

AUGUST 2021



**TSHEDZA 3 INVESTMENTS(PTY) LTD**  
**40MW PHOTOVOLTAIC SOLAR ENERGY FACILITY (PHASE 2)**  
**AVIFAUNAL SCOPING REPORT**

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## PROFESSIONAL EXPERIENCE

**Ms. Megan Diamond** Megan completed a Bachelor of Science degree in Environmental Management from the University of South Africa and has been involved in conservation for 20 years. She has 15 years' worth of experience in the field of bird interactions with electrical infrastructure and during this time has completed impact assessments for over 140 projects. During her tenure at the Endangered Wildlife Trust's Wildlife & Energy Programme and the Programme's primary project (i.e. the Eskom-EWT Strategic Partnership) from 2006 to 2013, Megan was responsible for assisting the energy industry and the national utility in minimising the negative impacts, associated with the construction and operation of electrical infrastructure, on wildlife through the provision of strategic guidance, risk and impact assessments, training and research. Megan (SACNASP Environmental Science Registration number 300022/14) currently owns and manages *Feathers Environmental Services* and is tasked with providing guidance to industry through the development of best practice procedures and avifaunal specialist studies for various developments including renewable energy facilities, power lines, power stations and substation infrastructure in addition to railway infrastructure and residential properties within South Africa and elsewhere within Africa. Megan has attended and presented at several conferences and facilitated workshops, as a subject expert, since 2007. Megan has authored and co-authored several academic papers, research reports and energy industry related guidelines, including the *BirdLife South Africa/ Endangered Wildlife Trust best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa* and the *Avian Wind Farm Sensitivity Map for South Africa* (2015), and played an instrumental role in facilitating the endorsement of these two products by the South African Wind Energy Association (SAWEA), IAIAsa (International Association for Impact Assessment South Africa) and Eskom. She chaired the Birds and Wind Energy Specialist Group in South Africa (2011/2012) and the IUCN/SSC Crane Specialist Group's Crane and Powerline Network (2013-2015), a working group comprised of subject matter experts from across the world, working in partnership to share lessons, develop capacity, pool resources, and accelerate collective learning towards finding innovative solutions to mitigate this impact on threatened crane populations. She is currently a member of the IUCN Stork, Ibis and Spoonbill Specialist Group and the Eskom-EWT Strategic Partnership Ludwig's Bustard Working Group.

## DECLARATION OF INDEPENDENCE

I, **Megan Diamond**, in my capacity as a specialist consultant, hereby declare that I:

- \* Act as an independent specialist to Environmental Management Assistance (Pty) Ltd for this project.
- \* Do not have any personal or financial interest in the project except for financial compensation for specialist investigations completed in a professional capacity as specified by the Amendment to Environmental Impact Assessment Regulations, 2017.
- \* Will not be affected by the outcome of the environmental process, of which this report forms part of.
- \* Do not have any influence over the decisions made by the governing authorities.
- \* Do not object to or endorse the proposed developments, but aim to present facts and our best scientific and professional opinion with regard to the impacts of the development.
- » Undertake to disclose to the relevant authorities any information that has or may have the potential to influence its decision or the objectivity of any report, plan, or document required in terms of the Amendment to Environmental Impact Assessment Regulations, 2017.

## INDEMNITY

- \* This avifaunal impact assessment report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken.
- \* This report is based on a desktop investigation using the available information and data related to the site to be affected. No long-term investigation or monitoring has been conducted.
- \* The Precautionary Principle has been applied throughout this investigation.
- \* The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information at the time of study.
- \* Additional information may become known or available during a later stage of the process for which no allowance could have been made at the time of this report.
- \* The specialist investigator reserves the right to modify this report, recommendations and conclusions at any stage should additional information become available.
- \* Information, recommendations and conclusions in this report cannot be applied to any other area without proper investigation.
- \* This report, in its entirety or any portion thereof, may not be altered in any manner or form or for any purpose without the specific and written consent of the specialist investigator as specified above.
- \* Acceptance of this report, in any physical or digital form, serves to confirm acknowledgment of these terms and liabilities.



6 August 2021

## EXECUTIVE SUMMARY

In order to demonstrate commitment to sustainable development and a pledge to move towards a cleaner energy future Tshedza 1 Pre Project Development (Pty) Ltd and Tshedza 3 Investments(Pty) Ltd (hereinafter referred to as *Tshedza*) proposes to construct a 59.9MW Photovoltaic (PV) solar energy facility (SEF), split across two phases of 19.9MW (Phase 1 on Farm Witpoortje 117 IR with associated 22kV power lines and 100MWh containerised battery storage, South of Brakpan, Gauteng Province (Ref: GP158MREA)) and 40MW (Phase 2) respectively, to supply power to the existing Ergo Mining (Pty) Ltd Brakpan Plant, a wholly owned subsidiary of DRD Gold Ltd. The Phase 2 development envelope is situated on Ergo Mining owned land adjacent to the Withok Estates Agricultural Holdings and Witpoort Estates Agricultural Holdings areas of Brakpan within the City of Ekurhuleni Metropolitan Municipality, Gauteng Province.

A screening report for the proposed study area was generated in August 2021. The proposed study area occurs within the Gauteng Environmental Management Framework and within an Air Quality Priority Area. Parts of the proposed study area are considered to have a MEDIUM Animal Species Theme Sensitivity and a HIGH Avian Theme Sensitivity, as a result of the presence of wetland areas. It is important to note that the delineation of wetlands actually pertains to the Bat Theme Sensitivity but may still have relevance to avifauna within the proposed study area. A preliminary desktop assessment of the available avifaunal data suggests that the site sensitivity is likely to be LOW-MEDIUM. This will however be verified during the EIA phase of the project following a site visit to the proposed development area.

A total of 309 bird species have been recorded within the relevant pentads during the SABAP2 atlassing period to date. The presence of these species in the broader area provides an indication of the diversity of species that could potentially occur within the areas earmarked for the proposed 40MW SEF, particularly where pockets of natural vegetation/habitats persist. Of the 309 species, 16 of these are considered to be of regional conservation concern. The White Stork *Ciconia ciconia*, which is not listed, but is protected internationally under the *Bonn Convention on Migratory Species* and Lesser Kestrel *Falco naumanni*, a GDARD priority species has also been recorded in the study area.

It is important to note that Red List species have been recorded in low numbers, with less than 20 individual birds being recorded over the fourteen-year survey period. Lanner Falcon *Falco biarmicus* is the only Red List species recorded in the single pentad within which the proposed 40MW SEF development is located. The low report rates can be attributed to fairly high levels of disturbance and habitat loss associated with the surrounding mining and industrial practices which has undoubtedly displaced many of the naturally occurring species, that under optimum conditions, would inhabit these areas. Although this report focuses on Red List species, since the impacts associated with the construction and operation of the proposed SEF are likely to be more biologically significant for these species, the impact on non-Red List species is also assessed, albeit in

less detail. Furthermore, Red List species can often be used as surrogate species for the others in terms of impacts and the necessary mitigation.

The study area is located within the Grassland Biome and is comprised the Kliprivier Highveld Grassland, Tsakane Clay Grassland and Soweto Highveld Grassland vegetation types. The proposed study area has experienced a fairly substantial degree of transformation as a result of agricultural practices. While pockets of natural habitat persist, the fragmented nature of this habitat and the levels of existing disturbance, preclude an abundance of Red List species within the proposed development area.

In conclusion, this high-level assessment has identified at least four avifaunal habitats of varying sensitivities within the proposed study area. Despite anthropogenic impacts, mostly in the form of agricultural and mining practices that have largely transformed the landscape resulting in a negative impact on avifaunal abundance, potentially sensitive habitat persists within the study area. The construction of the proposed Phase 2 PV SEF facility and its ancillary infrastructure will likely result in impacts of medium significance, which can be reduced through the application of mitigation measures. It is anticipated that sustainable development of the proposed Phase 2 PV SEF facility and grid connection can be achieved with acceptable levels of impact on the resident avifauna subject to further specialist avifaunal impact assessment studies to be conducted as part of the EIA process in order to:

- \* Confirm avifaunal microhabitats within the proposed development area and assess these for their suitability to support Red List and non-Red List priority species, in terms of breeding, roosting and foraging;
- \* Describe the avifaunal communities (both Red List and non-Red List priority species) most likely to be impacted, based on data collected as part of a systematic and quantified data collection process:

*a. Sample counts of small terrestrial species*

Small terrestrial birds are an important component of this programme. Given the spatial scale of the development, these smaller species may be particularly vulnerable to displacement and habitat level effects. Sampling these species is aimed at establishing indices of abundance for small terrestrial birds in the study area. These counts should be done when conditions are optimal. In this case this means the times when birds are most active and vocal, i.e. early mornings. A minimum of 12 point count survey points will be established across the proposed 40MW SEF sites.

*b. Counts of large terrestrial species and raptors*

This is a very similar data collection technique to that above, the aim being to establish indices of abundance for large terrestrial species and raptors. These species are relatively easily detected from a vehicle, hence vehicle-based counts are conducted in order to determine the presence and number

of birds of relevant species in the study area. Detection of these large species is less dependent on their activity levels and calls, so these counts can be done later in the day. A minimum of one driven transect route will be established and conducted during the single-day site survey.

*c. Focal site surveys and monitoring*

Any particularly sensitive sites such as wetlands, dams and breeding sites will be identified and monitored during the site visit.

*d. Incidental observations*

All other incidental sightings of Red List and non-Red List priority species (and particularly those suggestive of breeding or important feeding or roosting sites) within the development area will be georeferenced and documented.

- \* Provide a detailed description of the impacts associated with the construction, operation and decommissioning of the proposed Phase 2 40MW SEF development;
- \* Assess the significance (rated according to a pre-determined set of criteria, as supplied by the primary consultant) of the identified direct, indirect and cumulative impacts, during the construction, operation and decommissioning phases of the proposed development based on data collected in-field;
- \* Consider layout plans and advise possible changes to the layout;
- \* Recommend practical mitigation measures for the management of the identified impacts, at each stage of the development process, for inclusion in the draft Environmental Management Programme (EMPr);
- \* Propose a monitoring programme for the sensitive areas, species or receptors (if necessary); and
- \* Describe the gaps in baseline data will be provided. An indication of the confidence levels will be given. The best available data sources will be used to predict the impacts, and extensive use will be made of local knowledge if available.

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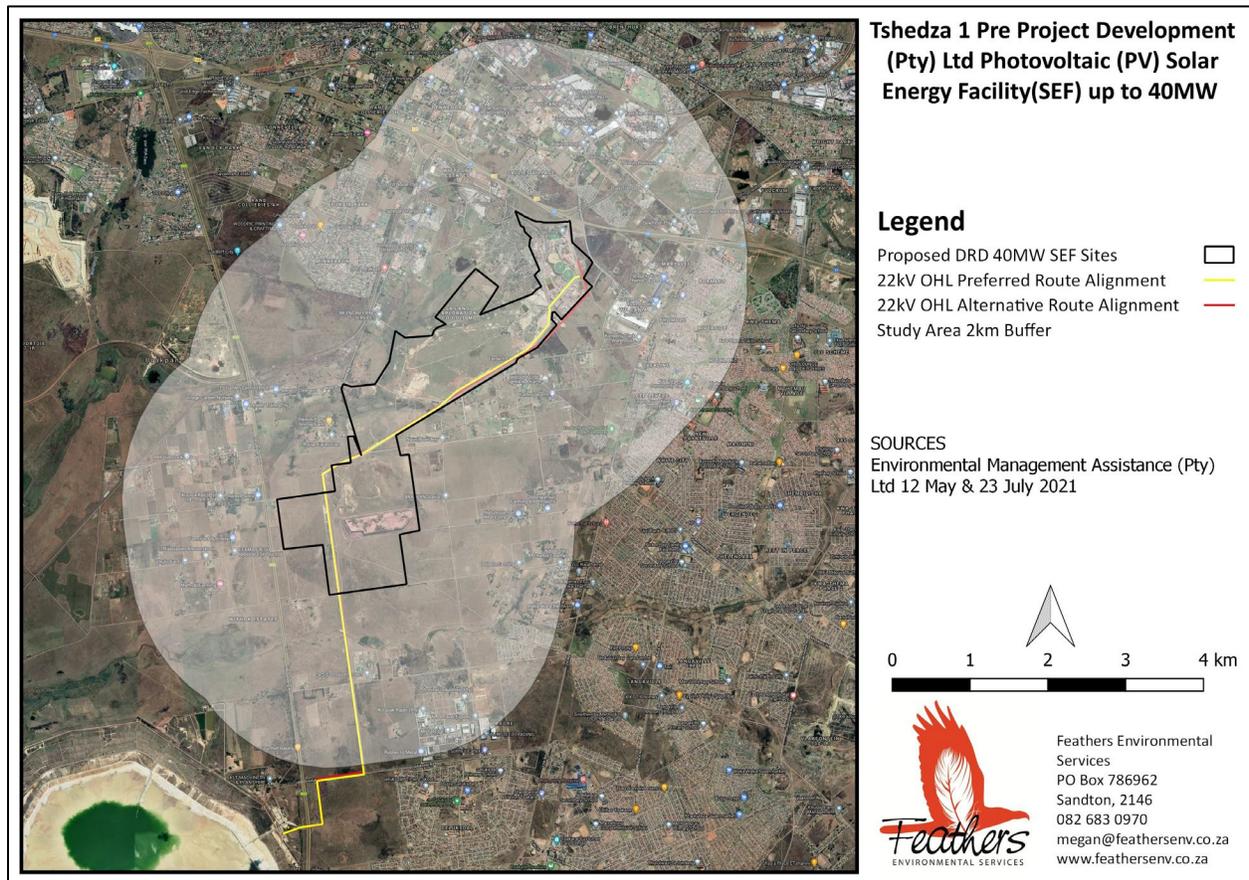
# 1. INTRODUCTION

## 1.1 Background

Energy infrastructure plays an important role in fortifying economic activity and growth across the country and therefore the development of this infrastructure needs to be robust and extensive enough to meet industrial, commercial and household needs. South Africa's Renewable Energy potential is significant and together with a national commitment to transition to a low carbon economy, 26 030MW of the 2019 Integrated Resources Plan target of newly generated power are expected to be from renewable energy sources (<https://ipp-projects.co.za>). In order to demonstrate commitment to sustainable development and a pledge to move towards a cleaner energy future Tshedza 1 Pre Project Development (Pty) Ltd and Tshedza 3 Investments(Pty) Ltd (hereinafter referred to as *Tshedza*) proposes to construct a 59.9MW Photovoltaic (PV) solar energy facility (SEF), split across two phases of 19.9MW (**Phase 1 - on Farm Witpoortje 117 IR with associated 22kV power lines and 100MWh containerised battery storage, South of Brakpan, Gauteng Province (Ref: GP158MREA) previously assessed through a Basic Assessment Process**) and 40MW (**Phase 2 - as assessed in this scoping report**) respectively, to supply power to the existing Ergo Mining (Pty) Ltd Brakpan Plant, a wholly owned subsidiary of DRD Gold Ltd. The Phase 2 development envelope is situated on Ergo Mining owned land adjacent to the Withok Estates Agricultural Holdings and Witpoort Estates Agricultural Holdings areas of Brakpan within the City of Ekurhuleni Metropolitan Municipality, Gauteng Province (FIGURE 1). The two mining facilities i.e., Ergo Mining Brakpan Plant and the Brakpan/Withok Tailings Dam facility, are currently supplied with electricity by Eskom via the existing grid infrastructure. The proposed PV SEF will generate electricity with battery storage (battery storage assessed through a separate BAR process (Phase 1), to integrate with the existing Eskom grid to supply the Ergo Mining Brakpan Plant and the Brakpan/Withok Tailings Facility. The generated electricity will be utilised when there is an interruption to Eskom's supply in energy.

The National Environmental Management Act (NEMA) (Act 107 of 1998) requires that an impact assessment be conducted for any development which could have a significant effect on the environment, with the objective to identify, predict and evaluate the actual and potential impacts of these activities on ecological systems; identify alternatives; and provide recommendations for mitigation to minimize the negative impacts. In order to meet the Scoping and Environmental Impact Reporting (S&EIR) requirements as outlined in the 2014 National Environmental Management Act (No 107 of 1998) Regulations GNR 983, GNR 984 and GNR 985, as amended in 2017, *Tshedza* require detailed specialist studies that will document any potential fatal flaws, the impacts of the project and recommend measures to manage (maximise positive and minimise negative) and monitor those impacts. *Tshedza* has appointed Environmental Management Assistance (Pty) Ltd (hereinafter referred to as *EMA*) as independent environmental assessment practitioners to manage the Environmental Impact Assessment (EIA) process for the proposed Phase 2 development. Feathers Environmental Services CC was appointed to compile the avifaunal component using a set methodology and various data sets (discussed

elsewhere) to determine which avian species regularly occur within the study area, the availability of bird micro habitats (i.e. avifaunal sensitive areas), and the possible impacts of the proposed development.



**FIGURE 1:** Regional map detailing the location of the proposed PV solar energy facility (up to 40MW) located within the Ekurhuleni Metropolitan Municipality, Gauteng Province.

## 1.2 Project Description

The proposed project site that has been earmarked for the proposed 40MW PV SEF is located in the Brakpan area in the Ekurhuleni Metropolitan Municipality, Gauteng Province. The proposed 40MW SEF development envelope is approximately 560ha in extent.

The key infrastructure components associated with the proposed project will consist of the following:

- \* PV solar panels with an export capacity of up to 40MW;
- \* Mounting structures to support the PV panels. The PV panels will be mounted at an appropriate height so as to receive the maximum amount of solar radiation without the buffeting effects of the wind. The angle of the panel moves and tracks the sun so that the maximum amount of solar radiation can be collected through the day;

- \* Cabling between project components;
- \* An onsite substation with central inverter/transformer stations to collect the energy generated from the PV panels and convert the electricity from direct to alternating current which can be evacuated into the electricity distribution grid;
- \* Internal access roads (3m in width); and
- \* Associated buildings including a workshop area for maintenance, storage, and control facility with basic services such as water, sewage and electricity.

## 2. RELEVANT LEGISLATION AND GUIDELINES

The following pieces of legislation are applicable to this assessment:

- \* The Convention on Biological Diversity;
- \* The Convention on the Conservation of Migratory Species of Wild Animals;
- \* The Agreement on the Conservation of African-Eurasian Migratory Water Birds;
- \* The National Environmental Management Act 107 of 1998 (NEMA);
- \* The National Environmental Management Act 107 of 1998 (NEMA) Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes, October 2020;
- \* The National Environmental Management Act 107 of 1998 (NEMA) Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal and or Avifaunal Species, October 2020;
- \* The National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA) and the Threatened or Protected Species Regulations, February 2007 (TOPS Regulations);
- \* National Environmental Management: Protected Areas Act 27 of 2003;
- \* Gauteng Biodiversity Conservation Plan, Version 3.3
- \* Gauteng Department of Agriculture and Rural Development (GDARD) Requirements for Biodiversity Assessments Version 3, March 2014
- \* Best Practice Guidelines: Birds and Solar Energy
- \* International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability

## 3. STUDY METHODOLOGY

### 3.1 Terms of Reference

The avifaunal specialist has conducted this scoping assessment according to the following terms of reference:

- \* Conduct a site sensitivity assessment through the use of a desk top analysis, using satellite imagery and any other available and relevant information;

- \* Identify and describe avifaunal microhabitats within the proposed 40MW SEF study area and assess these for their suitability to support Red List and non-Red List priority species, in terms of breeding, roosting and foraging;
- \* Describe the avifaunal communities (particularly with reference to Red List species) most likely to be impacted on by the proposed 40MW SEF development;
- \* Identify potentially significant (avifaunal) impacts to be assessed during the EIA phase and detail the methodology to be adopted in assessing the potential impacts associated the construction, operation and decommissioning of the proposed 40MW SEF development; and
- \* Consider layout plans and advise possible changes to the layout.

### 3.2 Methods

The following methodology was employed to compile this avifaunal scoping report:

- \* Collect and examine various avifaunal data sets (detailed in section 3.3) at a desktop level to determine the presence of sensitive Red List, as well as non-Red List priority species, that may be vulnerable to the impacts associated with the proposed 40MW SEF development;
- \* Identify suitable avifaunal habitats and potential sensitive areas within the immediate surrounds of the proposed 40MW SEF development, where impacts are likely to occur, using various Geographic Information System (GIS) layers and Google Earth imagery; and
- \* Predict and describe the potential impacts, associated with the construction and operation of the proposed 40MW SEF on the avifaunal community

### 3.3 Data sources used

The following data sources and reports were used in varying levels of detail for this study:

- \* Screening Report for an Environmental Authorisation or for an Environmental Authorisation as required by the 2014 EIA Regulations - Proposed Site Environmental Sensitivity, Feathers Environmental Services, 5 February 2021
- \* Bird distribution data of the South African Bird Atlas 2 (SABAP 2) was obtained from the Animal Demography Unit of the University of Cape Town (20 July 2021) as a means to ascertain which species occur within the **broader area**, based on nine pentad grid cells surrounding the proposed 40MW SEF development. Each pentad is approximately 8 × 7.6 km. Between 2007 and 2021, a total of 1232 full protocol cards (i.e. 1232 bird surveys lasting a minimum of two hours each) have been completed across the nine pentads. The relevant pentads within the study area include: 2610\_2815; 2610\_2820; 2610\_2825; 2615\_2815; 2615\_2820; 2615\_2825; 2620\_2815; 2620\_2820 and 2620\_2825 (FIGURE 3);

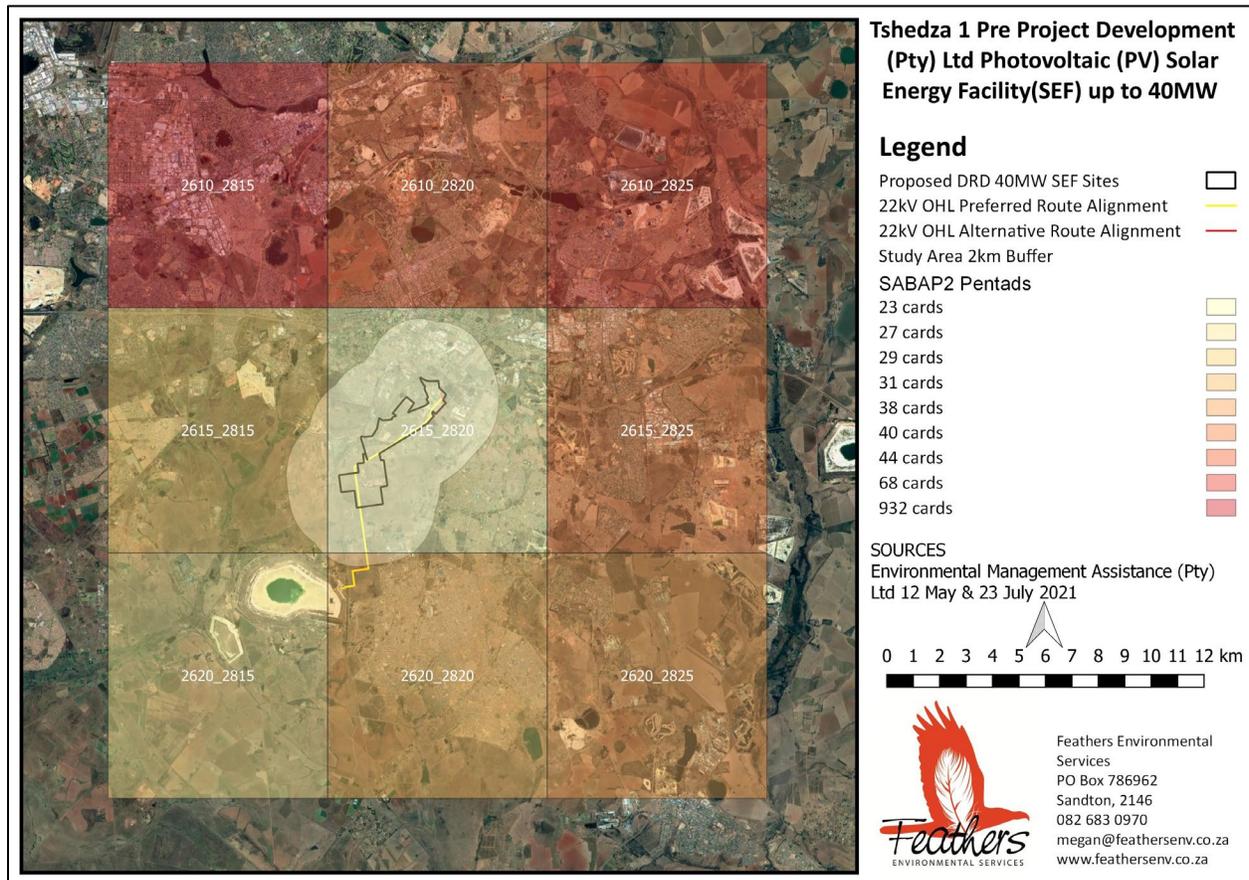
- \* The Important Bird Areas (IBAs) report (Marnewick et al. 2015) was consulted to determine the location of the nearest IBAs and their importance for this study. The study area is not located within an IBA, however the Blesbokspruit IBA (SA017) may have relevance to this study;
- \* Co-ordinated Waterbird Count Database (CWAC – Taylor et al. 1999) was consulted determine if large concentrations of water birds, associated with South African wetlands, may occur within the study area. The study area does not contain CWAC sites, however eight CWAC sites i.e., Cowles Dam, Grootvaly Wetland Reserve, Grootvaly on Blesbok, the Anglo Reserve, Marievale (Areas A & B), Leeupan and Apex Pan that are located within 20km of the study area and may have relevance to this study;
- \* Coordinated Avifaunal Roadcount project database (CAR – Young et al, 2003) - was consulted to obtain relevant data on large terrestrial bird report rates in the area. The study area does not contain a CAR route, however a single route (GD02) occurs within 20km of the study area and may have relevance to this study;
- \* The conservation status and endemism information of all bird species occurring in the aforementioned pentads was then determined with the use of the Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland (Taylor et al. 2015) and the IUCN Red List of Threatened Species (<http://www.iucnredlist.org>) and the most recent and comprehensive summary of southern African bird biology (Hockey et al. 2005);
- \* The latest vegetation classification described in the Vegetation Map of South Africa (South African National Biodiversity Institute, 2012 and Mucina & Rutherford, 2006) was consulted in order to determine which vegetation types occur within the proposed study area;
- \* High-resolution Google Earth ©2021 imagery was used to examine the microhabitats within the proposed study area;
- \* KMZ. shapefile detailing the location of Phase 2 of the proposed 40MW SEF, provided by Environmental Management Assistance (Pty) Ltd on 23 July 2021;
- \* Primary bird occurrence and microhabitat data emanating from a summer season survey of the Phase 1 study area (8-9 February 2021);
- \* Comments received from Interested and Affected Party (I&AP) Ms. Jeanne-Michele White and Mrs. Santjie White on 17 and 25 March 2021 respectively during the public participation process conducted for Phase 1, regarding the presence and breeding activities of African Grass Owl, Marsh Owl *Asio Capensis* and African Marsh Harrier, in addition to the occasional presence of Blue Crane *Anthropoides paradeus*, Verreaux's Eagle *Aquila verreauxii* and Secretarybird according to observations carried out in the area over a 15-year period; and
- \* The BirdLife South Africa position statement on solar energy and birds (BirdLife South Africa, 2012) and the *Birds and Solar Energy: Guidelines for assessing and monitoring the impact of solar power generating facilities on birds in southern* (Jenkins et al, 2017) was used for evaluating the potential impacts and to inform the site visit requirements for this assessment.

### 3.4 Limitations & assumptions

The author assumed that the sources of information used are reliable. However, it must be noted that there are limiting factors and these may potentially detract from the accuracy of the predicted results.

- \* This scoping report is the result of a desktop review of the available information. **Therefore, the precautionary principle was applied throughout this scoping assessment.** This scoping report relies on secondary data sources with regards to bird occurrence and abundance such as the SABAP2 and IBA projects. These comprehensive datasets provide a valuable baseline against which any changes in species presence, abundance, and distribution can be monitored.
- \* By virtue of their mobility, the assessment of bird presence and abundance cannot be confined to the proposed 40MW SEF sites, therefore the **study area was defined as a 2km zone** around the proposed development area. Avifaunal sensitivity has been defined for this study area i.e., the proposed SEF site in addition to the 2km zone surrounding the proposed development.
- \* Although the proposed 40MW SEF is located largely within a single pentad grid cell (2615\_2820), a larger area is necessary to obtain a dataset that is large enough (encompassing nine pentad grid cells) to ensure that reasonable conclusions about species diversity and densities, in a particular habitat type, can be drawn. Coverage by SABAP2 is extensive with a total of 1232 full protocol data cards being completed across the nine pentads (FIGURE 2). These surveys provide an accurate snapshot of the avifauna in the study area.
- \* The focus of this assessment is primarily on the potential impacts on regional Red List and priority species i.e., species that are vulnerable to the displacement and collision impacts associated with the construction and operation of the proposed 40MW SEF. The impact on non-Red List species is also assessed, albeit in less detail. Furthermore, much of the mitigation recommended for Red List species will also protect non-Red List species in the study area.
- \* Predictions in this study are based on experience of these and similar species in different parts of South Africa, through the authors' experience working in the avifaunal specialist field since 2006. However, bird behaviour cannot be reduced to formulas that will hold true under all circumstances. It must also be noted that, it is often not possible to entirely eliminate the risk of the disturbance and displacement impacts associated with the construction and operational activities. Our best possible efforts can probably not ensure zero impact on birds. Assessments such as this attempt to minimise the risk as far as possible, and although the impacts associated with the proposed developments will be unavoidable, they are likely to be temporary.

The above limitations need to be stated as part of this assessment so that the reader fully understands the complexities. **However, they do not detract from the confidence that this author has in the findings of this scoping report and recommendations for subsequent phases of this project.**



**FIGURE 2:** Location of the nine South African Bird Atlas Project 2 (SABAP2) pentad grid cells that were considered for the proposed Phase 2 40MW SEF development.

#### 4. SITE SENSITIVITY VERIFICATION

A screening report for the proposed study area was generated in August 2021. The proposed study area occurs within the Gauteng Environmental Management Framework and within an Air Quality Priority Area. Parts of the proposed study area are considered to have a MEDIUM Animal Species Theme Sensitivity and a HIGH Avian Theme Sensitivity, as a result of the presence of wetland areas. It is important to note that the delineation of wetlands actually pertains to the Bat Theme Sensitivity but may still have relevance to avifauna within the proposed study area. A preliminary desktop assessment of the available avifaunal data suggests that the site sensitivity is likely to be LOW-MEDIUM. This will however need to be verified during the EIA phase of the project following a site visit to the proposed development area.

#### 5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

## 5.1 Relevant Bird Populations

### 5.1.1 Important Bird Areas

The proposed Phase 2 40MW SEF is not located within the confines of an Important Bird Area (IBA). The closest IBA to the proposed study area is the Blesbokspruit IBA (SA021) with its most western boundary located approximately 12km to the east of the proposed solar site (FIGURE 3). The Blesbokspruit IBA is a large, highly modified wetland which extends along the Blesbokspruit, one of the Vaal River's larger tributaries, from the Grootvaly Wetland Reserve in the north to the Marievale Bird Sanctuary in the south. More than 220 species have been recorded for the IBA in SABAP2 (Marnewick et al. 2015). African Marsh Harrier *Circus ranivorus* and African Grass-Owl *Tyto capensis* have been displaced from much of the surrounding area as a result of intense industrialisation, urbanisation and habitat modification. The proximity of the IBA provides an indication of the species that are likely to occur in similar habitats found within the proposed development area. In particular, they highlight those species of conservation concern that are vulnerable to the displacement and collision impacts associated with the construction and operation of the 40MW SEF.

### 5.1.2 Protected Areas

Four protected areas are located within a 20km radius of the proposed 40MW SEF (FIGURE 3). These areas are protected by law and managed for biodiversity conservation, providing much needed habitat that can potentially support a diversity and abundance of avifaunal species. Similarly, to IBAs these areas may provide an indication of the avifaunal species that are likely to occur in similar habitats found within the study area.

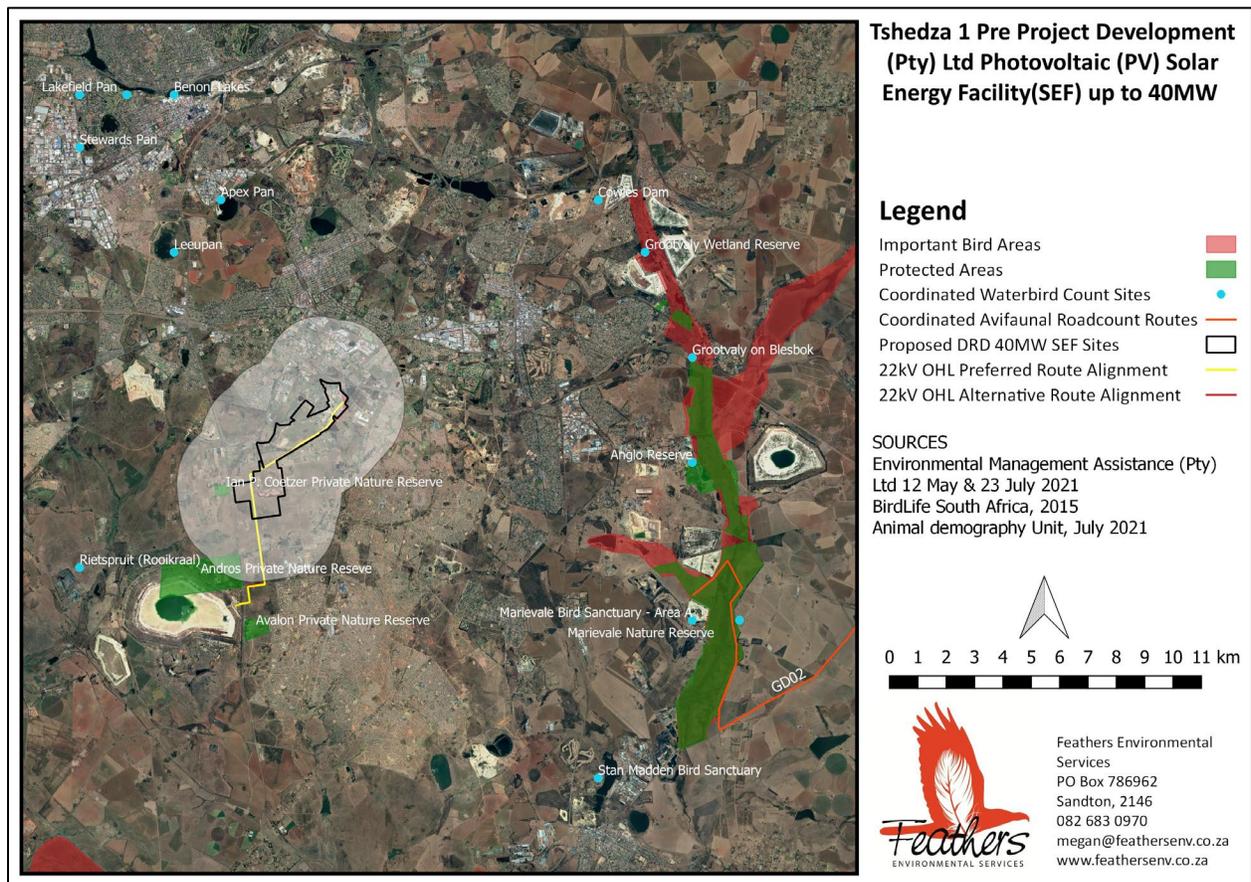
### 5.1.3 Coordinated Avifaunal Roadcount (CAR) Routes

Cranes, bustards, storks and other large birds that spend most of their time on the ground, need wide, open spaces and are certainly not restricted to protected areas. Agricultural habitats are used extensively for feeding, roosting and breeding, often because no natural, pristine habitats are available, and sometimes because the agricultural habitats are especially attractive to birds. The Coordinated Avifaunal Roadcounts (CAR) project monitors the populations of 36 species of large terrestrial birds in agricultural habitats, in addition to gamebirds, raptors and corvids along 350 fixed routes covering over 19 000km (<http://car.adu.org.za/>). Although CAR road counts do not give an absolute count of all the individuals in a population, they do provide a measure of relative abundance in a particular area. Given the built-up nature of the study area, there are no CAR routes within the proposed development area. Route GD02 occurs within a 20km of the study area and is associated with the Blesbokspruit IBA (FIGURE 3). This route has recorded White Stork, Secretarybird *Sagittarius serpentarius*, Steppe Buzzard and Back-shouldered Kite *Elanus caeruleus*.

### 5.1.4 Coordinated Waterbird Count (CWAC) Sites

A CWAC site is any body of water, other than the oceans, which supports a significant number (set at approximately 500 individual waterbirds, irrespective of the number of species) of birds which use the site for

feeding, and/or breeding and roosting (Harrison et al, 2004). This definition includes natural pans, vleis, marshes, lakes, rivers, as well as a range of manmade impoundments (i.e. sewage works). The presence of a CWAC site within the study area is an indication of a large number of waterbird species occurring there and the overall sensitivity of the area. Eight CWAC sites occur within 20km of the proposed solar site. These include Cowles Dam, Grootvaly Wetland Reserve, Grootvaly on Blesbok, the Anglo Reserve, Marievale (Areas A & B), Leeupan and Apex Pan (FIGURE 3). While these CWAC sites may provide an indication of the waterbird species that could be supported by natural and artificial impoundments within the study area, these sites will not have a significant impact on the sensitivity rating for the proposed 40MW SEF.



**FIGURE 3:** Regional map detailing the location of the proposed 40MW SEF development site in relation to Important Bird Areas (IBAs), Protected Areas, Coordinated Waterbird Count Sites and Coordinated Avifaunal Roadcount Routes.

**5.1.5. South African Bird Atlas Project 2 Data (SABAP2)**

A total of 309 bird species have been recorded within the relevant pentads during the SABAP2 atlassing period to date (APPENDIX 1). The presence of these species in the broader area provides an indication of the diversity of species that could potentially occur within the areas earmarked for the proposed 40MW SEF, particularly

where pockets of natural vegetation/habitats persist. Of the 309 species, 16 of these are considered to be of regional conservation concern i.e. regional Red List species (Taylor et al, 2015). The White Stork *Ciconia ciconia*, which is not listed, but is protected internationally under the *Bonn Convention on Migratory Species* and Lesser Kestrel *Falco naumanni*, a GDARD priority species has also been recorded in the study area. It is important to note that with the exception of Maccoa Duck *Oxyura maccoa* (n=129), Lesser Flamingo (n=166) and Greater Flamingo (n=409) the remaining Red List species have been recorded in low numbers, with less than 20 individual birds being recorded over the fourteen-year survey period. The significant individual numbers of Maccoa Duck, Lesser and Greater Flamingo can be attributed to the number of observations/surveys conducted within three pentads to the north of the study area, which contain a series of wetlands and waterbodies - habitat that is capable of supporting these species in their abundance. Lanner Falcon *Falco biarmicus* is the only Red List species recorded in the single pentad within which the proposed 40MW SEF development sites are located. The low report rates can be attributed to fairly high levels of disturbance and habitat loss associated with the surrounding mining and industrial practices which has undoubtedly displaced many of the naturally occurring species, that under optimum conditions, would inhabit these areas. Although this report focuses on Red List species, since the impacts associated with the construction and operation of the proposed 40MW SEF is likely to be more biologically significant for these species, the impact on non-Red List species is also assessed, albeit in less detail. Furthermore, Red List species can often be used as surrogate species for the others in terms of impacts and the necessary mitigation. The non-Red List priority species that have been considered for this assessment include korhaan, buzzards, kestrels, falcons, herons, geese, ibis and various water dependent species. Each Red List species' potential for occurring in a specific habitat class is indicated in TABLE 1.

#### **5.1.7. Interested and Affected Party Comments and Local Knowledge**

Comments were received from Ms. Jeanne-Michele White and Mrs. Santjie White on 17 and 25 March 2021 respectively, regarding the presence and breeding activities of African Grass Owl, Marsh Owl *Asio Capensis* and African Marsh Harrier, in addition to the occasional presence of Blue Crane *Anthropoides paradeus*, Verreaux's Eagle *Aquila verreauxii* and Secretarybird according to observations carried out in the area over a 15-year period. These comments have been considered for this scoping assessment in addition to the following observations made by the avifaunal specialist during the Phase 1 impact assessment:

- \* A Phase 1 site sensitivity verification of the project was conducted through the use of both a desktop analysis and an on-site inspection, conducted on 8-9 February 2021. The desktop analysis and on-site inspection, revealed that the study area demarcated as potential African Grass Owl habitat, occurs within a rehabilitated mine area and is bordered by a light industrial zone and residential area. The natural habitat in this area is highly fragmented and subject to significant disturbance (i.e. pastoral activities, industrial activities as well as vehicle and pedestrian traffic) and therefore unlikely to support African Grass

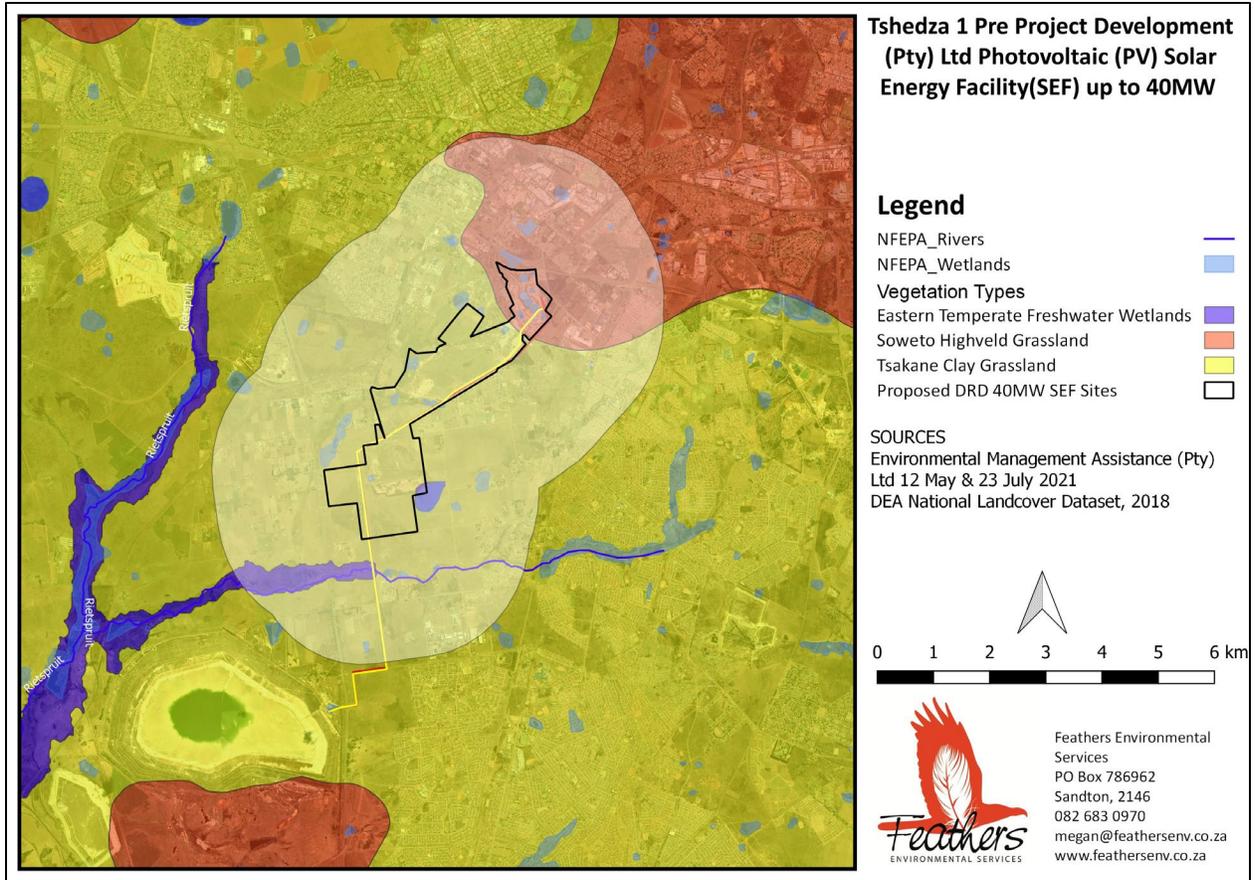
Owl. An analysis of the South Africa Bird Atlas Project 2 and CAR datasets supports this premise, with no African Grass Owl observations in the study area or within the much broader area of 68,000ha.

- \* The Phase 1 site visit produced a combined list of 40 species, covering both the study area and to a limited extent, the surrounding area. No Red List species were observed during the site visit. Most observations were of small passerine species that are common to this area. Each of these species has the potential to be displaced by the proposed 40MW SEF as a result of habitat transformation and disturbance. However, these species have persisted despite existing disturbance within the study area. This resilience, coupled with the fact that similar habitat is available throughout the broader area, means that the displacement impact will not be of regional or national significance. In addition, no raptor nests or other possible breeding sites were noted during the site survey.

## 5.2 Bird Habitat Classes (Microhabitats)

Vegetation is one of the primary factors determining bird species distribution and abundance in an area. It is widely accepted within ornithological circles that vegetation structure is more important in determining which bird species will occur there. The classification of vegetation types is from Mucina & Rutherford (2006 and 2012), while from an avifaunal perspective, the Atlas of southern African Birds (SABAP1) recognises six primary vegetation divisions or biomes within South Africa, namely (1) Fynbos (2) Succulent Karoo (3) Nama Karoo (4) Grassland (5) Savanna and (6) Forest (Harrison et al. 1997). Whilst much of the distribution and abundance of bird species can be attributed to the broad vegetation types present in an area, it is the smaller spatial scale habitats (micro habitats) that support the requirements of a particular bird species that need to be examined in greater detail. Micro habitats are shaped by factors other than vegetation, such as topography, land use, food availability, and various anthropogenic factors all of which will either attract or deter birds and are critically important in mapping the site in terms of avifaunal sensitivity and ultimately informing mitigation requirements. Investigation of the proposed 40MW SEF development site revealed at least four broadly described avifaunal micro habitats i.e. grassland, rivers, waterbodies and exotic/alien tree stands (FIGURE 4).

TABLE 1 details the micro habitats that each Red List bird species and non-Red List priority species (recorded by SABAP2) will typically frequent in the study area. It must be stressed that birds can and will, by virtue of their mobility, utilise almost any areas in a landscape from time to time. However, the analysis in TABLE 1 represents each species' most preferred or normal habitats. These locations are where most of the birds of that species will spend most of their time which in turn provides an indication of where impacts on those species will be most significant.



**FIGURE 4:** Regional map detailing the various vegetation types, perennial, non-perennial rivers and wetlands occurring at the proposed development site and within the broader study area

TABLE 1: Habitat features considered for the identification of sensitive areas within the identified development area

| CRITERIA | FEATURE              | SOURCE   | DESCRIPTION   | BUFFER | FEATURE ID | PRIORITY SPECIES   | PRELIMINARY ASSESSMENT SENSITIVITY RATING   | DEVELOPMENT CATEGORY  |
|----------|----------------------|--|---|--------|------------|--|---|---|
| Habitat  | Rivers               | NFEPA Rivers 2012  | Rivers provide important corridors of microhabitat for waterbirds that will utilise rivers as a source of drinking water, food, bathing and shelter for skulking species. Thick riverine woodland with large shady riparian trees, offers important breeding substrate for a variety of birds including raptors   | 500m   |            | <p>Maccoa Duck<br/>Half-collared Kingfisher<br/>Yellow-billed Stork<br/>White Stork</p> <p>Coots, cormorants, ducks, teals, herons, egrets, ibis, geese, lapwing, ruffs, and stints</p>  | <b>HIGH</b> - These areas are potentially unsuitable for development owing to the presence of critical habitat (utilised for breeding, roosting and foraging) and the presence of priority species vulnerable to the proposed development | <b>NON-PREFERRED</b><br>Areas where development is discouraged i.e. no-go areas |
| Habitat  | Wetlands/Waterbodies | DEA National Landcover Dataset 2018<br>NFEPA Wetlands 2012 | <p>Wetlands are characterized by slow flowing seasonal water (or permanently wet) and tall emergent vegetation (rooted or floating) and provide habitat for many water birds.</p> <p>Whilst dams have altered flow patterns of streams and rivers, a number of species have benefited from their construction resulting in a range expansion for many water bird species, formerly restricted to areas of higher rainfall. Apart from the water quality, the structure of the dam, and specifically the margins and the associated shoreline and vegetation, plays a significant role in determining the species that will be attracted to the waterbody.</p> | 500m   |            | <p>Maccoa Duck<br/>Greater Flamingo<br/>Lesser Flamingo<br/>African Marsh Harrier<br/>Greater Painted Snipe<br/>Great White Pelican<br/>Yellow-billed Stork<br/>White Stork<br/>Caspian Tern</p> <p>Coots, cormorants, ducks, teals, herons, egrets, ibis, geese, lapwing, ruffs, and stints</p> | <b>HIGH</b> - These areas are potentially unsuitable for development owing to the presence of critical habitat (utilised for breeding, roosting and foraging) and the presence of priority species vulnerable to proposed development     | <b>NON-PREFERRED</b><br>Areas where development is discouraged i.e. no-go areas |

| CRITERIA | FEATURE            | SOURCE                              | DESCRIPTION  | BUFFER | FEATURE ID         | PRIORITY SPECIES  | PRELIMINARY ASSESSMENT SENSITIVITY RATING  | DEVELOPMENT CATEGORY  |
|----------|--------------------|-------------------------------------|--|--------|--------------------|---|--|---|
| Habitat  | Grassland          | DEA National Landcover Dataset 2018 | Of South Africa's 841 bird species, 350 occur in the Grassland Biome. This includes 29 species of conservation concern. Grasslands represent a significant feeding area for many bird species in densely populated areas. Grassland patches are also a favourite foraging area for game birds which in turn attract large raptors. | -      | Grassland          | Secretarybird<br>Blue Korhaan<br>African Grass Owl<br>Lanner Falcon<br>Lesser Kestrel<br>African March Harrier<br>Black-winged Pratincole<br>Abdim's Stork<br>White Stork<br>Melodious Lark | <b>MEDIUM HIGH -</b><br>Areas that contain habitat of importance to priority bird species sensitive to the proposed development            | <b>ACCEPTABLE:</b><br>Areas are developable but with mitigation |
| Habitat  | Exotic Tree Stands | DEA National Landcover Dataset 2018 | Stands of <i>Eucalyptus</i> are invader species, but have become important refuges for certain species of raptors, which will commonly roost and breed in small stands of <i>Eucalyptus</i> in suburbs of small towns  | -      | Exotic plantations | Martial Eagle<br>Lanner Falcon  | <b>MEDIUM LOW -</b><br>Areas that contain habitat that may be of importance to priority bird species sensitive to the proposed development | <b>ACCEPTABLE:</b><br>Areas are developable but with mitigation |

## 6. GENERAL DESCRIPTION OF BIRD INTERACTIONS WITH ELECTRICITY GENERATION INFRASTRUCTURE

The effects of any development on birds are highly variable and depend on a wide range of factors including the specification of the development, the topography of the surrounding land, the habitats affected and the number and diversity of species present. The principal areas of concern for Red List and non-Red List priority species related to the proposed 40MW SEF development are listed below:

- \* Displacement due to habitat loss in the physical SEF infrastructure footprint;
- \* Displacement due to disturbance associated with construction and operation/maintenance of the proposed 40MW SEF development;
- \* Mortality due to collision with the PV panels; and
- \* Displacement due to habitat loss as a result of altered run-off and the use of chemical pollutants.

The aforementioned impacts will be described and assessed in detail, following the site visit to the Phase 2 study area during the EIA phase of the project process. TABLE 2 provides a summary of the potential impacts associated with the proposed development, based on a preliminary assessment of the species and habitat information contained within this scoping report.

**TABLE 2: Scoping assessment of the potential impacts associated with the proposed Phase 2 40MW SEF development**

| IMPACT  | NATURE OF THE IMPACT   | GEOGRAPHICAL EXTENT | NO-GO AREAS   |
|---|--|---------------------|---|
| Displacement: Habitat loss or transformation    | <p>Avifaunal habitat is cleared to accommodate the Phase 2 PV SEF facility and its ancillary infrastructure reducing the amount of habitat available to birds for foraging, roosting and breeding.</p> <p>It is also important to note that this impact, associated with the construction of the Phase 2 PV SEF facility and its on-site ancillary infrastructure, may potentially have dire consequences for the smaller passerine species with small home ranges as entire territories could be removed.</p>   | Local               | <p>Relevant to this assessment, although sections of the study area have already been intensively transformed through agricultural and mining activities, industrial activities and urbanisation, <b>rivers systems and waterbody/wetland habitat</b> feature within the study area that are likely to be transformed (or further transformed) during the course of the construction activities, which could in turn impact on birds using these habitats. <b>Development in these areas should be precluded.</b></p>   |
| Displacement: Disturbance                       | <p>Excavation and construction activities are a source of significant disturbance particularly as a result of the machinery and construction personnel that are present on site for the duration of the construction of the facility. For most bird species, construction activities are likely to be a cause of temporary disturbance and may impact on foraging, breeding and roosting behaviours or in more extreme cases, result in displacement from the site entirely.</p>   | Local               | <p>The study area is already subjected to a fairly significant degree of disturbance due to the existing mining, urban and industrial activities in the immediate vicinity of the proposed development area. However, <b>rivers systems and waterbody/wetland habitat</b> are present and remain areas of refuge for priority species. Development within these habitats may be a significant source if disturbance and should be precluded.</p>  |
| Direct Mortality: Collisions with the PV panels | <p>This impact refers to collision-related fatality resulting from the direct contact of the bird with the PV panel infrastructure. In some instances, the bird is not killed outright by the collision impact, but succumbs to predation later, as it cannot avoid predators due to its injuries.</p> <p>Bird abundance and flight activity levels differ according to habitat availability, and other natural features. Therefore, the impact on birds through direct fatality is very site specific. In addition, the so-called “lake effect” could act as a potential attraction to numerous waterbird species recorded in the broader study area.</p> | Local               | <p><b>Rivers systems and waterbody/wetland habitat</b> are present and remain areas of refuge for priority waterbird species, that may be susceptible to the ‘lake effect’. Development within these habitats may be a significant source if disturbance and should be precluded.</p> <p>It is also important to note, that in order to increase solar panel efficiency and power output, most solar panels are treated with an anti-reflective coating which may mitigate this impact. It is not possible to determine whether this impact will occur until operational monitoring reveals actual mortalities at the proposed SEF.</p> |
| Altered Runoff and Chemical Pollution           | <p>The transformation of the site surface from natural vegetation to infrastructure alters the manner in which water moves on the site after rainfall and cleaning of infrastructure. If this is not carefully managed this could cause soil erosion reducing the remaining bird habitat further. Increased runoff could also create moister conditions on or near the site thereby attracting more birds to the area and increasing the likelihood of other interactions with the facility.</p>   | Local               | <p>Habitat within the study area is already transformed to a large degree through agriculture. mining, industrial and urban activities. However sensitive avifaunal habitat still occurs in pockets (i.e. rivers, waterbodies, wetlands and some intact grassland. Construction and operational practices associated with this development may further degrade the natural habitat. Development in these areas should be precluded.</p>   |

| IMPACT   | NATURE OF THE IMPACT   | GEOGRAPHICAL EXTENT | NO-GO AREAS |
|--|--|---------------------|-------------|
|  | Pollution could occur if hazardous chemicals are used to clean PV panels once operational. This could have secondary effects on vegetation, invertebrate populations and in turn food availability and habitat for birds.  |                     |             |
| Nesting  | Various bird species are quick to seize a new opportunity for perching, roosting or nesting, including on man- made structures. Relevant to the proposed 40MW SEF, passerine and corvid species are likely to use certain parts of the proposed facility once commissioned. Whilst nesting could be viewed as a positive impact for birds, it can result in operational problems for the facility. | Local               | N/A         |
| <p><b>RECOMMENDATIONS FOR FURTHER STUDY:</b></p> <ul style="list-style-type: none"> <li>* The site survey should be conducted during the austral summer (November to March) to ensure observations of the migrant species that may occur within the study area. If the fieldwork is conducted in the austral autumn or winter, field survey data will be supplemented with secondary data sources and the findings of the Phase 1 survey.</li> <li>* Further assessment of the displacement impact as a result of disturbance will occur during the impact assessment phase of the project.</li> <li>* If the 40MW SEF is authorised, a detailed inspection of the authorised site, prior to construction, would be required to establish if there are any breeding Red List species that could be disturbed. In such an event, appropriate mitigation measures would need to be implemented (such as postponing the construction of the PV facility to avoid peak breeding season)</li> </ul> |  |                     |             |

## 7. IDENTIFICATION OF A PREFERRED ALTERNATIVE

Several land portions are being considered for the proposed Phase 2 PV SEF facility. A preferred layout for the establishment of the proposed Phase 2 PV SEF facility (based on the avoidance of avifaunal sensitives) will be identified, following a detailed assessment of the primary data collected during a proposed site survey of the proposed 40MW SEF development envelope.

## 8. CONCLUSION & EIA PLAN OF STUDY

In conclusion, this high-level assessment has identified at least four avifaunal habitats of varying sensitivities within the proposed study area. Despite anthropogenic impacts, mostly in the form of agricultural practices that have largely transformed the landscape resulting in a negative impact on avifaunal abundance, potentially sensitive habitat persists within the study area. The construction of the proposed Phase 2 PV SEF facility and its ancillary infrastructure will likely result in impacts of medium significance, which can be reduced through the application of mitigation measures. It is anticipated that sustainable development of the proposed Phase 2 PV SEF facility and grid connection can be achieved with acceptable levels of impact on the resident avifauna subject further specialist avifaunal impact assessment studies to be conducted as part of the EIA process in order to:

- \* Confirm avifaunal microhabitats within the proposed development area and assess these for their suitability to support Red List and non-Red List priority species, in terms of breeding, roosting and foraging;
- \* Describe the avifaunal communities (both Red List and non-Red List priority species) most likely to be impacted, based on data collected as part of a systematic and quantified data collection process:

### *a. Sample counts of small terrestrial species*

Small terrestrial birds are an important component of this programme. Given the spatial scale of the development, these smaller species may be particularly vulnerable to displacement and habitat level effects. Sampling these species is aimed at establishing indices of abundance for small terrestrial birds in the study area. These counts should be done when conditions are optimal. In this case this means the times when birds are most active and vocal, i.e. early mornings. A minimum of 12 point count survey points will be established across the proposed 40MW SEF sites.

### *b. Counts of large terrestrial species and raptors*

This is a very similar data collection technique to that above, the aim being to establish indices of abundance for large terrestrial species and raptors. These species are relatively easily detected from a vehicle, hence vehicle-based counts are conducted in order to determine the presence and number

of birds of relevant species in the study area. Detection of these large species is less dependent on their activity levels and calls, so these counts can be done later in the day. A minimum of one driven transect route will be established and conducted during the single-day site survey.

*c. Focal site surveys and monitoring*

Any particularly sensitive sites such as wetlands, dams and breeding sites will be identified and monitored during the site visit.

*d. Incidental observations*

All other incidental sightings of Red List and non-Red List priority species (and particularly those suggestive of breeding or important feeding or roosting sites) within the development area will be georeferenced and documented.

- \* Provide a detailed description of the impacts associated with the construction, operation and decommissioning of the proposed Phase 2 40MW SEF development;
- \* Assess the significance (rated according to a pre-determined set of criteria, as supplied by the primary consultant) of the identified direct, indirect and cumulative impacts, during the construction, operation and decommissioning phases of the proposed development based on data collected in-field;
- \* Consider layout plans and advise possible changes to the layout;
- \* Recommend practical mitigation measures for the management of the identified impacts, at each stage of the development process, for inclusion in the draft Environmental Management Programme (EMPr);
- \* Propose a monitoring programme for the sensitive areas, species or receptors (if necessary); and
- \* Describe the gaps in baseline data will be provided. An indication of the confidence levels will be given. The best available data sources will be used to predict the impacts, and extensive use will be made of local knowledge if available.

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## APPENDIX 1: SOUTH AFRICAN BIRD ATLAS PROJECT DATA (SABAP2) FOR THE PROPOSED PROJECT

| Family Name                | Scientific Name                | Red Data Global | Red Data Regional | Endemicity South Africa | Endemicity Southern Africa | Average Report Rate | No. of Records |
|----------------------------|--------------------------------|-----------------|-------------------|-------------------------|----------------------------|---------------------|----------------|
| Apalis, Bar-throated       | <i>Apalis thoracica</i>        |                 |                   |                         |                            | 0.1                 | 1              |
| Avocet, Pied               | <i>Recurvirostra avosetta</i>  |                 |                   |                         |                            | 8.7                 | 103            |
| Babbler, Arrow-marked      | <i>Turdoides jardineii</i>     |                 |                   |                         |                            | 0.5                 | 6              |
| Barbet, Acacia Pied        | <i>Tricholaema leucomelas</i>  |                 |                   |                         | Near-endemic               | 0.3                 | 4              |
| Barbet, Black-collared     | <i>Lybius torquatus</i>        |                 |                   |                         |                            | 42.4                | 504            |
| Barbet, Crested            | <i>Trachyphonus vaillantii</i> |                 |                   |                         |                            | 74.3                | 884            |
| Batis, Chinspot            | <i>Batis molitor</i>           |                 |                   |                         |                            | 0.2                 | 2              |
| Bee-eater, White-fronted   | <i>Merops bullockoides</i>     |                 |                   |                         |                            | 0.3                 | 4              |
| Bee-eater, European        | <i>Merops apiaster</i>         |                 |                   |                         |                            | 1.3                 | 15             |
| Bishop, Yellow             | <i>Euplectes capensis</i>      |                 |                   |                         |                            | 0.2                 | 2              |
| Bishop, Yellow-crowned     | <i>Euplectes afer</i>          |                 |                   |                         |                            | 13.6                | 162            |
| Bishop, Southern Red       | <i>Euplectes orix</i>          |                 |                   |                         |                            | 81.2                | 966            |
| Bittern, Little            | <i>Ixobrychus minutus</i>      |                 |                   |                         |                            | 3.7                 | 44             |
| Bokmakierie                | <i>Telophorus zeylonus</i>     |                 |                   |                         | Near-endemic               | 1.1                 | 13             |
| Boubou, Southern           | <i>Laniarius ferrugineus</i>   |                 |                   |                         | Endemic                    | 7.4                 | 88             |
| Brubru                     | <i>Nilaus afer</i>             |                 |                   |                         |                            | 0.1                 | 1              |
| Bulbul, African Red-eyed   | <i>Pycnonotus nigricans</i>    |                 |                   |                         | Near-endemic               | 1.0                 | 12             |
| Bulbul, Dark-capped        | <i>Pycnonotus tricolor</i>     |                 |                   |                         |                            | 82.4                | 981            |
| Bunting, Cape              | <i>Emberiza capensis</i>       |                 |                   |                         | Near-endemic               | 0.1                 | 1              |
| Bunting, Cinnamon-breasted | <i>Emberiza tahapisi</i>       |                 |                   |                         |                            | 0.2                 | 2              |
| Buttonquail, Kurrichane    | <i>Turnix sylvaticus</i>       |                 |                   |                         |                            | 0.2                 | 2              |
| Buzzard, Jackal            | <i>Buteo rufofuscus</i>        |                 |                   | Near endemic            | Endemic                    | 0.2                 | 2              |
| Buzzard, Steppe            | <i>Buteo buteo</i>             |                 |                   |                         |                            | 0.7                 | 8              |
| Canary, Cape               | <i>Serinus canicollis</i>      |                 |                   |                         | Endemic                    | 0.1                 | 1              |
| Canary, Yellow-fronted     | <i>Crithagra mozambica</i>     |                 |                   |                         |                            | 1.1                 | 13             |
| Canary, Yellow             | <i>Crithagra flaviventris</i>  |                 |                   |                         | Near-endemic               | 11.5                | 137            |
| Canary, Black-throated     | <i>Crithagra atrogularis</i>   |                 |                   |                         |                            | 31.6                | 376            |

| Family Name                  | Scientific Name                  | Red Data Global | Red Data Regional | Endemicity South Africa | Endemicity Southern Africa | Average Report Rate | No. of Records |
|------------------------------|----------------------------------|-----------------|-------------------|-------------------------|----------------------------|---------------------|----------------|
| Chat, Familiar               | <i>Cercomela familiaris</i>      |                 |                   |                         |                            | 0.3                 | 4              |
| Chat, Anteating              | <i>Myrmecocichla formicivora</i> |                 |                   |                         | Endemic                    | 1.7                 | 20             |
| Cisticola, Lazy              | <i>Cisticola aberrans</i>        |                 |                   |                         |                            | 0.1                 | 1              |
| Cisticola, Rattling          | <i>Cisticola chiniana</i>        |                 |                   |                         |                            | 0.2                 | 2              |
| Cisticola, Desert            | <i>Cisticola aridulus</i>        |                 |                   |                         |                            | 1.5                 | 18             |
| Cisticola, Wing-snapping     | <i>Cisticola ayresii</i>         |                 |                   |                         |                            | 2.4                 | 29             |
| Cisticola, Zitting           | <i>Cisticola juncidis</i>        |                 |                   |                         |                            | 21.8                | 259            |
| Cisticola, Levillant's       | <i>Cisticola tinniens</i>        |                 |                   |                         |                            | 48.4                | 576            |
| Cisticola, Cloud             | <i>Cisticola textrix</i>         |                 |                   | Near endemic            | Near-endemic               | 6.5                 | 77             |
| Cliff-swallow, South African | <i>Petrochelidon spilodera</i>   |                 |                   | Breeding-endemic        | Breeding-endemic           | 1.6                 | 19             |
| Coot, Red-knobbed            | <i>Fulica cristata</i>           |                 |                   |                         |                            | 86.0                | 1,023          |
| Cormorant, Cape              | <i>Phalacrocorax capensis</i>    | EN              | EN                |                         | Breeding-endemic           | 0.1                 | 1              |
| Cormorant, White-breasted    | <i>Phalacrocorax lucidus</i>     |                 |                   |                         |                            | 53.7                | 639            |
| Cormorant, Reed              | <i>Phalacrocorax africanus</i>   |                 |                   |                         |                            | 66.7                | 794            |
| Coucal, Burchell's           | <i>Centropus burchellii</i>      |                 |                   |                         | Near-endemic               | 6.5                 | 77             |
| Crake, African               | <i>Crecopsis egregia</i>         |                 |                   |                         |                            | 0.1                 | 1              |
| Crake, Corn                  | <i>Crex crex</i>                 |                 |                   |                         |                            | 0.1                 | 1              |
| Crake, Black                 | <i>Amaurornis flavirostra</i>    |                 |                   |                         |                            | 9.1                 | 108            |
| Crow, Cape                   | <i>Corvus capensis</i>           |                 |                   |                         |                            | 0.1                 | 1              |
| Crow, Pied                   | <i>Corvus albus</i>              |                 |                   |                         |                            | 34.6                | 412            |
| Cuckoo, Jacobin              | <i>Clamator jacobinus</i>        |                 |                   |                         |                            | 0.1                 | 1              |
| Cuckoo, Klaas's              | <i>Chrysococcyx klaas</i>        |                 |                   |                         |                            | 0.1                 | 1              |
| Cuckoo, Diderick             | <i>Chrysococcyx caprius</i>      |                 |                   |                         |                            | 15.8                | 188            |
| Cuckoo, Red-chested          | <i>Cuculus solitarius</i>        |                 |                   |                         |                            | 6.6                 | 79             |
| Darter, African              | <i>Anhinga rufa</i>              |                 |                   |                         |                            | 54.3                | 646            |
| Dove, Namaqua                | <i>Oena capensis</i>             |                 |                   |                         |                            | 0.5                 | 6              |
| Dove, Rock                   | <i>Columba livia</i>             |                 |                   |                         |                            | 71.5                | 851            |
| Dove, Red-eyed               | <i>Streptopelia semitorquata</i> |                 |                   |                         |                            | 90.2                | 1,073          |

| Family Name           | Scientific Name           | Red Data Global | Red Data Regional | Endemicity South Africa | Endemicity Southern Africa | Average Report Rate | No. of Records |
|-----------------------|---------------------------|-----------------|-------------------|-------------------------|----------------------------|---------------------|----------------|
| Dove, Laughing        | Streptopelia senegalensis |                 |                   |                         |                            | 95.0                | 1,13           |
| Drongo, Fork-tailed   | Dicrurus adsimilis        |                 |                   |                         |                            | 0.3                 | 4              |
| Duck, Unidentified    | N/A N/A                   |                 |                   |                         |                            | 0.1                 | 1              |
| Duck, Comb            | Sarkidiornis melanotos    |                 |                   |                         |                            | 0.4                 | 5              |
| Duck, Mandarin        | Aix galericulata          |                 |                   |                         |                            | 0.7                 | 8              |
| Duck, Hybrid Mallard  | Anas hybrid               |                 |                   |                         |                            | 0.8                 | 9              |
| Duck, Maccoa          | Oxyura maccoa             | NT              | NT                |                         |                            | 10.8                | 128            |
| Duck, Domestic        | Anas platyrhynchos        |                 |                   |                         |                            | 2.9                 | 35             |
| Duck, White-backed    | Thalassornis leuconotus   |                 |                   |                         |                            | 3.3                 | 39             |
| Duck, African Black   | Anas sparsa               |                 |                   |                         |                            | 4.0                 | 48             |
| Duck, White-faced     | Dendrocygna viduata       |                 |                   |                         |                            | 45.9                | 546            |
| Duck, Fulvous         | Dendrocygna bicolor       |                 |                   |                         |                            | 5.5                 | 65             |
| Duck, Mallard         | Anas platyrhynchos        |                 |                   |                         |                            | 5.6                 | 67             |
| Duck, Yellow-billed   | Anas undulata             |                 |                   |                         |                            | 55.6                | 662            |
| Eagle, Martial        | Polemaetus bellicosus     | VU              | EN                |                         |                            | 0.1                 | 1              |
| Eagle, Long-crested   | Lophaetus occipitalis     |                 |                   |                         |                            | 0.3                 | 3              |
| Eagle-owl, Spotted    | Bubo africanus            |                 |                   |                         |                            | 1.3                 | 15             |
| Egret, Little         | Egretta garzetta          |                 |                   |                         |                            | 11.8                | 140            |
| Egret, Great          | Egretta alba              |                 |                   |                         |                            | 2.0                 | 24             |
| Egret, Yellow-billed  | Egretta intermedia        |                 |                   |                         |                            | 4.4                 | 52             |
| Egret, Cattle         | Bubulcus ibis             |                 |                   |                         |                            | 46.4                | 552            |
| Falcon, Peregrine     | Falco peregrinus          |                 |                   |                         |                            | 0.1                 | 1              |
| Falcon, Lanner        | Falco biarmicus           | LC              | VU                |                         |                            | 0.4                 | 5              |
| Falcon, Amur          | Falco amurensis           |                 |                   |                         |                            | 6.4                 | 76             |
| Finch, Red-headed     | Amadina erythrocephala    |                 |                   |                         | Near-endemic               | 39.8                | 474            |
| Firefinch, Red-billed | Lagonosticta senegala     |                 |                   |                         |                            | 0.1                 | 1              |
| Fiscal, Common        | Lanius collaris           |                 |                   |                         |                            | 78.7                | 936            |
| Fish-eagle, African   | Haliaeetus vocifer        |                 |                   |                         |                            | 0.6                 | 7              |

| Family Name               | Scientific Name               | Red Data Global | Red Data Regional | Endemicity South Africa | Endemicity Southern Africa | Average Report Rate | No. of Records |
|---------------------------|-------------------------------|-----------------|-------------------|-------------------------|----------------------------|---------------------|----------------|
| Flamingo, Lesser          | Phoeniconaias minor           | NT              | NT                |                         |                            | 13.9                | 166            |
| Flamingo, Greater         | Phoenicopterus roseus         | LC              | NT                |                         |                            | 34.1                | 406            |
| Flufftail, Red-chested    | Sarothrura rufa               |                 |                   |                         |                            | 0.5                 | 6              |
| Flycatcher, Fairy         | Stenostira scita              |                 |                   | Near endemic            | Endemic                    | 0.1                 | 1              |
| Flycatcher, Spotted       | Muscicapa striata             |                 |                   |                         |                            | 0.8                 | 9              |
| Flycatcher, Fiscal        | Sigelus silens                |                 |                   | Near endemic            | Endemic                    | 11.1                | 132            |
| Francolin, Orange River   | Scleroptila gutturalis        |                 |                   |                         |                            | 0.5                 | 6              |
| Go-away-bird, Grey        | Corythaixoides concolor       |                 |                   |                         |                            | 68.7                | 817            |
| Godwit, Bar-tailed        | Limosa lapponica              | NT              | LC                |                         |                            | 2.9                 | 34             |
| Goose, Domestic           | Anser anser                   |                 |                   |                         |                            | 13.4                | 159            |
| Goose, Spur-winged        | Plectropterus gambensis       |                 |                   |                         |                            | 41.1                | 489            |
| Goose, Egyptian           | Alopochen aegyptiaca          |                 |                   |                         |                            | 89.9                | 1,07           |
| Goshawk, Gabar            | Melierax gabar                |                 |                   |                         |                            | 0.3                 | 3              |
| Grassbird, Cape           | Sphenoeacus afer              |                 |                   | Near endemic            | Endemic                    | 0.3                 | 3              |
| Grebe, Black-necked       | Podiceps nigricollis          |                 |                   |                         |                            | 1.1                 | 13             |
| Grebe, Great Crested      | Podiceps cristatus            |                 |                   |                         |                            | 24.9                | 296            |
| Grebe, Little             | Tachybaptus ruficollis        |                 |                   |                         |                            | 53.4                | 635            |
| Green-pigeon, African     | Treron calvus                 |                 |                   |                         |                            | 0.7                 | 8              |
| Greenshank, Common        | Tringa nebularia              |                 |                   |                         |                            | 2.3                 | 27             |
| Guineafowl, Helmeted      | Numida meleagris              |                 |                   |                         |                            | 69.8                | 831            |
| Gull, Hartlaub's          | Chroicocephalus hartlaubii    |                 |                   |                         | Endemic                    | 0.1                 | 1              |
| Gull, Kelp                | Larus dominicanus             |                 |                   |                         |                            | 0.2                 | 2              |
| Gull, Lesser Black-backed | Larus fuscus                  |                 |                   |                         |                            | 1.0                 | 12             |
| Gull, Grey-headed         | Chroicocephalus cirrocephalus |                 |                   |                         |                            | 86.3                | 1,027          |
| Hamerkop                  | Scopus umbretta               |                 |                   |                         |                            | 1.0                 | 12             |
| Harrier-Hawk, African     | Polyboroides typus            |                 |                   |                         |                            | 2.4                 | 28             |
| Heron, Green-backed       | Butorides striata             |                 |                   |                         |                            | 0.9                 | 11             |
| Heron, Squacco            | Ardeola ralloides             |                 |                   |                         |                            | 15.8                | 188            |

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|---------------------------|---------------------------------|-----------------|-------------------|-------------------------|----------------------------|---------------------|----------------|
| Heron, Goliath            | <i>Ardea goliath</i>            |                 |                   |                         |                            | 35.8                | 426            |
| Heron, Grey               | <i>Ardea cinerea</i>            |                 |                   |                         |                            | 37.2                | 443            |
| Heron, Black-headed       | <i>Ardea melanocephala</i>      |                 |                   |                         |                            | 57.1                | 679            |
| Heron, Purple             | <i>Ardea purpurea</i>           |                 |                   |                         |                            | 7.1                 | 85             |
| Heron, Black              | <i>Egretta ardesiaca</i>        |                 |                   |                         |                            | 9.4                 | 112            |
| Honey-buzzard, European   | <i>Pernis apivorus</i>          |                 |                   |                         |                            | 0.1                 | 1              |
| Honeyguide, Lesser        | <i>Indicator minor</i>          |                 |                   |                         |                            | 0.8                 | 10             |
| Honeyguide, Greater       | <i>Indicator indicator</i>      |                 |                   |                         |                            | 4.1                 | 49             |
| Hoopoe, African           | <i>Upupa africana</i>           |                 |                   |                         |                            | 31.0                | 369            |
| Hornbill, African Grey    | <i>Tockus nasutus</i>           |                 |                   |                         |                            | 0.2                 | 2              |
| House-martin, Common      | <i>Delichon urbicum</i>         |                 |                   |                         |                            | 0.7                 | 8              |
| Ibis, Glossy              | <i>Plegadis falcinellus</i>     |                 |                   |                         |                            | 62.8                | 747            |
| Ibis, African Sacred      | <i>Threskiornis aethiopicus</i> |                 |                   |                         |                            | 87.8                | 1,045          |
| Ibis, Hadedda             | <i>Bostrychia hagedash</i>      |                 |                   |                         |                            | 94.1                | 1,12           |
| Jacana, African           | <i>Actophilornis africanus</i>  |                 |                   |                         |                            | 3.0                 | 36             |
| Kestrel, Greater          | <i>Falco rupicoloides</i>       |                 |                   |                         |                            | 0.1                 | 1              |
| Kestrel, Lesser           | <i>Falco naumanni</i>           |                 |                   |                         |                            | 0.2                 | 2              |
| Kestrel, Rock             | <i>Falco rupicolus</i>          |                 |                   |                         |                            | 0.2                 | 2              |
| Kingfisher, Half-collared | <i>Alcedo semitorquata</i>      | LC              | NT                |                         |                            | 0.1                 | 1              |
| Kingfisher, Brown-hooded  | <i>Halcyon albiventris</i>      |                 |                   |                         |                            | 0.3                 | 3              |
| Kingfisher, Woodland      | <i>Halcyon senegalensis</i>     |                 |                   |                         |                            | 0.6                 | 7              |
| Kingfisher, Giant         | <i>Megaceryle maxima</i>        |                 |                   |                         |                            | 1.7                 | 20             |
| Kingfisher, Malachite     | <i>Alcedo cristata</i>          |                 |                   |                         |                            | 2.6                 | 31             |
| Kingfisher, Pied          | <i>Ceryle rudis</i>             |                 |                   |                         |                            | 8.0                 | 95             |
| Kite, Yellow-billed       | <i>Milvus aegyptius</i>         |                 |                   |                         |                            | 0.3                 | 4              |
| Kite, Black-shouldered    | <i>Elanus caeruleus</i>         |                 |                   |                         |                            | 41.8                | 498            |
| Korhaan, Northern Black   | <i>Afrotis afraoides</i>        |                 |                   |                         | Endemic                    | 0.5                 | 6              |
| Lapwing, African Wattled  | <i>Vanellus senegallus</i>      |                 |                   |                         |                            | 57.8                | 688            |

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|----------------------------|---------------------------------|-----------------|-------------------|-------------------------|----------------------------|---------------------|----------------|
| Lapwing, Crowned           | <i>Vanellus coronatus</i>       |                 |                   |                         |                            | 64.3                | 765            |
| Lapwing, Blacksmith        | <i>Vanellus armatus</i>         |                 |                   |                         |                            | 91.9                | 1,094          |
| Lark, Eastern Long-billed  | <i>Certhilauda semitorquata</i> |                 |                   | Endemic                 | Endemic                    | 0.1                 | 1              |
| Lark, Melodious            | <i>Mirafra cheniana</i>         | NT              | LC                | Near endemic            | Endemic                    | 0.1                 | 1              |
| Lark, Spike-heeled         | <i>Chersomanes albofasciata</i> |                 |                   |                         | Near-endemic               | 2.4                 | 29             |
| Lark, Rufous-naped         | <i>Mirafra africana</i>         |                 |                   |                         |                            | 3.5                 | 42             |
| Lark, Red-capped           | <i>Calandrella cinerea</i>      |                 |                   |                         |                            | 5.8                 | 69             |
| Longclaw, Cape             | <i>Macronyx capensis</i>        |                 |                   |                         | Endemic                    | 18.1                | 215            |
| Mannikin, Bronze           | <i>Lonchura cucullata</i>       |                 |                   |                         |                            | 0.8                 | 9              |
| Marsh-harrier, Western     | <i>Circus aeruginosus</i>       |                 |                   |                         |                            | 0.1                 | 1              |
| Marsh-harrier, African     | <i>Circus ranivorus</i>         | LC              | EN                |                         |                            | 1.6                 | 19             |
| Martin, Banded             | <i>Riparia cincta</i>           |                 |                   |                         |                            | 0.8                 | 10             |
| Martin, Sand               | <i>Riparia riparia</i>          |                 |                   |                         |                            | 1.2                 | 14             |
| Martin, Brown-throated     | <i>Riparia paludicola</i>       |                 |                   |                         |                            | 22.4                | 266            |
| Martin, Rock               | <i>Hirundo fuligula</i>         |                 |                   |                         |                            | 7.6                 | 90             |
| Masked-weaver, Southern    | <i>Ploceus velatus</i>          |                 |                   |                         |                            | 95.3                | 1,134          |
| Moorhen, Common            | <i>Gallinula chloropus</i>      |                 |                   |                         |                            | 74.1                | 882            |
| Mousebird, White-backed    | <i>Colius colius</i>            |                 |                   |                         | Endemic                    | 0.1                 | 1              |
| Mousebird, Red-faced       | <i>Urocolius indicus</i>        |                 |                   |                         |                            | 68.3                | 813            |
| Mousebird, Speckled        | <i>Colius striatus</i>          |                 |                   |                         |                            | 69.7                | 829            |
| Myna, Common               | <i>Acridotheres tristis</i>     |                 |                   |                         |                            | 94.1                | 1,12           |
| Neddicky, Neddicky         | <i>Cisticola fulvicapilla</i>   |                 |                   |                         |                            | 3.8                 | 45             |
| Night-Heron, Black-crowned | <i>Nycticorax nycticorax</i>    |                 |                   |                         |                            | 11.8                | 141            |
| Nightjar, Freckled         | <i>Caprimulgus tristigma</i>    |                 |                   |                         |                            | 0.2                 | 2              |
| Olive-pigeon, African      | <i>Columba arquatrix</i>        |                 |                   |                         |                            | 49.2                | 585            |
| Oriole, Black-headed       | <i>Oriolus larvatus</i>         |                 |                   |                         |                            | 0.5                 | 6              |
| Ostrich, Common            | <i>Struthio camelus</i>         |                 |                   |                         |                            | 0.7                 | 8              |
| Owl, Barn                  | <i>Tyto alba</i>                |                 |                   |                         |                            | 0.5                 | 6              |

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|------------------------------|----------------------------------|-----------------|-------------------|-------------------------|----------------------------|---------------------|----------------|
| Owl, Marsh                   | <i>Asio capensis</i>             |                 |                   |                         |                            | 1.6                 | 19             |
| Painted-snipe, Greater       | <i>Rostratula benghalensis</i>   | LC              | NT                |                         |                            | 0.2                 | 2              |
| Palm-swift, African          | <i>Cypsiurus parvus</i>          |                 |                   |                         |                            | 48.5                | 577            |
| Paradise-flycatcher, African | <i>Terpsiphone viridis</i>       |                 |                   |                         |                            | 1.9                 | 23             |
| Parakeet, Rose-ringed        | <i>Psittacula krameri</i>        |                 |                   |                         |                            | 2.4                 | 28             |
| Parrot, Meyer's              | <i>Poicephalus meyeri</i>        |                 |                   |                         |                            | 0.4                 | 5              |
| Peacock, Common              | <i>Pavo cristatus</i>            |                 |                   |                         |                            | 0.8                 | 10             |
| Pelican, Great White         | <i>Pelecanus onocrotalus</i>     | LC              | VU                |                         |                            | 0.1                 | 1              |
| Pigeon, Speckled             | <i>Columba guinea</i>            |                 |                   |                         |                            | 69.2                | 823            |
| Pipit, Buffy                 | <i>Anthus vaalensis</i>          |                 |                   |                         |                            | 0.2                 | 2              |
| Pipit, Plain-backed          | <i>Anthus leucophrys</i>         |                 |                   |                         |                            | 0.5                 | 6              |
| Pipit, African               | <i>Anthus cinnamomeus</i>        |                 |                   |                         |                            | 15.4                | 183            |
| Plover, Common Ringed        | <i>Charadrius hiaticula</i>      |                 |                   |                         |                            | 0.2                 | 2              |
| Plover, Kittlitz's           | <i>Charadrius pecuarius</i>      |                 |                   |                         |                            | 1.8                 | 22             |
| Plover, Three-banded         | <i>Charadrius tricollaris</i>    |                 |                   |                         |                            | 30.5                | 363            |
| Pochard, Southern            | <i>Netta erythrophthalma</i>     |                 |                   |                         |                            | 28.1                | 334            |
| Pratincole, Black-winged     | <i>Glareola nordmanni</i>        | NT              | NT                |                         |                            | 0.5                 | 6              |
| Prinia, Black-chested        | <i>Prinia flavicans</i>          |                 |                   |                         | Near-endemic               | 10.8                | 128            |
| Prinia, Tawny-flanked        | <i>Prinia subflava</i>           |                 |                   |                         |                            | 44.5                | 530            |
| Puffback, Black-backed       | <i>Dryoscopus cubla</i>          |                 |                   |                         |                            | 0.3                 | 4              |
| Quail, Common                | <i>Coturnix coturnix</i>         |                 |                   |                         |                            | 0.4                 | 5              |
| Quailfinch, African          | <i>Ortygospiza fuscocrissa</i>   |                 |                   |                         |                            | 2.7                 | 32             |
| Quelea, Red-billed           | <i>Quelea quelea</i>             |                 |                   |                         |                            | 8.2                 | 97             |
| Rail, African                | <i>Rallus caerulescens</i>       |                 |                   |                         |                            | 2.6                 | 31             |
| Reed-warbler, Great          | <i>Acrocephalus arundinaceus</i> |                 |                   |                         |                            | 1.6                 | 19             |
| Reed-warbler, African        | <i>Acrocephalus baeticatus</i>   |                 |                   |                         |                            | 19.3                | 230            |
| Robin-chat, Cape             | <i>Cossypha caffra</i>           |                 |                   |                         |                            | 67.5                | 803            |
| Rock-thrush, Cape            | <i>Monticola rupestris</i>       |                 |                   | Endemic                 | Endemic                    | 0.1                 | 1              |

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| Rock-thrush, Sentinel         | Monticola explorator     |                 |                   | Endemic                 | Endemic                    | 0.1                 | 1              |
| Roller, Lilac-breasted        | Coracias caudatus        |                 |                   |                         |                            | 0.1                 | 1              |
| Ruff                          | Philomachus pugnax       |                 |                   |                         |                            | 9.1                 | 108            |
| Rush-warbler, Little          | Bradypterus baboecala    |                 |                   |                         |                            | 39.1                | 465            |
| Sanderling, Sanderling        | Calidris alba            |                 |                   |                         |                            | 0.1                 | 1              |
| Sandpiper, Common             | Actitis hypoleucos       |                 |                   |                         |                            | 1.3                 | 16             |
| Sandpiper, Curlew             | Calidris ferruginea      | NT              | LC                |                         |                            | 1.4                 | 17             |
| Sandpiper, Marsh              | Tringa stagnatilis       |                 |                   |                         |                            | 2.3                 | 27             |
| Sandpiper, Wood               | Tringa glareola          |                 |                   |                         |                            | 4.7                 | 56             |
| Scimitarbill, Common          | Rhinopomastus cyanomelas |                 |                   |                         |                            | 0.1                 | 1              |
| Seedeater, Streaky-headed     | Crithagra gularis        |                 |                   |                         |                            | 12.9                | 154            |
| Shelduck, South African       | Tadorna cana             |                 |                   |                         | Endemic                    | 3.1                 | 37             |
| Shikra                        | Accipiter badius         |                 |                   |                         |                            | 0.1                 | 1              |
| Shoveler, Cape                | Anas smithii             |                 |                   |                         | Near-endemic               | 55.6                | 662            |
| Shrike, Crimson-breasted      | Laniarius atrococcineus  |                 |                   |                         | Near-endemic               | 0.1                 | 1              |
| Shrike, Lesser Grey           | Lanius minor             |                 |                   |                         |                            | 0.4                 | 5              |
| Shrike, Red-backed            | Lanius collurio          |                 |                   |                         |                            | 0.5                 | 6              |
| Snake-eagle, Black-chested    | Circaetus pectoralis     |                 |                   |                         |                            | 0.3                 | 4              |
| Snipe, African                | Gallinago nigripennis    |                 |                   |                         |                            | 7.3                 | 87             |
| Sparrow, Southern Grey-headed | Passer diffusus          |                 |                   |                         |                            | 10.8                | 128            |
| Sparrow, House                | Passer domesticus        |                 |                   |                         |                            | 72.8                | 866            |
| Sparrow, Cape                 | Passer melanurus         |                 |                   |                         | Near-endemic               | 94.0                | 1,119          |
| Sparrowhawk, Black            | Accipiter melanoleucus   |                 |                   |                         |                            | 0.3                 | 4              |
| Sparrowhawk, Little           | Accipiter minullus       |                 |                   |                         |                            | 0.4                 | 5              |
| Sparrowhawk, Ovambo           | Accipiter ovampensis     |                 |                   |                         |                            | 1.3                 | 15             |
| Sparrow-weaver, White-browed  | Plocepasser mahali       |                 |                   |                         |                            | 3.8                 | 45             |
| Spoonbill, African            | Platalea alba            |                 |                   |                         |                            | 16.8                | 200            |
| Spurfowl, Natal               | Pternistis natalensis    |                 |                   |                         | Near-endemic               | 0.1                 | 1              |

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| Spurfowl, Swainson's      | <i>Pternistis swainsonii</i>       |                 |                   |                         |                            | 15.4                | 183            |
| Starling, Common          | <i>Sturnus vulgaris</i>            |                 |                   |                         |                            | 0.2                 | 2              |
| Starling, Red-winged      | <i>Onychognathus morio</i>         |                 |                   |                         |                            | 1.9                 | 23             |
| Starling, Pied            | <i>Lamprotornis bicolor</i>        |                 |                   | Endemic                 | Endemic                    | 11.8                | 141            |
| Starling, Wattled         | <i>Creatophora cinerea</i>         |                 |                   |                         |                            | 30.3                | 360            |
| Starling, Cape Glossy     | <i>Lamprotornis nitens</i>         |                 |                   |                         |                            | 74.1                | 882            |
| Stilt, Black-winged       | <i>Himantopus himantopus</i>       |                 |                   |                         |                            | 13.3                | 158            |
| Stint, Little             | <i>Calidris minuta</i>             |                 |                   |                         |                            | 6.7                 | 80             |
| Stonechat, African        | <i>Saxicola torquatus</i>          |                 |                   |                         |                            | 38.7                | 460            |
| Stork, Abdim's            | <i>Ciconia abdimii</i>             | LC              | NT                |                         |                            | 0.3                 | 3              |
| Stork, Yellow-billed      | <i>Mycteria ibis</i>               | LC              | EN                |                         |                            | 1.0                 | 12             |
| Stork, White              | <i>Ciconia ciconia</i>             |                 |                   |                         |                            | 1.3                 | 15             |
| Sunbird, Malachite        | <i>Nectarinia famosa</i>           |                 |                   |                         |                            | 0.1                 | 1              |
| Sunbird, Amethyst         | <i>Chalcomitra amethystina</i>     |                 |                   |                         |                            | 11.6                | 138            |
| Sunbird, White-bellied    | <i>Cinnyris talatala</i>           |                 |                   |                         |                            | 29.7                | 353            |
| Swallow, Pearl-breasted   | <i>Hirundo dimidiata</i>           |                 |                   |                         |                            | 0.2                 | 2              |
| Swallow, Lesser Striped   | <i>Cecropis abyssinica</i>         |                 |                   |                         |                            | 1.0                 | 12             |
| Swallow, Barn             | <i>Hirundo rustica</i>             |                 |                   |                         |                            | 28.7                | 342            |
| Swallow, White-throated   | <i>Hirundo albigularis</i>         |                 |                   |                         |                            | 32.7                | 389            |
| Swallow, Greater Striped  | <i>Cecropis cucullata</i>          |                 |                   |                         |                            | 43.6                | 519            |
| Swampphen, African Purple | <i>Porphyrio madagascariensis</i>  |                 |                   |                         |                            | 38.4                | 457            |
| Swamp-warbler, Lesser     | <i>Acrocephalus gracilirostris</i> |                 |                   |                         |                            | 39.7                | 472            |
| Swan, Black               | <i>Cygnus atratus</i>              |                 |                   |                         |                            | 14.6                | 174            |
| Swift, African Black      | <i>Apus barbatus</i>               |                 |                   |                         |                            | 0.3                 | 3              |
| Swift, Common             | <i>Apus apus</i>                   |                 |                   |                         |                            | 0.4                 | 5              |
| Swift, Horus              | <i>Apus horus</i>                  |                 |                   |                         |                            | 0.7                 | 8              |
| Swift, Little             | <i>Apus affinis</i>                |                 |                   |                         |                            | 19.6                | 233            |
| Swift, White-rumped       | <i>Apus caffer</i>                 |                 |                   |                         |                            | 35.0                | 416            |

| Family Name                  | Scientific Name            | Red Data Global | Red Data Regional | Endemicity South Africa | Endemicity Southern Africa | Average Report Rate | No. of Records |
|------------------------------|----------------------------|-----------------|-------------------|-------------------------|----------------------------|---------------------|----------------|
| Tchagra, Black-crowned       | Tchagra senegalus          |                 |                   |                         |                            | 0.1                 | 1              |
| Teal, Red-billed             | Anas erythrorhyncha        |                 |                   |                         |                            | 22.6                | 269            |
| Teal, Hottentot              | Anas hottentota            |                 |                   |                         |                            | 23.7                | 282            |
| Teal, Cape                   | Anas capensis              |                 |                   |                         |                            | 5.3                 | 63             |
| Tern, Caspian                | Sterna caspia              | LC              | VU                |                         |                            | 0.1                 | 1              |
| Tern, Whiskered              | Chlidonias hybrida         |                 |                   |                         |                            | 13.9                | 165            |
| Tern, White-winged           | Chlidonias leucopterus     |                 |                   |                         |                            | 5.4                 | 64             |
| Thick-knee, Spotted          | Burhinus capensis          |                 |                   |                         |                            | 53.9                | 642            |
| Thrush, Groundscraper        | Turdus litsitsirupa        |                 |                   |                         |                            | 0.1                 | 1              |
| Thrush, Karoo                | Turdus smithi              |                 |                   | Near endemic            | Endemic                    | 76.5                | 910            |
| Tinkerbird, Yellow-fronted   | Pogoniulus chrysoconus     |                 |                   |                         |                            | 0.1                 | 1              |
| Tit-babbler, Chestnut-vented | Sylvia subcaerulea         |                 |                   |                         | Near-endemic               | 0.1                 | 1              |
| Turtle-dove, Cape            | Streptopelia capicola      |                 |                   |                         |                            | 95.4                | 1,135          |
| Wagtail, Yellow              | Motacilla flava            |                 |                   |                         |                            | 0.2                 | 2              |
| Wagtail, African Pied        | Motacilla aguimp           |                 |                   |                         |                            | 0.3                 | 3              |
| Wagtail, Cape                | Motacilla capensis         |                 |                   |                         |                            | 81.8                | 974            |
| Warbler, Marsh               | Acrocephalus palustris     |                 |                   |                         |                            | 0.8                 | 9              |
| Warbler, Sedge               | Acrocephalus schoenobaenus |                 |                   |                         |                            | 1.4                 | 17             |
| Warbler, Willow              | Phylloscopus trochilus     |                 |                   |                         |                            | 3.8                 | 45             |
| Waxbill, Blue                | Uraeginthus angolensis     |                 |                   |                         |                            | 0.2                 | 2              |
| Waxbill, Common              | Estrilda astrild           |                 |                   |                         |                            | 13.9                | 166            |
| Waxbill, Orange-breasted     | Amandava subflava          |                 |                   |                         |                            | 5.2                 | 62             |
| Weaver, Cape                 | Ploceus capensis           |                 |                   | Near endemic            | Endemic                    | 0.3                 | 4              |
| Weaver, Village              | Ploceus cucullatus         |                 |                   |                         |                            | 0.3                 | 4              |
| Weaver, Thick-billed         | Amblyospiza albifrons      |                 |                   |                         |                            | 49.4                | 588            |
| Wheatear, Mountain           | Oenanthe monticola         |                 |                   |                         | Near-endemic               | 22.9                | 272            |
| Wheatear, Capped             | Oenanthe pileata           |                 |                   |                         |                            | 9.7                 | 116            |
| White-eye, Cape              | Zosterops virens           |                 |                   | Near endemic            | Endemic                    | 55.5                | 660            |

| Family Name             | Scientific Name               | Red Data Global | Red Data Regional | Endemicity South Africa | Endemicity Southern Africa | Average Report Rate | No. of Records |
|-------------------------|-------------------------------|-----------------|-------------------|-------------------------|----------------------------|---------------------|----------------|
| Whydah, Pin-tailed      | <i>Vidua macroura</i>         |                 |                   |                         |                            | 26.4                | 314            |
| Widowbird, White-winged | <i>Euplectes albonotatus</i>  |                 |                   |                         |                            | 1.7                 | 20             |
| Widowbird, Red-collared | <i>Euplectes ardens</i>       |                 |                   |                         |                            | 1.8                 | 22             |
| Widowbird, Long-tailed  | <i>Euplectes progne</i>       |                 |                   |                         |                            | 20.2                | 240            |
| Widowbird, Fan-tailed   | <i>Euplectes axillaris</i>    |                 |                   |                         |                            | 5.5                 | 65             |
| Wood-hoopoe, Green      | <i>Phoeniculus purpureus</i>  |                 |                   |                         |                            | 50.2                | 597            |
| Woodpecker, Cardinal    | <i>Dendropicus fuscescens</i> |                 |                   |                         |                            | 2.0                 | 24             |
| Wryneck, Red-throated   | <i>Jynx ruficollis</i>        |                 |                   |                         |                            | 10.8                | 129            |

## APPENDIX 2: CURRICULUM VITAE

# MEGAN DIAMOND

## PERSONAL DETAILS

Date of Birth | *7 December 1978*  
Driver's License | *Code A and B*  
Home Language | *English*  
Other Languages | *Afrikaans*

## EDUCATION

BSc Environmental Management | *University of South Africa (UNISA) 2002 – 2009*

## ACCREDITATION

South African Council for Natural Scientific Professions | *Environmental Science*  
Registration Number: 300022/14

## EXPERIENCE

Owner & Avifaunal Specialist | *Feathers Environmental Services*  
July 2013 – Present

- \* Perform specialist avifaunal assessment studies to minimise the impact of industrial infrastructure on birds and their habitats;
- \* Provide strategic guidance to industry through the development of best practice procedures and guidelines;
- \* Review and comment on methodologies, specialist studies and EIA reports for Renewable Energy projects;
- \* Provide input into renewable energy and power line developments elsewhere in Africa and across the globe;
- \* Manage the collection and collation of relevant and complete desktop and/or field datasets;
- \* Manage pre- and post-construction avifaunal monitoring data collected at wind and solar energy facilities;
- \* Site assessments, either as part of the project team or independently;
- \* Preparation of reports according to project deadlines, including the use of Geographic Information Systems (GIS) to portray data;
- \* Attendance of specialist integration meetings; and
- \* Liaison with stakeholders where necessary.

October 2006 – June 2013

*Programme management*

- \* Annually review the programme's conservation and research strategic objectives and update in accordance with the EWT's and programme's vision and mission including work plans for staff etc.;
- \* Ensure timeous, professional delivery on all aspects of Wildlife & Energy Programme activities;
- \* Formulate, prioritise and approve relevant research and conservation projects;
- \* Ensure acceptable quality of all research projects and their outputs;
- \* Participate in international network liaison as and when required;
- \* Produce regular popular articles & media releases on the Wildlife & Energy Programme projects and outputs & contribute to the EWT publications;
- \* Establish & maintain a network with relevant national & international stakeholders;
- \* Deliver presentations at relevant meetings, functions, workshops & conferences on behalf of the programme;
- \* Assist with compilation of newsletters, updating of webpage, compilation of press articles, any advocacy issues;
- \* Identify & establish partnerships to achieve Wildlife & Energy Programme conservation goals.

*Eskom –EWT Strategic Partnership*

- \* Ensure that this partnership is managed effectively and sustainably against its goals. Manage staff in this division;
- \* Develop and maintain relationships with Eskom;
- \* Negotiate the terms of reference for the annual service level agreements between EWT and Eskom, to ensure the sustainability of the relationship;
- \* Compile annual report to Eskom Corporate Environment and Sustainability;
- \* Produce monthly reports to Eskom's regional grids on the status of incident follow-up;
- \* Attend applicable forums to interact with Eskom stakeholders;
- \* Participate in international network liaison as and when required;
- \* Maintain a network with all relevant local and regional level stakeholders (meetings, forums, workshops, etc.);
- \* Identify research needs relating to the management of wildlife interaction with power lines;
- \* Conduct research projects on wildlife and power line interaction and present the results at national and international conferences and workshops;
- \* Development and implementation of training for Eskom field services staff (at various levels) in the management of wildlife interactions; and
- \* Conduct special investigations on power lines relating to wildlife induced faulting.

*Environmental Impact Assessment Division*

- \* Ensure that this division operates effectively and efficiently at all times and manage staff in this division; and

- \* Conduct specialist avifaunal studies for new power lines developments including: tendering/quoting for the projects, conducting field work, preparing reports, presenting results & negotiating the acceptance of recommendations, final "walk through" as part of Environmental Management Plans; general project management, all liaison with clients, Eskom, authorities, Interested and Affected Parties etc.

#### *Management and administration*

- \* Ensure all programme staff have relevant terms of reference;
- \* Ensure that all programme staff are performance appraised against their terms of reference;
- \* Compile and manage programme budgets, monthly reports, work plans and strategy;
- \* Monitor expenditure and take corrective action if necessary; and
- \* Ensure timely delivery on all projects to all stakeholders.

## CONFERENCE ATTENDANCE

- \* *Society for Conservation Biology 21<sup>st</sup> Annual Meeting (1-5 July 2007)*
- \* *The 6<sup>th</sup> TAWIRI Scientific Conference (3 – 6 December 2007) Presented a paper titled "Co-operative management of wildlife and power line conflicts: an African solution"*
- \* Pan-African Ornithological Congress (7-12 September 2008)
- \* International Conference on Overhead Lines, Design, Construction, Inspection & Maintenance, Fort Collins Colorado USA. (29 March – 1 April 2010) **Presented a paper titled "Bird's eye view: how birds see is key to avoiding power line collision"**
- \* Windaba 2011 – Implementing South African Wind Energy (27-29 September 2011)
- \* Pan African Vulture Summit (16-20 April 2012) **Presented a paper titled "Electrification in Africa – Are our vultures being strung along"**
- \* 4th Wind Power Africa Conference & Renewable Energy Exhibition (28-30 May 2012) **Presented a paper titled "Wind Energy in Africa – what does this really mean for our continent's birds"**
- \* 13th Pan-African Ornithological Congress (14-21 October 2012) **Presented a paper titled "Stringing South Africa's Terrestrial Birds Along - Monitoring of Bird Interactions with Power Line and Experimental Testing of Bird Collision Mitigation at the Karoo Long Term Monitoring Site"**
- \* AEWA Single Species Action-Planning Workshop for the Conservation of the Grey Crowned Crane (10-13 September 2013) **Presented and participated in the workshop as a subject expert (energy and bird interactions)**

## AUTHORED & CO-AUTHORED PAPERS

Jenkins, A.R., Smallie, J. & **Diamond, M.** 2009. Balls, flashers, flappers and coils: South African perspectives on a global search for ways to prevent avian collisions with overhead lines. In: Harebottle, D.M., Craig, A.J.F.K., Anderson, M.D., Rakatomonana, H. & Muchai, M. (eds). Proceedings of the 12<sup>th</sup> Pan-African Ornithological Congress, 2008. Cape Town, Animal Demography Unit.

Smallie, J., **Diamond, M.** & Jenkins, A. 2009. Lighting up the African continent – what does it mean for our birds? pp. 38–43. In: Harebottle, D.M., Craig, A.J.F.K., Anderson, M.D., Rakotomanana, H. & Muchai. (eds). *Proceedings of the 12th Pan-African Ornithological Congress, 2008*. Cape Town, Animal Demography Unit.

Jenkins, A. R., Smallie, J.J and **Diamond, M.** 2010 Avian collisions with power lines: a global review of causes and mitigation with a South African perspective. Bird Conservation International, page1 of16.

Retief, E.F., **Diamond, M.**, Anderson, M.D., Smit, H.A., Jenkins, A.R., Brooks, M. 2011. Avian Wind Farm Sensitivity Map for South Africa.

Jenkins, A.R., Van Rooyen, C.S., Smallie, J.J., Harrison, J.A., **Diamond, M.** And Smit, H.A. 2012. BirdLife South Africa / Endangered Wildlife Trust best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa.

Jenkins, A.R., De Goede, K.H., Sebele, L. and **Diamond, M.** 2013. Brokering a settlement between eagles and industry: sustainable management of large raptors nesting on power infrastructure. Bird Conservation International (2013) 23:232 – 246.

**Diamond, M.**, Harris, J., Mirande, C. and Austin, J. 2014. People of a feather flock together: A global initiative to address crane and power line interactions. 13th North American Crane Workshop Summary. Lafayette, Louisiana.

Page-Nicholson, S., Tate, G., Hoogstad, C., Murison, M., **Diamond, M.**, Blofield, A., Pretorius, M., Michael, M.D. 2018. Mitigating the Impact of Large Mammals on Wooden Electrical Distribution Poles in the Kruger National Park, South Africa. African Journal of Wildlife Research.

**Diamond, M.** and Hoogstad, C. (in press) Collisions and habitat loss associated with utility lines and wind turbines. IUCN SSC Crane Specialist Group – Crane Conservation Strategy.