geronticus calvus (Southern Bald Ibis) (**VU/VU**)	**NONE** Southern Bald Ibis are mostly found in high-altitude grassland (1 200 – 1 850 m), high-rainfall (>700 mm/yr.), although they are known to use grasslands right down to the coast, including artificial grassland such as sports firlds, golf courses and irrigated meadows (Manry 1985a, b). For breeding, this species requires cliffs with suitable ledges, generally above water. Apart from modified grasslands the species also uses old maize fields, croplands, firebreaks and open spaces in towns when foraging (Taylor *et al*., 2015). They generally occur in sour and alpine treeless grasslands, characterised by short, dense grass swards; favours recently burnt, ploughed, mowed or heavily grazed fields, also cultivated land with short grass or stubble. Almost exclusively in grassland early in wet season, moving to pastures during winter. On Polokwane plateau and in ne KwaZulu-Natal, in lightly wooded and relatively arid country (Hockey *et al*. 2005).	Highly unlikely Due to a lack of suitable habitat. .
Pelecanus onocrotalus (Great White Pelican) (**NT/VU**)	**NONE** Occurs along Coastal bays, estuaries, lakes, larger pans and dams (Hockey *et al*. 2005).	Highly unlikely Due to a lack of suitable habitat.
Mycteria ibis (Yellow-billed Stork) (**NT/EN**)	**SUBOPTIMAL** Utilises diverse wetlands and permanent and seasonal habitats, including alkaline and freshwater lakes, river, dams, pans, flood plains, large marshes, swamps, estuaries, margins of lakes or rivers, flooded grassland and small pools or streams where there are areas of shallow water free of emergent vegetation (Tarboton *et al.,* 1987); less often marine mudflats and estuaries (Hockey *et al*., 2005). Nests colonially on large trees adjacent to productive wetlands, but only locally and erratically during ideal conditions.	Highly unlikely Only likely to move along the Jukskei River on very rare occasions. Common at large wetlands within Gauteng; erratic elsewhere (Marais & Peacock, 2008)
Anastomus lamelligerus (African Openbill) (**NT/LC**)	**NONE** Wetlands, including flood plains, temporarily flooded pans, marshes, swamps, ponds, river shallows, streams, rice fields, dams, lake edges, lagoons and intertidal flats; occasionally in ploughed fields. Mainly < 1 500 m (Hockey et al, 2005).	Highly unlikely This species was assessed as regionally Near Threatened in the 2000 (Barnes, 2000) assessment, but was considered as peripheral and is now considered as regionally Least Concern (Taylor *et al*., 2015)
*Ciconia nigra** (Black Stork) (**NT/VU**)	**NONE** The Black Stork is a solitary and associated with mountainous areas and build nests on suitable cliffs (Hancock *et al*., 2010) during winter which is an adaptation to take advantage of an abundance of prey in waterbodies with receding water levels (Siegfried, 1967). This species is mainly piscivorous which constitute 91% of their diet (Chevallier *et al*., 2008). Their piscivorous diet recoded consists of	Highly unlikely Only likely to move through the area on very rare occasions.

SPECIES NAME**	PRESENCE OF SUITABLE HABITAT AND HABITAT REQUIREMENTS	LIKELIHOOD OF OCCURRENCE ON STUDY SITE
	such species as Sharptooth Catfish (*Clarias gariepinus*), other catfish (*Clarias* spp), mud-fishes (*Labeo* spp), and Tigerfish (*Hydrocynus vittatus*). In Kuiseb River, Namibia, inferred to eat Mozambique Tilapia (*Oreochromis mossambicus*), Carp (*Cyprinus carpio*) and Chubbyhead Barb (*Barbus anoplus*) (all alien to the river system). They are absent or uncommon from seasonal pans that lack fish (Allan in Hockey *et al*., 2005). There is no correlation between the abundance of fish and site selected by Black Storks and suggests that selection of fishing areas are influenced by other factors such as human activities (Chevallier *et al*., 2008). The diet of nestlings differs from adult birds and mainly consists of amphibians and insects (Hampl *et al*., 2005). Amphibian prey species include Common Platanna (*Xenopus laevis*), Southern Pygmy Toad (*Bufo vertebralis*) and Cape Sand Frog (*Tomopterna* delalandi). Other diet include tadpoles, small mammals, nestling birds, small reptiles, including tortoises, large insects, larvae of Armyworms (*Spodoptera exempta*), and freshwater snails (Hockey *et al*., 2005). Black Storks mainly forages single and occasionally, in pairs or small groups in shallow water where they are readily found at dams, shallow pans and floodplains where they are readily found in their core distribution range and also make use of shallows of streams and rivers, pools in dry riverbeds, coastal estuaries and sometimes on marshland and flooded grassland and they are occasionally found on dry land (Hockey *et al*., 2005). Their nests are being predated by Verreaux's Eagle (*Aquila verreauxii*) and Martial Eagle (*Polemaetus bellicosus*) as well as Chacma Baboon (*Papio ursinus*) (Cannell, 1991).	
Ciconia abdimii (Abdim's Stork) (**LC/NT**)	**NONE** Abdim's Storks are non-breeding inter-African migrants that depart during May to August to their breeding ground in a wide band south of the Sahara from Senegal in the west to Ethiopia and Somalia in the east. Local movements occur throughout summer in response to food availability, especially rain-related insect irruptions. They depart to their breeding grounds from February to early April, exceptionally during the middle to late April. They gather in large flocks at staging areas, including Limpopo Province during mid-March. Occasionally overwinters in southern Africa. Abdim's Storks are mainly found in grassland, sparsely savannah woodland, edges of pans, pastures, cultivated land and suburban areas in groups of up to 100 birds (Anderson in Hockey *et al*., 2005). Prior to migration they occur in large groups of up to 10 000 birds. After good rains and during migration they also occur in semi-desert habitats, including Kalahari. Generally absent from wetlands, but uses rice paddies and marshes near Beira, Mozambique (Hockey *et al*., 2005).	Highly unlikely Only likely to move through the area on very rare occasions.

SPECIES NAME**	PRESENCE OF SUITABLE HABITAT AND HABITAT REQUIREMENTS	LIKELIHOOD OF OCCURRENCE ON STUDY SITE
Leptoptilos crumeniferus (Marabou Stork) (**NT/NT**)	**NONE** Marabou Storks occur in both aquatic and terrestrial habitats, favouring open and semi-arid areas and are largely absent from forest areas and true desert. Common at wetlands, including dams, pans and rivers, and in wildlife reserves and ranching areas (Hockey *et al*., 2005). They are scavengers and feed on a wide variety of food resources, including carrion from large mammal carcasses, aquatic vertebrates and human waste (Pomeroy, 1975). Despite their extensive distribution, they only breed at limited localities throughout their distribution range (Monadjem et al., 2008)	Highly unlikely Due to a lack of suitable breeding and foraging habitat Only likely to move through the area on very rare occasions.
Mirafra cheniana (Melodious Lark) (**NT/LC**)	**NONE** Occurs in grassland dominated by *Themeda triandra* grass in South Africa. Occasionally in planted pastures of *Eragrostis curvula* and *E. tef.* Avoids wet lowlands, favouring fairly short grassland (< 0.5 m), with open spaces between tussocks, at 550 – 1 750 m.a.s.l. with annual rainfall of between 400 – 800 mm p/a (Hockey *et al*., 2005).	Unlikely Due to a lack of suitable habitat Localised resident in Gauteng (Marais & Peacock, 2008) where suitable habitat occur. This species Red Data status has change from near threatened to least concerned (Taylor *et al* 2015).
Buphagus erythrorhynchus (Red-billed Oxpecker) (**NT/LC**)	**NONE** Open savanna, up to 3 000 m a.s.l. (Hockey *et al*., 2005). Uses mammal feeding hosts in a variety of woodlands, all in rainfall zones of more than 400 mm/annum. Needs holes in trees for nesting and uses Ilala Palms, tree Aloes, reed beds and rarely larger game to roost on at night (Harrison *et al*. 1997a). Their presence is highly dependent on the availability of tick on large game species and cattle.	Unlikely This species was assessed as regionally Near Threatened in the 2000 (Barnes, 2000) assessment, but due to its encouraging population size increase through conservation efforts, it is now assessed as regionally Least Concern (Taylor *et al*., 2015)

*Priority Red Data bird species according to GDARD.
**Red data status according to Barnes (2000)/Red Data status according to Taylor *et al* (2015)
Latest bird names according to BirdLife South Africa Checklist of Birds in South Africa (2016)
Red Data avifaunal species Categories : EX= Extinct (regionally), **CR** = Critically Endangered **EN** = Endangered, **VU** = Vulnerable, **NT** = Near-threatened, **LC** = Least Concern, **DD** = Data Deficient, **NR** = Not Recognised by BirdLife International, **LC** = Least Concern, **DD** = Data Deficient, **NR** = Not Recognised by BirdLife International, **NA** = Not Assessed (Taylor *et al* 2015).

6. FINDINGS AND POTENTIAL IMPLICATIONS

6.1 Red Data avifaunal species confirmed from the study site for which suitable foraging, breeding and roosting habitat was confirmed:

None

6.2 Red Data avifaunal species for which suitable foraging, breeding and/or roosting habitat was confirmed from the study site:

Half-collared Kingfisher (*Alcedo semitorquata*):

IUCN Global Status (2016): Least Concern
Red Data Status according to Barnes (2000): Near Threatened.
Red Data Status according to Taylor *et al*. (2015): **Near Threatened**
Threat: Half-collared Kingfisher is one of 11 South African waterbird species that is primarily restricted to riverine habitats and the degraded state of the river ecosystems in South Africa is highlighted by the fact that seven of these species are considered threatened or near-threatened (Harrison *et al*., 1997). The Half-collared Kingfisher is threatened by widespread degradation of its specialised riverine habitat through siltation, erosion, inflow of water containing suspended sediments, heavy metals and other pollutants, water extraction and clearing of riparian vegetation (Barnes, 2000 & Taylor *et al*., 2015) and clearance and damage to the riparian vegetation through recreational activities. As a result of linear connectivity of its habitat, consequences of detrimental factors are not limited to the study site or point of impact but also downstream. Man-made impoundments also may have a major ecological impact downstream, through the reduction of water flow, attenuated flood peaks and altering seasonality and temperature of flow, sediment load, channel morphology and water chemistry (Barnes, 2000). Species that are adapted to fast-flowing, clear and relatively nutrient-poor ecosystems, such as the Half-collared Kingfisher are particularly vulnerable to algal blooms caused by eutrophication by run-off from agricultural and miming activities, sewer works and other sources (Taylor *et al*., 2015). Changes in river catchments, including alien plants invasion, irrigation, over-abstraction, human settlement and overgrazing have reduced natural run-off and groundwater levels substantially (Barnes, 2000). Availability of suitable banks for construction of nest tunnels may be a further limiting factor for this species. It is unknown whether infestation of waterways by alien fish constitutes a threat (Taylor *et al*., 2015).
On site conclusion: Comparing the SABAP1 data with the SABAP2 data for Half-collared Kingfisher, the reporting rate for this species for the 2527DD q.d.g.c. indicate a stable reporting rate of 2% (SABAP1 n=8 and SABABP2 n=51). The reporting rate for the specific pentad (2555_2755) is also low with 2% reporting rate (n=20) since 1 July 2007. The river and riparian vegetation habitat systems on the south-western boundary of the study site offers suitable foraging and roosting habitat for this species. High levels of pollution in the river system is a point of concern and could have a negative effect on the presence of this species. They will move along the river system to more suitable habitat up- and downstream along the river system. The river en riparian area as delineated by an aquatic specialist together with a buffer of 50 m from the riparian edge should be regarded as of high sensitivity for Half-collared Kingfisher.

The only sensitive topographical feature is the river and riparian vegetation habitat system which offer suitable habitat for threatened or sensitive avifaunal species.

Although the natural riparian vegetation has largely been disturbed by past and present human activities, it offers an important corridor for species to move through to and from more suitable habitat up and downstream from the study site.

Species richness: Due to the disturbed state of the habitat systems on and surrounding the rest of the study site only the more common avifaunal species that are able to adapt to areas changed by man are likely to occur within the study area and in general the species richness are low.
Endangered species: The habitat systems on the study site will favour at least one threatened avifaunal species recorded for the 2527DD q.d.g.c.

Sensitive species and/or areas (Conservation ranking): The study site falls inside the Egoli Granite Grassland (Gm 10), which has an **endangered** status, but little, if any, natural grassland vegetation is left on site as it has been disturbed and transformed by past and present human activities.

Habitat(s) quality and extent: The majority of the vegetation on site has been destroyed by past and present human activities such as informal housing, ground clearing and other human related disturbances. Open space areas that are not developed are also highly disturbed through trampling, invasive and alien vegetation and other human related disturbances.

Impact on species richness and conservation: Development along the Jukskei River and the edge effect thereof have already had a significant negative and lasting effect on sensitive avifaunal species and as a result has created low species richness and species of conservation concern. The area within the riparian area of the Jukskei River and within a 50 m buffer zone has already been transformed and disturbed by human related activities. Further development would involve enlarging the current human footprint, in sensitive areas which will also result in more human related disturbances and transformation of areas that has already been disturbed and transformed. The development will have a permanent footprint.

If the development should go ahead, a very important indirect effect would be the likely impact that the proposed development might have on the water quality of the river due to surface water runoff. Development within the riparian area and its buffer zone will have a negative impact on the conservation of the general biodiversity and the maintaining of ecological functioning in the long term.

Connectivity: The only connectivity within the study area is the river and riparian areas that flank it. The connectivity on and around the study site itself is poor.
Management recommendation: The river and riparian area and its buffers must not be negatively affected by any development but must be improved by clearing of alien vegetation and plating with natural riparian trees and prevention of pollution in general.
General: The River and riparian area together with a buffer of 50 m from the edge of the riparian area should be regarded as of high sensitivity. With regards to the rest of the study site, there is no objection against the development from an avifaunal perspective.

Although suboptimal, the river and riparian habitat offers suitable foraging and roosting habitat for Half-collared Kingfisher (*Alcedo semitorquata*) and to a very lesser extent African Finfoot (*Podica senegalensis*). The river and riparian area also serve as a corridor for these and other avifaunal species to move through from and to more suitable habitat up and downstream from the study site. These species were recorded during the SABAP1 and SABAP2 period and probably only likely to move through the area on occasions. It is possible that this species may have been overlooked and/or excess to prime habitat was limited for avifaunal surveys and monitoring.

Particular reference was made to the occurrence of the following threatened avifaunal species according to the National Screening Tool.

- African Finfoot (*Podica senegalensis*)
- African Grass Owl (*Tyto capensis*)
- Caspian Tern (*Hydropogne caspia*)
- Yellow-billed Stork (*Mycteria ibis*)

African Finfoot (*Podica senegalensis*):

IUCN Global Status (2016): Least Concern
Red Data Status according to Barnes (2000): Vulnerable.
Red Data Status according to Taylor *et al*. (2015): **Vulnerable**
Habitat and Ecology: Clear, perennial rivers and streams, lined with reeds, overhanging trees and shrubs and avoids stagnant and fast-flowing waters (Barnes, 2000). It feeds on aquatic invertebrates, frogs and fish, and roosts and breeds in dense overhanging vegetation.
Threat: The African Finfoot is threatened primarily by a reduction of water flow through commercial afforestation of catchment areas, damming and water extraction, as well as degradation and clearing of riverine vegetation and increased salt and silt loads in rivers because of erosion (Barns, 2000). In addition, pesticide contamination my lead tp primary poisoning, secondary poisoning through eating affected prey, and reduction in prey availability. Increased human settlement, cultivation along rivers and acute water shortages facing South Africa suggest that this species' woes are set to continue for the foreseeable future. Locally, its sensitive habitat may be degraded through trampling and damaging by both domestic livestock and wild game, particularly African Elephants (*Loxodonata africana*)(Taylor et al, 20015) as well as disturbance and damage caused by recreational activities along river banks.
On site conclusion: The Jukskei River stretch along the study area offer suboptimal conditions for African Finfoot. They are only likely to move through the area on rare occasions. The riparian vegetation has been transformed over time due to human related disturbances. African Finfoot is very habitat specific and sensitive for any disturbance and as a result are localised to certain areas within their very narrow linear habitat. They occur in clear, perennial rivers and streams, lined with overhanging trees and shrubs and avoid stagnant and fast-flowing waters (Barnes, 2000). The SABAP1 and SABAP2 data indicate a very low but stable reporting rate of <1% (SABAP1 n=1, SABAP2 n=6) and the reporting rate for the pentad in which the study site is situated is also low at a reporting rate of <1%, only recorded once on 4 July 2009 for the pentad since 1 July 2007. The African Finfoot is a very shy and elusive species and, as a result, very sensitive to disturbance and as a result easily overlooked. At the first sign of threat, they will hide in the dense undergrowth of overhanging vegetation or seek cover on land (Hockey *et al.* 2005). They usually detect human presence long before a human is aware of their presence and will hide out of sight until the disturbance is gone (pers obs). The river might be a bit shallow, rocky and fast flowing in some places, but this can change during different seasons.

The African Finfoot territories range from a few hundred metres to a few kilometres in length (Irwin 1981; Urban *et al.* 1986) and it is almost certain that they will forage this far. The African Finfoot forages by swimming up and down along the edge of the rivers and walking on the river banks (Hockey *et al.* 2005). They prey mainly from the water surface but will also take prey under water without diving (Percy & Pitman, 1963), catching such food as dragonfly nymphs, frogs and fishes (Urban *et al.* 1986 & Loon, 2001). They will also leave the water to forage on the banks to feed on insects (e.g. grasshoppers and beetles), spiders, crabs, snails, frogs and even small snakes (Gerhart, 1980). They do not wander far from the water's edge, 1 – 2 m maximum (pers. obs.; Loon *pers. comm.*). Disturbance, to which this species is very sensitive, will have a negative impact on their presence. The low reporting rate for this species for the q.d.g.c. and pentad in which the study site is situated could be attributed to the lack of suitable riparian vegetation along the Jukskei River, human presence and human related disturbance. The delineated riparian area with a buffer of 50 m from the edge of the delineated riparian zone (GDARD, 2014) should be left undisturbed with limited human movement and activities. This riparian zone also offers a corridor for African Finfoot and they will make use of the river system on rare occasions to move up and down to and from more suitable habitat conditions or during local migration.

Due to their sensitivity to disturbance it is important that the overhanging vegetation along the banks as well as vegetation within the 100-year flood line be kept as natural as possible. None of these trees should be cleared or removed. If exotic trees are to be removed, they should be replaced by indigenous trees in a gradual process. Not only will the clearance of these trees have a negative effect on the African Finfoot but it will also influence the Half-collared Kingfisher (mentioned above) and the general bird biodiversity for the area. This river will ideally serve as a corridor, not only for birds but also for mammals such as the Cape Clawless Otter and Water Mongoose.

African Grass Owl (*Tyto capensis*):

Criteria for IUCN threatened category (2013): Status: Least Concern
Red Data Status according to Barnes (2000): Vulnerable.
Red Data Status according to BirdLife SA: Regionally: **Vulnerable**, Globally: Least Concern
IUCN Global Status (2016):….
Red Data Status according to Barnes (2000):….
Red Data Status according to Taylor *et al*. (2015):….
Habitat: The African Grass Owl is found exclusively in rank grass at fairly high altitudes (Cyrus & Robson 1980) and has been recorded breeding in permanent vleis. It will also breed in long grass usually close to some kind of wetland system but according Tarbonton (*in litt*) their breeding habitat is or not necessarily associated with wetlands. They nest within a system of tunnels on the ground in tall grass with the peak breeding season being between February to April which usually coincides with maximum grass cover (Steyn 1982). In years when rodents are abundant they will hunt during the night over adjacent grassland and dry savanna, which is typically regarded as a sub-optimal habitat (Kemp & Calburn 1987). Their hunting does not extend to agricultural croplands or to short grasslands and seems to be confined to tall grasslands (Kemp & Calburn 1987).
Threat: Land-use change, habitat loss and fragmentation of their ecological requirements are the largest factors that impact this species negatively (Barnes 2000).
On site conclusion: The African Grass Owl is unlikely to occur on site. No suitable breeding, roosting and foraging habitat that will support a seasonal population could be found that will favour this species.

Caspian Tern (*Hydropogne caspia*):

IUCN Global Status (2016): Least concern.
Red Data Status according to Barnes (2000): Near Threatened
Red Data Status according to Taylor *et al*. (2015): **Vulnerable.**
Habitat and breeding biology: Caspian Tern occurs along the coast, mostly in sheltered bays and estuaries. Inland, they occur at large water bodies, both natural and man-made, with preference for saline pans and large impoundments. Coastal breeding habitat are primarily offshore islands, but with increasing use of sandy beaches and islands in saltworks, where protection is available. Inland, they breed on small, low islets in pans and dams. Usually solitary, but family groups may persist for more tahn 8 months. They Congregates at nocturnal roost sites and when loafing by day. Rarely alights on water, but sits high when it does. Recorded drinking by 'skimming' water like a skimmer; also does this to clean bill. Flight is leisurely and gull-like, more purposeful than other terns, with deep, powerful wing-beats. Bill held horizontal in direct flight.
Threats: the primary threat to this species are during the breeding period when it is highly susceptible to human disturbance including through egg collecting and predation by domestic dogs and even potentially through avitourism. Extreme weather events such as heavy rainfall, draughts and heat waves can also impact on the breeding success of this spies. Rising water levels may also flood nests, while falling water levels grant access to terrestrial predator predation. Other threats include the bio-accumulation of heavy metals, pesticides, and other chemical pollutants (Taylor et al, 2015).
On site conclusion: There is no suitable habitat for this species and they are only likely to move through the area on very rare occasions moving along the Jukskei and other major rivers in Gauteng to and from more suitable habitat. The reporting rate of this species for the q.d.g.c and pentad in which the study site is situated is very low, <1% (n=1) reporting rate during SABAP1, 2%(n=62) during the SABAP2 period and <1(n=1) for the 2555_2855 pentad.

Yellow-billed Stork (*Mycteria ibis*):

IUCN Global Status (2016): Least Concern.
Red Data Status according to Barnes (2000): Near-Threatened.
Red Data Status according to Taylor *et al*. (2015): **Endangered.**
Habitat: Wetlands, including alkaline and freshwater lakes, rivers, dams, pans, flood plains, marshes, flooded grassland and small pools or streams; less often marine mudflats and estuaries (Hockey et al 2005).
Threat: Loss of extensive system of wetlands, notably pans, marshes, lake and floodplains, all threated habitat (Barnes 2000).
On site conclusion: This species was recorded during the SABAP1 period with a reporting rate of 1%(n=4). To date the SABAP2 data indicate a reporting rate of 1%(n=38) for the entire 2527DD q.d.g.c. and was only recorded twice for the 2555_2755 pentad in which the study area is situated with a reporting rate of <1%(n=2). This species is only likely to occur through the study area on very rare occasions when passing through the area along the Jukskei River.

7. LIMITATIONS, ASSUMPTIONS AND GAPS IN KNOWLEDGE

The Galago Environmental team has appropriate training and registration, as well as extensive practical experience and access to wide-ranging data bases to consider the derived species lists with high limits of accuracy. In this instance the biodiversity of all Alignments has to a greater or lesser extent been jeopardized, which renders the need for field surveys unnecessary. In instances where uncertainty exists regarding the presence of a species it is listed as a potential occupant, which renders the suggested mitigation measures and conclusions more robust.

Even though every care is taken to ensure the accuracy of this report, environmental assessment studies are limited in scope, time and budget. Discussions and proposed mitigations are to some extent made on reasonable and informed assumptions built on *bone fide* information sources, as well as deductive reasoning. Deriving a 100% factual report based on field collecting and observations can only be done over several years and seasons to account for fluctuating environmental conditions and migrations. Since environmental impact studies deal with dynamic natural systems additional information may come to light at a later stage. Galago Environmental can thus not accept responsibility for conclusions and mitigation measures made in good faith based on own databases or on the information provided at the time of the directive. This report should therefore be viewed and acted upon with these limitations in mind.

The on-site bird survey was done at the end of the main breeding season of most species and during the time when most Palaearctic and intra-African have already started their northern migration. This, however, will not have an effect on recording Red Data species, since most Red Data species are resident to South Africa and the few Red Data species that are Palaearctic migrants are mainly threatened in their northern hemisphere distribution ranges.

The site surveys was done during several hours in one day and not on a regular basis during several season over a period of time thus the avifaunal biodiversity could change slightly as more species are confirmed from the various habitat system within the study area. The time of the day and weather condition also as has an effect on the number of species recorded in the study area during the site visit. The general assessment of species rests mainly on the 1987 atlas for birds of the then-Transvaal (Tarboton *et al*. 1987), the 1997 SABAP1 atlas data (Harrison et al. 1997) and the current data for the SABAP2 period for comparison, so any limitations in either of those studies will by implication also affect this survey and conclusions.

The general assessment of species rests mainly on the 1997 SABAP1 atlas data (Harrison et al. 1997) for comparison with the current SABAP2 atlas, so any limitations in either of those studies will by implication also affect this survey and conclusions.

Furthermore the number of atlas cards received and the diversity of habitat systems surveyed for avifaunal species within a q.d.g.c. or pentad or lack thereof could also have an effect on the avifaunal diversity that could potentially occur on the study site.

8. IMPACT ASSESSMENT

8.1 Assessment Criteria

The possible impacts, as described in the next section, were assessed based on the Significance Score. The Significance Score of the impact is calculated as follows and rating significance is explained below:

SS (Significance Score) = (magnitude + duration + extent + irreplaceable + reversibility) x probability.

I. The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.

II. The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):

III. The **duration**, wherein it will be indicated whether
- the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
- the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
- medium-term (5–15 years) – assigned a score of 3;
- long term (> 15 years) - assigned a score of 4; or
- permanent - assigned a score of 5;

IV. The **consequences (magnitude)**, quantified on a scale from 0-10, where
- 0 is small and will have no effect on the environment,
- 2 is minor and will not result in an impact on processes,
- 4 is low and will cause a slight impact on processes,
- 6 is moderate and will result in processes continuing but in a modified way,
- 8 is high (processes are altered to the extent that they temporarily cease), and
- 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

V. The **probability** of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where
- 1 is very improbable (probably will not happen),
- 2 is improbable (some possibility, but low likelihood),
- 3 is probable (distinct possibility),
- 4 is highly probable (most likely) and
- 5 is definite (impact will occur regardless of any prevention measures).

VI. The significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and

VII. The **status**, which will be described as either positive, negative or neutral.

VIII. The degree to which the impact can be reversed.

IX. The degree to which the impact may cause irreplaceable loss of resources.

X. The degree to which the impact can be mitigated.

The **significance** weightings for each potential impact are as follows:

- **< 30 points:** **Low** (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- **30-60 points:** **Medium** (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- **60 points:** **High** (i.e. where the impact must have an influence on the decision process to develop in the area).

8.2 Impact Assessments

The tables below list the activities that could impact on the vertebrate fauna because of the proposed development, as well as impacts that may be associated with the operation thereof. The tables also list recommended mitigation measures to limit the impacts.

8.2.1 Destruction of sensitive Avifaunal habitat

Nature: Currently the negative impact has already taken place in most areas of the proposed township. The proposed development will increase the footprint and it will be permanent. This will lead to some terrestrial species becoming permanently and proportionally rarer within local context.

ACTIVITY: The sources of these impacts include the removal of vegetation by clearing the bush and felling of protected trees. The pollution of the drainage line will have an impact on the survival of many vertebrate species.

	Without mitigation	**With mitigation**
CONSTRUCTION		
Magnitude	High (8)	Low (6)
Duration	Long-term (4)	Long-term (4)
Extent	Limited to Local Area (2)	Limited to site (1)
Irreplaceable loss of	Definite potential of loss (5)	High potential of loss (4)
Reversibility	Irreversible (5)	Low Reversibility (4)
Probability	Definite (5)	High probable (4)
Significance	**120 (Very high)**	**76 (Medium-high)**
Status (positive or negative)	Negative	Negative
OPERATIONAL		
Magnitude	Moderate (8)	Low (6)
Duration	Permanent (5)	Permanent (5)
Extent	Limited to Local Area (2)	Limited to site (1)
Irreplaceable loss of	Definite potential of loss (5)	High potential of loss (4)
Reversibility	Irreversible (5)	Low Reversibility (4)
Probability	Definite (5)	High Probable (4)
Significance	**125 (Very high)**	**48 (Medium-high)**
Status (positive or negative)	Negative	Negative
Can impacts be mitigated?	Yes	

Mitigation:
1. Keep the footprint of the proposed development as small as possible.
2. Sensitive habitat (Jukskei River) should ideally be cordoned off during construction to prevent access. The 50m buffer outside the riparian area must be conserved for the Jukskei River.

Cumulative impacts: Construction activities outside the proposed development area will result in cumulative impact to the sensitive avifaunal habitat near the study site and even beyond. It is imperative that effective protective measures should be put into place and monitored in the sensitive area of the Jukskei River and its buffer area. A rehabilitation plan should be put into action should this sensitive area suffer degradation.

Residual Risks: Impacts on sensitive areas are likely to be permanent unless the development takes place only in the proposed footprint area.

8.2.2 Red Data Avifauna

Nature: All Red Data species listed as Critically Endangered, Vulnerable, Near Threatened or Data Deficient are discerning species and became endangered as a result of the deterioration of their preferred habitats. Most of the Red Data avifaunal species have already been killed or driven from the area. The Half Collared Kingfisher and to a lesser extent the African Finfoot is however likely to move along the Jukskei River to more suitable breeding areas. It is therefore imperative that impact be minimised.

The impacts could include:

- Removal of vegetation along the riparian area.
- Construction of illegal buildings or infrastructure within the floodlines and buffer area of the Jukskei River.
- Pollution of the Jukskei River and other water sources

This could lead to the loss of these sensitive Red data Avifaunal species of conservation concern.

	Without mitigation	**With mitigation**
CONSTRUCTION PHASE		
Magnitude	High (8)	Moderate (6)
Duration	Long-term (4)	Long-term (4)
Extent	Limited to Local Area (2)	Limited to site (1)
Irreplaceable loss of resources	High potential of loss (4)	Moderate potential of loss (3)
Reversibility	Irreversible (5)	Moderate Reversibility (3)
Probability	Definite (5)	Low Probable (2)
Significance	**125 (Very high)**	**34 (low)**
Status (positive or negative)	**Negative**	**Negative**
OPERATIONAL PHASE		
Magnitude	High (8)	Moderate (6)
Duration	Permanent (5)	Permanent (5)
Extent	Limited to Local Area (2)	Limited to site (1)
Irreplaceable loss of resources	High potential of loss (4)	Moderate potential of loss (3)
Reversibility	Low Reversibility (4)	Moderate Reversibility (3)
Probability	High Probable (4)	Low Probable (2)
Significance	**92 (medium-high)**	**36 (low)**
Status (positive or negative)	**Negative**	**Negative**
Can impacts be mitigated?	Reasonably	

Mitigation:
Planning:

- All the development must be located within the proposed footprint area and outside the 50m buffer from the riparian area to preserve biodiversity and habitat for the Half Kollared Kingfisher along the Jukskei River corridor.

Construction: • Prevent any pollution of the Jukskei River. • The riparian area and its buffer area must be fenced off and no construction activities allowed within this area. *Operational:* • Monitor the area to ensure that the development stays within the proposed footprint area. Monitor colonisation by exotics or invasive plants and control these as they emerge. • Remove alien invasive plant species along the riparian area and replant with indigenous plants that will encourage sensitive species to forage, feed and breed in this area.
Cumulative impacts: Pollution of the Jukskei River and reduction of foraging habitat for Red Data avifaunal species through the removal of riparian vegetation.
Residual Risks: The decline of Red data avifaunal species is likely to continue unless the development stays outside the riparian area and its 50m buffer and if this area is not managed to increase biodiversity.

9. RECOMMENDED MITIGATION MEASURES

The following mitigation measures are proposed by the specialist:

- The river and riparian area as delineated by an aquatic specialist as well as a buffer zone of 50 m from the edge of the delineated riparian edge should be regarded as a protected area with minimal disturbance and alteration to the habitat system. This protected zone will ensure foraging habitat for Half-collared Kingfisher and nesting, roosting and foraging habitat for a variety of aquatic and semi-aquatic avifaunal species.
- Apart from alien tree and plant species not indigenous to the area, no vegetation should be disturbed or removed within the riparian area and within the 50 m buffer zone.
- Areas within the riparian zone should be replanted with indigenous riparian trees and shrubs natural to the area.
- African Finfoot: A buffer zone of ≥50 m must be provided from the edge of the riparian zone (GDARD).
- Half-collared Kingfisher: A buffer zone of ≥50 m must be provided from the edge of the riparian zone (GDARD).
- Trees and riparian vegetation should be planted in the buffers zone to create more suitable habitat for this species and to act as a natural shield between the river and the proposed development area.
- Due to the sensitivity of the mentioned Threatened avifaunal species, overhanging riparian vegetation along both banks, as well as vegetation within the 100-year flood line, must be kept as undisturbed and natural as possible, not only where the river borders the site but also all along the entire stretch of the Jukskei River.
- Similar management plans should be implemented on the opposite bank to any development, to provide an integrated conservation plan for both sides of the river both up- and downstream of the development.
- A natural barrier should be built to shield the development from the river and to mitigate against the edge affect through human disturbance on these species. Human related activities along the banks of the Jukskei River should be restricted to the minimum, to prevent any disturbance to these sensitive bird species found on site or that are likely to occur on site. This should form part of a limited recreational development plan (trails, bird hides etc.).
- No activity whatsoever, such as temporary housing, temporary ablutions, disturbance of natural habitat, storing of equipment or any other use of the buffer/flood zone, may be permitted during the construction phase. The

demarcated buffer/flood zone must be fenced during the construction phase to prevent any misinterpretation or disturbance of this no-go zone.

- Development should take place outside of the main breeding season of the Half-collared Kingfisher (peak September to October), African Finfoot (peak September to March). Construction near the riparian buffer should be limited during this time.
- It is recommended that an ecological management plan be developed for the riparian area and the 50m buffer together with a rehabilitation plan to increase biodiversity and potential breeding areas for sensitive avifauna.
- Domestic pets, especially domestic cats must be excluded from all residential development areas where possible (https://www.birdlife.org.za/wp-content/uploads/2020/10/Position-Statement_Feral-and-Domestic-Cats.pdf).
- No riparian trees should be cleared or removed. If exotic trees are to be removed, they should be replaced by indigenous trees and the process done gradually.
- All Mallard, Mallard hybrids and Domestic Ducks must be removed by either lethal or non-lethal methods as soon as possible. Hybridization between alien waterfowl such as Mallard and indigenous duck species is considered a threat to local biodiversity. The release of alien species onto open waterbodies without a permit is prohibited in terms of the Gauteng Nature Conservation Ordinance (no. 12 of 1983). In terms of the alien and invasive species Regulations, the Domestic Ducks, Mallard and Mallard hybrids require control by means of a national invasive species management programme and must be removed.
- No surface stormwater generated as a result of the development may be channelled directly into the river. A stormwater and flood retention pond should be constructed as part of the management plan for surface runoff and stormwater. This management plan should be applied outside of the demarcated buffer/flood zone and should not impact on the natural hydrology and morphology of the river and the riparian zone.
- Since special care needs to be taken to prevent surface stormwater rich in sediments and other pollutants from entering the river, mechanisms are required to prevent erosion and dissipate water energy, such as drainage diversions and berms.
- Any large indigenous trees on the development area should be left as part of the landscaping where possible.
- No plants not indigenous to the area, or exotic plant species, especially lawn grasses and other ground-covering plants, should be introduced in the landscaping of the proposed development, as they might spread into the areas of natural vegetation and into the wetland;
- The cultivation of trees and shrubs in gardens proven to be advantageous to birds should be encouraged. The area does not support indigenous trees and shrubs; however woody garden plants are accepted as a given and exotics will result in an influx of common garden bird species.
- Forage and host plants required by pollinator species in the area should also be used in landscaped areas.
- Entrance by vehicles, especially off-road cars and bakkies, off-road bicycles and quad bikes to the areas to be excluded should be prohibited, both during the construction phase and during the lifespan of the project.
- The areas earmarked for exclusion from development must be fenced off during the construction phase to ensure that the developer and his contractors do not damage these areas or do not cover them with soil, builders' rubble or waste.
- **No vehicles should be allowed to move in or across the wet areas or drainage lines and possibly get stuck.** This leaves visible scars and destroys habitat.

- The contractor must ensure that no fauna is disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.
- It is suggested that where work is to be done close to the drainage lines, these areas **be fenced off during construction,** to prevent heavy machines and trucks from trampling the plants, compacting the soil and dumping in the system.
- During the construction phase, noise must be kept to a minimum to reduce the impact of the development on the fauna residing on the site.
- Alien and invasive plants on site must be removed and controlled to prevent regrowth.

10. CONCLUSIONS

None of the Threatened avifaunal species mentioned in Table 2 above were observed within the study area during the time of the survey but the river and riparian area habitat system offers suitable habitat for Half-collared Kingfisher (*Alcedo semitorquata*). Other threatened bird species recorded for the 2527DD q.d.g.c are only likely to move through the area on rare occasions. The riparian area as delineated by an aquatic specialist with a buffer of 50 m from the edge of the riparian area should be regarded as of high sensitivity for Half-collared Kingfisher (*Alcedo semitorquata*) (Figures 12 & 13). Outside the riparian and buffer zone area, the habitat within the footprint area of the development does not offer suitable habitat for any of the other Threatened avifaunal species recorded for the 2527DD q.d.g.c and can be regarded as of low sensitivity (see avifaunal sensitivity map Figure 13).

.

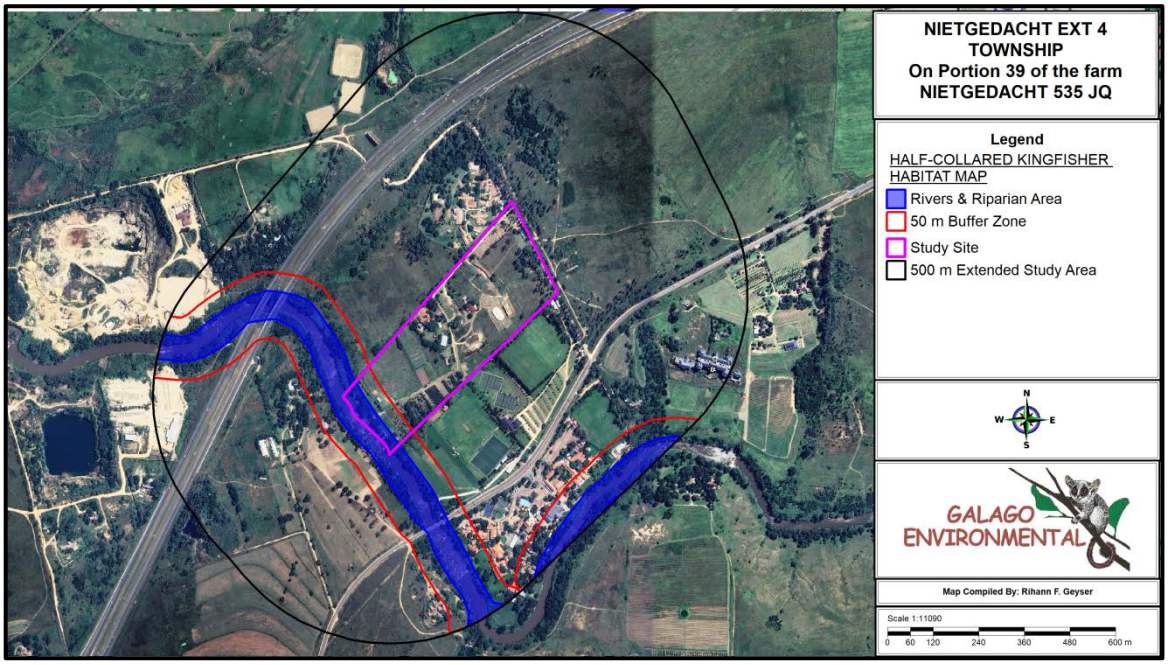

Figure 12: Half-collared Kingfisher habitat and sensitivity map

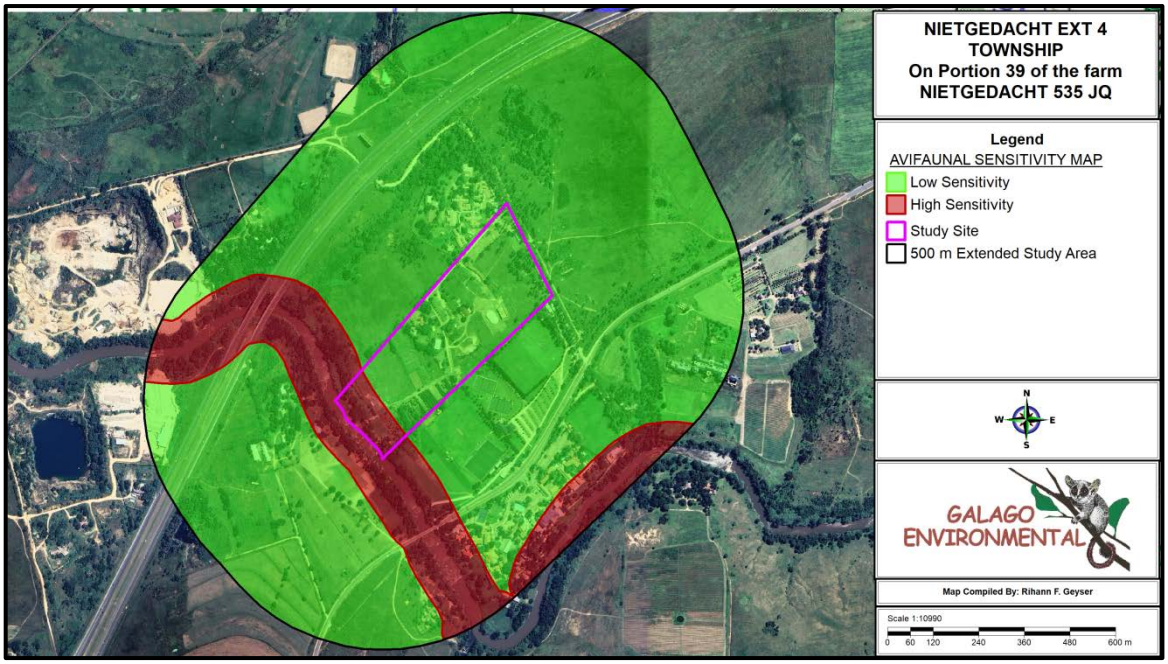

Figure 13: Avifaunal Sensitivity Map

11. LITERATURE SOURCES

Allan, D.G. 1988. **Breeding success, nest spacing and territory size of Black Eagles in the Magaliesberg**. Gabar, 3:76-81.

Anderson, M.D. 2000. **Status of flamingos in the Northern Cape Province**, South Africa. Ostrich, 71: 430-434.

Barnes, K.N. (ed.). 1998. **The Important Bird Areas of southern Africa**. Johannesburg: BirdLife South Africa.

Barnes, K.N. (ed.). 2000. **The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland**. BirdLife South Africa, Johannesburg.

Berruti, A.; Baker, N.; Abebe Y.D., Buijs, D.; Colahan, B. D.; Davies, C.; Eksteen J, Kolberg, H.; Marchant, A., Mpofu, Z. 2005. **International Single Spesies Action Plan for the Conservation of Maccoa Duck *Oxyura maccoa***. Bonn, Germany: AEWA Secretariat.

BirdLife South Africa. 2025. **BirdLife South Africa Checklist of Birds in South Africa 2025 17th edition**. Tandym Print, Cape Town.

Chevallier, D. Baillon, F., Robin, J.P., Le Maho, Y. & Massemin-Challet, S. 2008. **Prey selection of the black stork in the African wintering area**. Journal of Zoology, 276: 276-284.

Chittenden, H. 2007. **Roberts Bird Guide**. John Voelcker Bird Book Fund, Cape Town.

Chittenden, H., Davies, G. and Weiersbye, I. 2016. **Roberts Bird Guide 2ed Edition**. John Voelcker Bird Book Fund, Cape Town.

Clancy, P.A. & Herremans MJL. 1997 **Half-collared Kingfisher (*Alcedo semitorquata*).** In Harrison et al, 1997. Vol. 1. BirdLife South Africa, Johannesburg.

Curtis, O.E. 2005. **Responses of raptors to habitat fragmentation: from individual responses to population susceptibility.** Unpublished MSc thesis. University of Cape Town, Cape Town.

Davies, R.A.G. & Allan, D.G. 1997. **Black Eagle *Aquila verreauxii***. In Harrison et al, 1997. Vol. 1. BirdLife South Africa, Johannesburg.

Del Hoyo, J., Elliott, A. & Sargatal, J. (Eds). **Handbook of the birds of the world**. Vol. 1. Barcelona: Lynx Edicions.

Fry, C.H., Keith, S. & Urban, E. 1988. **The Birds of Africa, Voll. III***: Parrots to Woodpeckers.* London, United Kingdom: Academic Press.
Gargett, V. & Mundy, P.J. 1990. **The Black Eagle: a study.** Acorn Books, JHB.
GDARD, 2014. **Requirements for biodiversity assessments Version 3***.* Biodiversity Management Directorate, Department of Agriculture and Rural development.
GDARD, 2023. **Technical Report for the Gauteng Conservation Plan (Gauteng C-Plan V4.0***.* Gauteng Department of Agriculture and Rural Development.
Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J., Parker, V. & Brown, C.J. (eds.). 1997. **The Atlas of Southern African Birds***.* Vol. 1 & 2. BirdLife South Africa, Johannesburg.
Hockey, P.A.R., Dean, W.R.J. & Ryan, P.G. 2005. **Roberts Birds of Southern Africa VII th Edition**, The Trustees of the John Voelcker Bird Book Fund, Cape Town.
Johnsgard, P.A. 1978. **Ducks, Geese and Swans of the World***.* University of Nebraska Press, Lincoln and London.
Johnsgard, P.A. & Carbonell, M. 1996. **Ruddy Ducks and other stifftails: their behaviour and Biology***.* University of Oklahoma Press.
Keith, S., Urban, E.K. & Fry, C.H. 1992. **The Birds of Africa. Vol. 4**. Academic Press, London.
Kemp, A. C. 1995. **Aspects of the breeding biology and behaviour of the Secretarybird Sagittarius serpentarius near Pretoria**, South Africa. Ostrich 66: 61-68.
Kemp, A.C. & Calburn, S. 1987. **The owls of southern Africa**. Cape Town: Struik Winchester.
Kemp, A.C. 2005. **African Grass-Owl *Tyto capensis***. In Hockey *et al*, 2005. John Voelcker Bird Book Fund, Cape Town.
Kemp, A.C. & Begg, K.S. 2001. **Comparison of time-activity budgets and population structures for 18 large-bird species in the Kruger National Park**. Ostrich, 72:179-184.
Kemp, A.C. & Kemp, M.I. 2074. **Don't forget the big birds**. African Wildlife, 28(2): 12-13.
Kemp, A.C. & Kemp, M.I. 2006. **Sasol birds of prey of Africa and its islands**. Struik, Cape Town.
Kruger, T.A., 2010. **Long term prospects for the persistence of breeding Verreaux's Eagles (*Aquila verreauxii*) at the Walter Sisulu National Botanical Garden, Johannesburg.** Master of Science in Environmental Science Research Report – Final Submission, University of the Witwatersrand, Johannesburg.
Maclean, G.L., 1990. **Ornithology for Africa**. University of Natal Press, Pietermaritzburg.
Maclean, G.L., 1993. **Roberts' Birds of Southern Africa VIth ed**. John Voelcker Bird Book Fund, Cape Town.
Manry, D.E. 1985a. **Distribution, abundance and conservation of the Bald Ibis *Geronticus calvus* in Southern Africa**. Biological Conservation, 33: 351-362.
Manry, D.E. 1985b. **Reproductive performance of the Bald Ibis Geronticus calvus in relation to rainfall and grass-burning**. Ibis, 127: 159-173.
Marnewick, M.D., Retief, E.F., Theron, N.T., Wright, D.R., & Anderson, T.A., 2015. **Important Bird and Biodiversity Areas of South Africa**. Johannesburg: BirdLife South Africa.
McCulloch, G. & Borello, W.D. 1998. **Flamingo migration. Paper presented at the Colonial Waterbirds Meeting**, Miami, USA.
Mendelsohn, J.M. 1989. **Habitat preferences, population size, food and breeding of six owl species in the Springbok Flats**, South Africa. Ostrich.
Mucina, L. & Rutherford, M.C. (eds) 2006. **The vegetation of South Africa, Lesotho and Swaziland***.* Strelitzia 19. South African National Biodiversity Institute, Pretoria.

Ogada, DL., Keesing, F. & Virani, M.Z. 2012. **Dropping dead: cause and consequence of vulture population decline worldwide decline worldwide**. Annals of the New York Academy of Science, 1249: 57-71.
Peacock, F., Vasapolli, D. & Marais, E., 2024. **The Chamberlain guide to Birding Gauteng**, Mirafra Publishing, CTP Book Printers, Cape Town.
Peacock, F., 2006. **Pipits of Southern Africa – a complete guide to Africa's ultimate LBJ's**, Published by the author, Pretoria; www.pipits.co.za.
Percy, W., & Pitman C.R.S., 1963 **Further notes on the African Finfoot (*Podica senegalensis*)** (Viellot). Bull. Br. Ornithol. Club 83:127-132.
Simmons, R.E. 1990. **Copulation patterns of African Marsh Harrier: Evaluating the paternity assurance hypothesis**. Animal Behaviour, 40: 1151-1157.
Siegfried, W.R. 1967. **The distribution and status of the Black Stork in southern Africa**. Ostrich, 38: 179-185.
Simmons, R.E. 1990. **Copulation patterns of African Marsh Harrier: Evaluating the paternity assurance hypothesis**. Animal Behaviour, 40: 1151-1157.
Sinclair, I., Hockey, P., Tarboton W., Parrins, N., Rollinson. D. & Ryan P. 2020. **Sasol Birds of Southern Africa. 5th edition**, Struik, Cape Town.
Sinclair I., & Hockey P. 2005. **The Larger Illustrated Guide to Birds of Southern Africa**. Struik, Cape Town.
Steyn, P. 1982. **Birds of prey of southern Africa**. Claremont, Cape Town: David Philip.
Tarboton, W.R., Kemp, M.I., & Kemp, A.C. 1987. **Birds of the Transvaal**. Transvaal Museum, Pretoria.
Tarboton, W., 2001. **A Guide to the Nests and Eggs of Southern African Birds**. Struik, Cape Town.
Tarboton, W., 2011. **Roberts Nests and Eggs of Southern African Birds**. John Voelcker Bird Book Fund, Cape Town.
Tarboton, W.R. & Erasmus, R. 1998. **Sasol Owls & Owling in Southern Africa**. Struik, Cape Town.
Tarboton, W.R. & Allan, D.G. 1984. **The status and conservation of birs of prey in the Transvaal**. Transvaal Museum, Pretoria.
Taylor, MR, Peacock F, Wanless RW (eds). 2015. **The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland***. Birdlife South Africa*. Johannesburg. South Africa.
Turpie, JK. 2005. **Half-collared Kingfisher (*Alcedo semitorquata*)**. In: Hocky et al, 2005. *Roberts Birds of Southern Africa VII th Edition*, The Trustees of the John Voelcker Bird Book Fund, Cape Town.
Urban, E.K., Fry, C.H., & Keith, S., 1986. **Birds of Africa. Vol. 2**. Academic Press, London.
Van Ginkel, C.E., Glen, R.P., Gordon-Gray, K.D., Cilliers, C.J., Muasya, M., & van Deventer, P.P. 2011. **Easy identification of some South African Wetland Plants (Grasses, Restios, Sedges, Rushes, Bulrushes, Eriocaulons and Yellow-eyed grasses)**, Water Research Commission, Gezina.
Whittington-Jones, C. A., Lockwood, G., Pretorius, M. D. & Kemp, A. 2011. **Monitoring of the African Grass-Owl *Tyto capensis* on the Suikerbosrand Nature Reserve northern extension, Gauteng***, South Africa*: 2010-2011. Gabar 22: 19-21.

Websites:

www.iucnredlist.org
https://www.birdlife.org.za/media-and-resources/bird-checklists/
http://sabap2.adu.org.za/coverage/pentad/2555_2755
http://sabap2.adu.org.za/coverage/qdgc/2527DD

APPENDIX A: COMPLIANCE STATEMENT

Prior to commencing with a specialist assessment, the current use of the land and the environmental sensitivity of the site under consideration identified by the National screening tool must be confirmed by undertaking a site sensitivity verification.

The site sensitivity verification must be undertaken by an environmental assessment practitioner or a specialist.

The site sensitivity verification must be undertaken through the use of: (a) a desktop analysis, using satellite imagery; (b) a preliminary site inspection; and (c) any other available and relevant information.

The outcome of the site sensitivity verification must be recorded in the form of a report that: (a) confirms or disputes the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.; (b) contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; and (c) is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

Table 3: Terrestrial Biodiversity Compliance Statement – Low

Section in GN No. 320	Yes	No	Remarks / Section in the report
Has a Site verification report been undertaken by the Fauna Specialist	X		See the findings of the Verification report above.
The compliance statement must be prepared by a SACNASP registered specialist under one the fields of ecological sciences.	X		Zoological scientist registered at SACNASP with number: 134286
The compliance statement must: be applicable within the study area	X		See Locality Map in Section 3
confirm that the site is of “low” sensitivity for terrestrial biodiversity;	X		See Section 6. The study site outside the riparian area and buffer zone is regarded as low sensitive
indicate whether or not the proposed development will have any impact on the biodiversity feature.	X		Any development will affect the biodiversity, but the Red Data Half-collared Kingfisher and African Finfoot will be negatively affected if the proposed development encroach on the riparian area and it’s 50m buffer.
The compliance statement must contain, as a minimum, the following information: the contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	X		SACNASP Registration number: 134286. Zoological field of expertise CV attached to the report – see CV for contact details
a signed statement of independence by the specialist;	X		Page 4 of the report
a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	X		See Section 4
a baseline profile description of	X		See Section 5

Section in GN No. 320	Yes	No	Remarks / Section in the report
biodiversity and ecosystems of the site;			
the methodology used to verify the sensitivities of the terrestrial biodiversity features on the site, including equipment and modelling used, where relevant;	X		See Section 5 of the report
in the case of a linear activity, confirmation from the terrestrial biodiversity specialist that, in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase;		X	N/A
where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr;	X		See proposed mitigation measures in Section 8
a description of the assumptions made and any uncertainties or gaps in knowledge or data; and	X		See Section 7
any conditions to which this statement is subjected.	X		No development may take place within the riparian area and it's 50m buffer. Mitigation measures proposed must be implemented.
Signature of specialist:			Rihann F Geyser (Cert.Sci.Nat)

APPENDIX B: CURRICULUM VITAE

GEYSER, Rihann Frans

Identity Number	690304 5248 084
Gender	Male
Date of Birth	4 March 1969
Nationality	South African
Home Languages	Afrikaans, fluent in English, speak French
Cell	084 293 6128
E-mail	avifauna@galagoenvironmental.co.za
Qualifications	Senior Certificate (Grade 12) National Diploma Nature Conservation, Unisa (not completed)
SACNASP Registration:	Cert.Sci.Nat - No: 134286

Professional Honours

- 10 years' service with Galago Environmental
- 35 years birding experience
- Committee member of the BirdLife South Africa's BirdLife Northern Gauteng (Pretoria Bird Club) Branch.
- Bird Ringing coordinator for BirdLife Northern Gauteng and SAFRING, ADU, UCT, Cape Town.
- Chairman of BirdLife Northern Gauteng Bird ringing Group.
- 20 years' service at Department of Agriculture, Forestry and Fisheries.

Research Contributions

Review and contribution to several avifaunal publications such as Southern African Bird Atlas Project 1, Roberts Birds of southern Africa 7th edition, Pipits of Africa, LBJ's of southern Africa, Birding in Gauteng and 'my first bird book'. Sampling for DNA analyses; author of various bird ringing articles; lecturer and talk on bird related topics; projects participation on grey-headed gull colour ringing project, crimson breasted shrike behavioural studies, European swallow migratory studies, sunbird research, Pale Chanting Goshawk ringing and monitoring projects; Coordinated Avifaunal Road count (CAR), Coordinated Avifaunal Water Bird count (CWAC), Birds in Reserves Project (BIRP), Breeding and bird nest monitoring (NRCS), Southern African Bird Atlas 1 and 2 project, bird ringing promotions, liaison and training; Bird and nature guide, Bird photography. Avifaunal and biodiversity feasible studies, avifaunal surveys and over 650 scientific avifaunal reports for Environmental Impact Assessments.

Literary Contributions

Articles in popular science magazines and newspapers.

Formal Courses Attended

Bird identification, tree identification, small mammal identifications, mammal identification and ecology.

Experience in collecting and preserving of insects, mammals and plants as well as preparing skins of mammals and birds. Global Information Systems (GIS). General photography. ICDL computer training. First aid and fire prevention and distinguishing, time management, English writing skills, report writing etc.

Present Position:
Avifaunal (Birds) Specialist and Global Information System (GIS) technician, Galago Environmental CC, 1 January 2012 – 31 March 2021.

EMPLOYMENT HISTORY:
1 April 2021 – Present
Self Employed Avifaunal Specialist and Global Information Systems technician for Alcedo Birding. Avifaunal Monitoring for Renewable Energy consultant for AfriAvian Environmental. Guided birding Tours.

1 January 2012 – 31 March 2021
Full time Avifaunal Specialist and Global Information Systems technician for Galago Environmental CC.

2003 – 31 December 2011
Part time Avifaunal Specialist for Galago Environmental CC

1 December 1991 – 31 December 2011
Senior Administration Clerk and Senior Debt Security Inspector, Department of Agriculture, Forestry and Fisheries.

PROFESSIONAL CONTRIBUTIONS

- More than 650 Avifaunal specialist studies and reports for Galago Environmental CC for proposed residential/commercial developments, wind farms, solar farms and mining and rehabilitation.
- Thirty-five years of birding experience.
- Past Vice-chairman of BirdLife Northern Gauteng (Pretoria Bird Club).
- Leading birding outings and tours for BirdLife Northern Gauteng, various other bird clubs, Rietvlei Nature Reserve and other environmental and conservation organisations and operating as the official bird and tourist guide at Sammy Marks Ditsong Museum.
- Giving lectures on bird ringing, bird identification and quizzes as part of BirdLife Northern Gauteng program activities as well as to various other organisations.
- Past Chairman of the Pretoria Bird Club ringing group.
- Responsible for training and registering of newly qualified ringers at SAFRING.
- Lectures and popular articles.

HOBBIES AND SPORT
Birding, mammal and reptile surveys and monitoring. Photography. Skydiving, Hiking and Cricket.