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*Sphenophyllum hammanskraalensis*, *Annularia* sp., *Raniganjia* sp., *Asterotheca* spp., *Liknopetalon enigmata*, *Glossopteris* > 20 species, *Hirsutum* 4 spp., *Scutum* 4 spp., *Ottokaria* 3 spp., *Estcourtia* sp., *Arberia* 4 spp., *Lidgettonia* sp., *Noeggerathiopsis* sp. And *Podocarpidites* sp.

According to Bamford (2011), little data has been published on these potentially fossiliferous deposits. Good fossil material is likely around the coal mines and yet in other areas the exposures may be too poor to be of interest. When they do occur fossil plants are usually abundant and it would not be feasible to preserve and maintain all the sites. In the interests of heritage and science, however, such sites should be well recorded, sampled and the fossils kept in a suitable institution.

Although no vertebrate fossils have been recorded from the Vryheid Formation, invertebrate trace fossils have been described in some detail by Mason and Christie (1986). It should be noted, however, that the aquatic reptile, *Mesosaurus*, which is the earliest known reptile from the Karoo Basin, as well as fish (*Palaeoniscus capensis*), have been recorded in equivalent aged strata in the Whitehill Formation in the southern part of the basin (MacRae, 1999). Indications are that the Whitehill Formation in the main basin might be correlated with the mid-Vryheid Formation. If this assumption proves correct, there is a possibility that *Mesosaurus* could be found in the Vryheid Formation.

The late Carboniferous to early Jurassic Karoo Supergroup of South Africa includes economically important coal deposits within the Vryheid Formation. The Karoo sediments are almost entirely lacking in body fossils but ichnofossils (trace fossils) are locally abundant. Modern sedimentological and ichnofaunal studies suggest that the north-eastern part of the Karoo basin was marine. In KwaZulu-Natal a shallow basin margin accommodated a prograding fluviodeltaic complex forming a broad sandy platform on which coal-bearing sediments were deposited. Ichnofossils include U-burrows (formerly *Corophioides*) which are assigned to ichnogenus *Diplocraterion* (Mason and Christie, 1986)....

The Permian aged Vryheid Formation contains significant fossils of plants belonging to the *Glossopteris* assemblage. It is therefore likely that fossils will be present in all outcrops on the sites of the development.”

### **Recommendations for impacts to Cultural Heritage, Archaeology and Palaeontology**

Based on the above findings, a sensitivity map of the development area has been drafted indicating areas that are and are not appropriate for the WEF development within the identified development areas. Overall, however, it must be noted that the overall heritage sensitivity of the development areas for WEF 1 range from moderate to very high. The areas identified as having high heritage sensitivity should be considered as “tread-lightly” and the areas identified as having moderate sensitivity must be considered more closely for development activities.

As noted above, due to their landmark value within this cultivated landscape, it is recommended that the higher elevations of these mountains are not suitable for the construction of turbines, and more significantly, the construction of the large-scale roads required to construct these turbines. These areas must be



considered as very high sensitivity in the sensitivity maps below. Due to the combined sensitivity from cultural landscape impacts and impacts to buried archaeology, development within this VERY HIGH sensitivity landscape will need to be limited to have minimal impact and align with visual impacts, and carefully considered in terms of micro-siting to prevent impacts to burial archaeology. It is preferred if no new infrastructure development takes place within this very high sensitivity area.

The following recommendations are made:

- The no-development buffer recommendations indicated in Table 2 must be implemented
- The very high sensitivities areas and no-go buffers identified in Figures 1.1 and 1.2 are adhered to for all associated development activities.
- The high sensitivity areas identified in Figures 1.1 and 1.2 are considered as “tread-lightly” areas with limited infrastructure considered for these areas
- Ongoing community access to the identified burials, as well as their conservation, and the conservation of the significant Iron Age resources into the future, must be ensured. This can be managed through the development of a Heritage Management Plan for the Iron Age resources and burials to be implemented for the duration of the project. This plan can be drafted as a condition of the granting of the EA.
- Implementation of a Fossil Chance Find Protocol
- No additional mitigation measures are required for geological formations with low or insignificant sensitivity.
- Any fossils uncovered during construction should be reported to heritage authorities for evaluation and preservation.
- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

## 4 National Environmental Screening Tool

Table 3: SSVR Table

| Theme             | DFFE Screening Tool Report Sensitivity | Specialist Sensitivity | Rating Confirmed/ disputed and Reasons                                                                                                                                                                         | Compliance Statement or Full Assessment |
|-------------------|----------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Cultural Heritage | VERY HIGH                              | VERY HIGH              | <b>Confirmed</b><br>The cultural value of the broader area has significance in terms of its settler and agricultural history, with intact cultural landscape resources located within the development area     | Full Assessment                         |
| Archaeology       | VERY HIGH                              | VERY HIGH              | <b>Confirmed</b><br>Significant Iron Age archaeological heritage was identified within the development area                                                                                                    | Full Assessment                         |
| Palaeontology     | VERY HIGH                              | MEDIUM                 | <b>Disputed</b><br>It is anticipated that the impact of the development will mainly be <b>LOW to MODERATE</b> as only small sections of the development area are underlain by the sensitive Vryheid Formation. | Full Assessment                         |

## 5 Conclusion

It is confirmed that the site sensitivities identified in the specialist study have been verified as per section 4 above.



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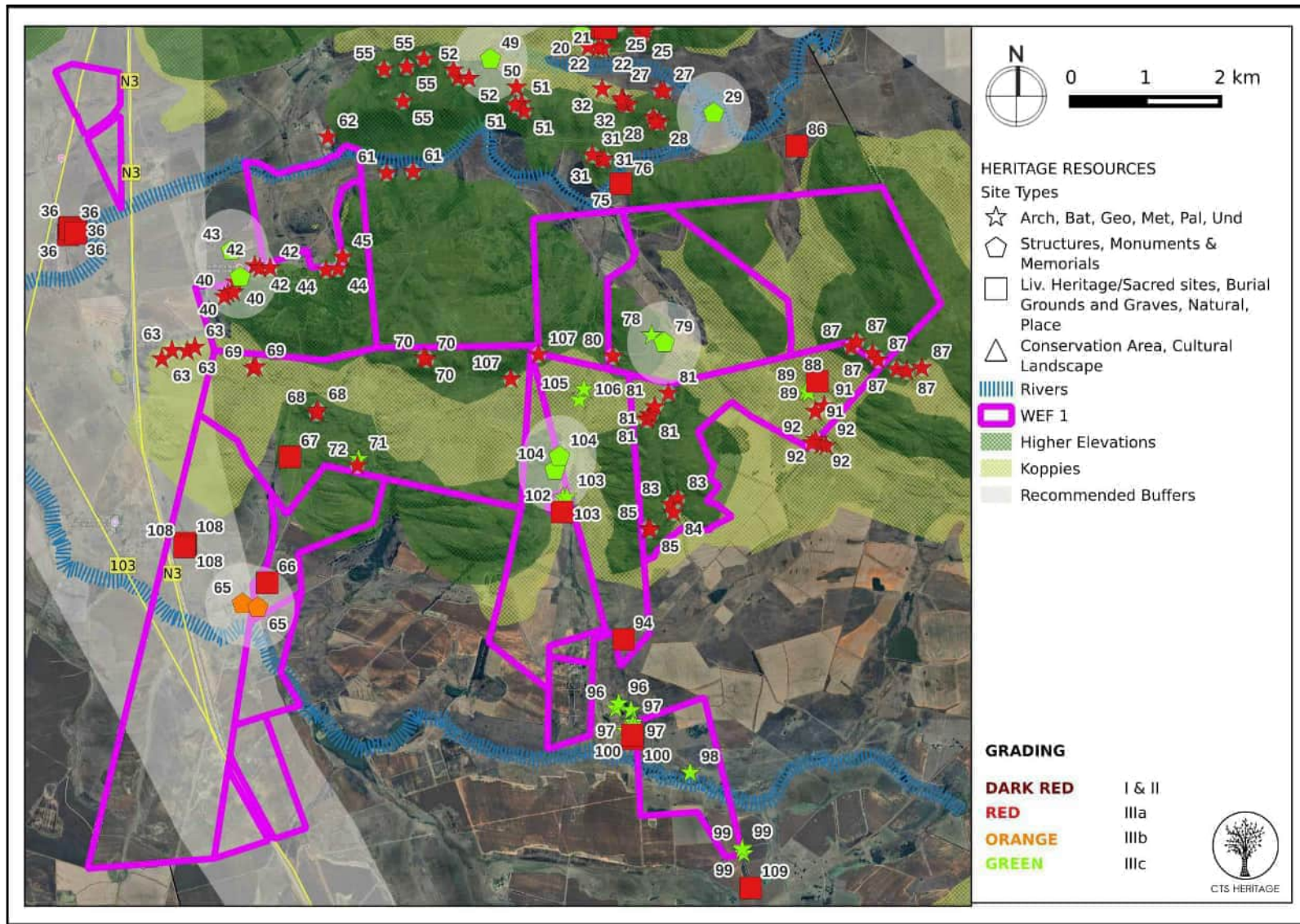


Figure 1.1: All heritage resources within proximity to the development area with recommended mitigation measures



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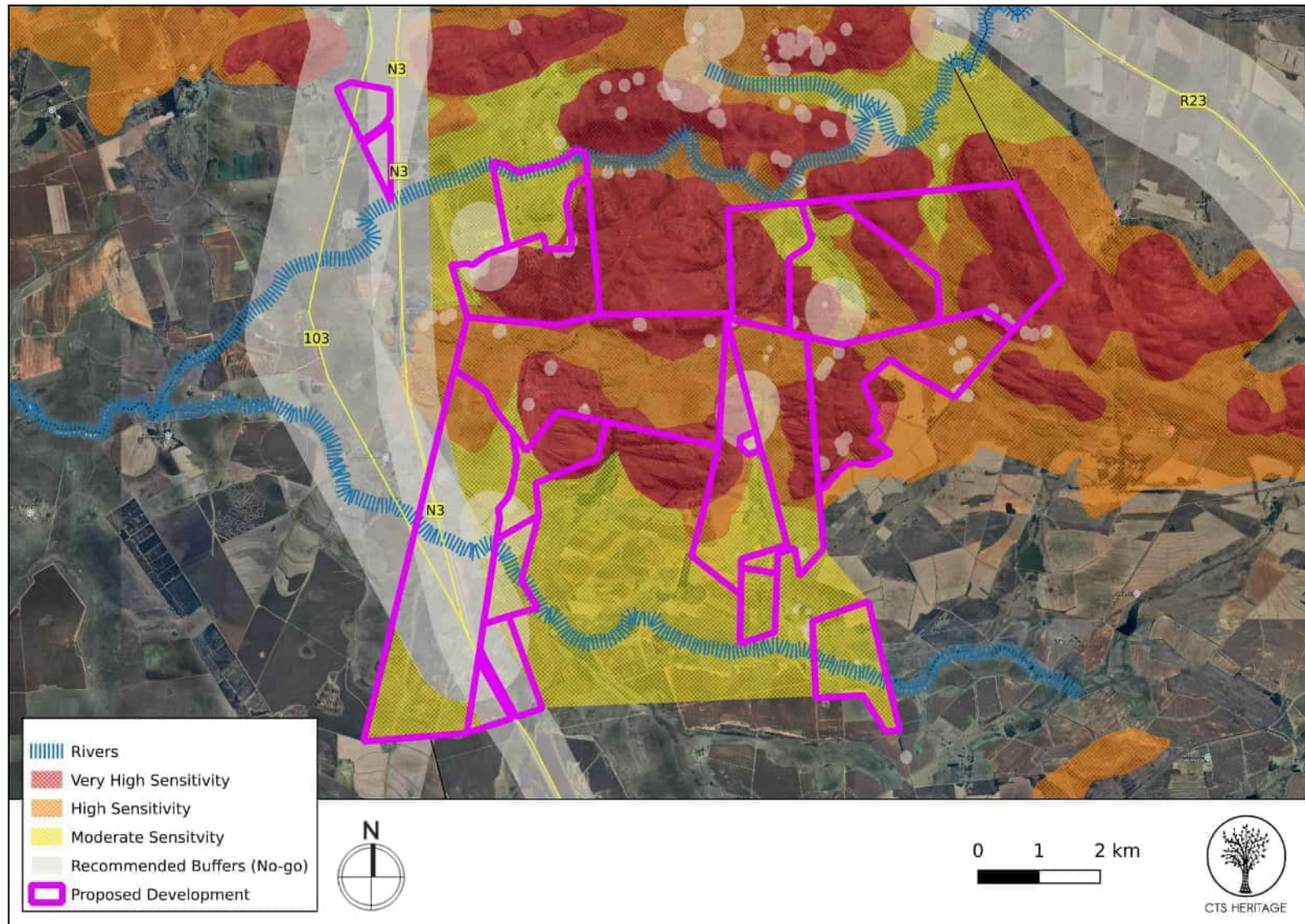


Figure 1.2: Heritage sensitivity map of WEF 1 based on the findings of the cultural heritage and archaeology assessment



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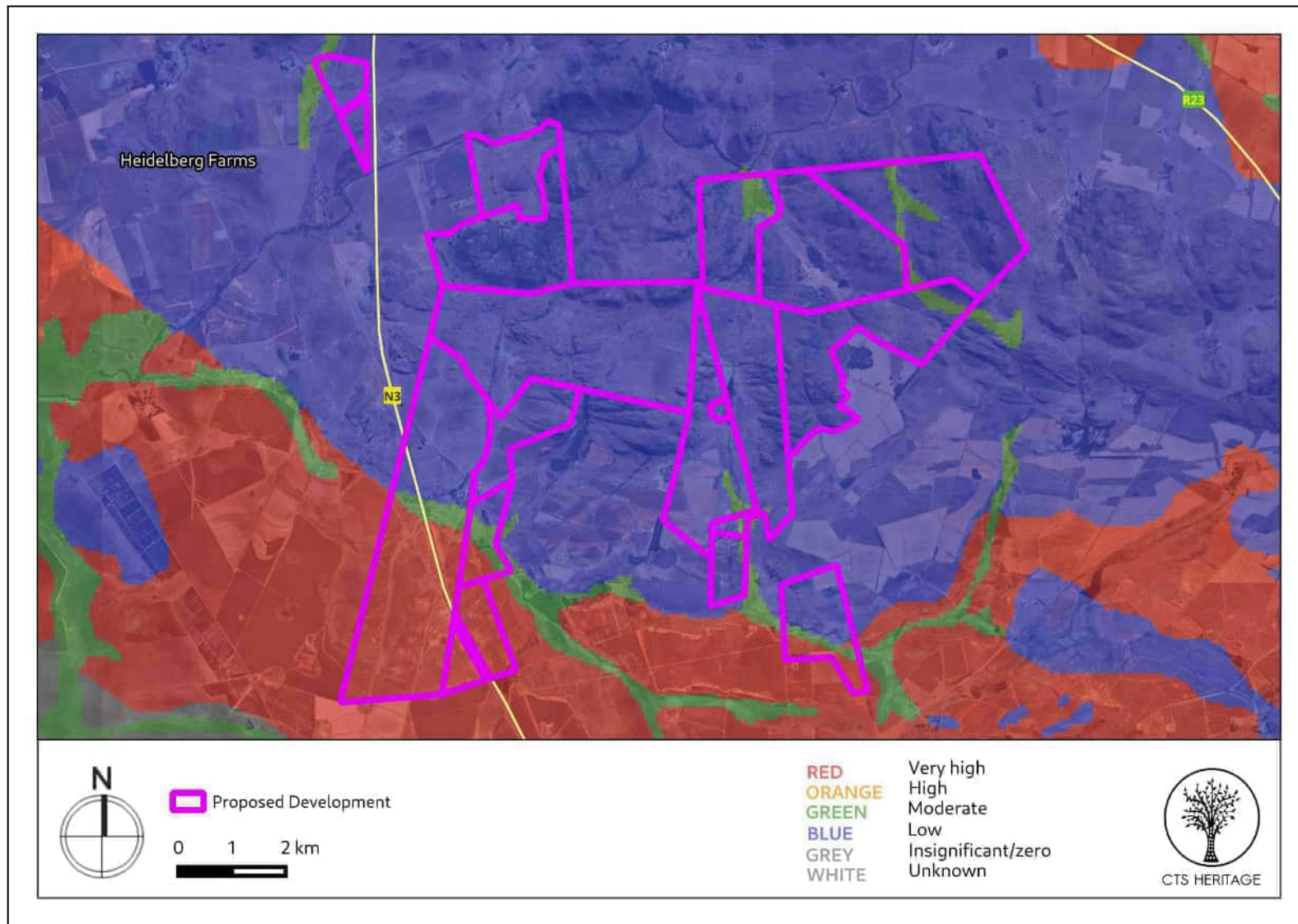


Figure 2.1: Palaeontological sensitivity of the development area from SAHRIS

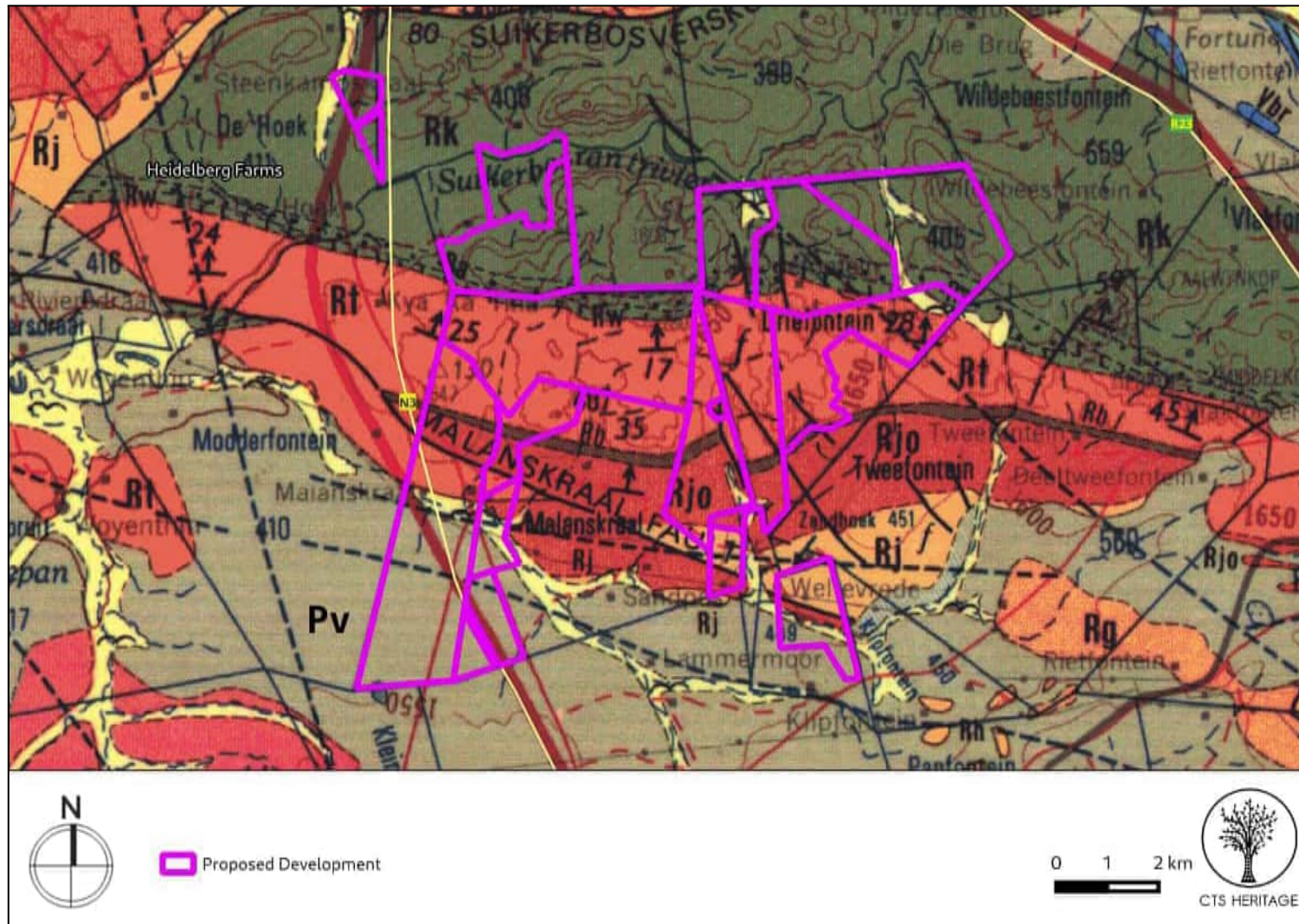


Figure 2.2 Geology Map. Extract from the CGS 2628 East Rand Geology Map indicating that the development area is underlain by Pv: Vryheid Formation in the Eccca Group, Ra: Alberton, and Rw: Westonaria, both in the Rk: Klipriviersberg Group, Rb: Booyens, Rjo: Johannesburg, and Rt: Turffontein Formations in the Central Rand Group, Rg: Government, and Rj: Jeppestown Formations in the West Rand Group, Q-a: Quaternary Alluvium and V-di: Diabase.

## REFERENCES

| Heritage Impact Assessments |                                     |                   |                                               |                                                                                                                                                                                                                                                                 |
|-----------------------------|-------------------------------------|-------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NID                         | Author(s)                           | Date              | Type                                          | Title                                                                                                                                                                                                                                                           |
| 4892                        | Jaco van der Walt                   | 02/06/2008        | AIA Phase 1                                   | Heritage Impact Assessment: Application for Mining Permits for the Arup Transnet Nmpp Alliance Borrow-Pits, Gauteng                                                                                                                                             |
| 5051                        | Johnny Van Schalkwyk, J van den Bos | 01/12/1999        | AIA Phase 1                                   | Scoping Report on Cultural Resources for the Proposed Clarens to Suikerbosrand Pipeline                                                                                                                                                                         |
| <b>5053</b>                 | <b>Julius CC Pistorius</b>          | <b>01/03/2003</b> | <b>AIA Phase 1</b>                            | <b>A Heritage Impact Assessment (HIA) of a Portion of the Farm Nooitgedacht 390 IR in the Heidelberg District of Gauteng</b>                                                                                                                                    |
| 5055                        | Francois P Coetzee                  | 01/09/2003        | AIA Phase 1                                   | Archaeological Investigation of the Proposed Heidelberg Kloof Estate Development, Heidelberg, Gauteng                                                                                                                                                           |
| 5056                        | Cobus Dreyer                        | 03/07/2006        | AIA Phase 1                                   | First Phase Archaeological and Cultural Heritage Assessment of the Proposed Feedlot Extensions at Elandsfontein 412 IR, Heidelberg, Gauteng Province                                                                                                            |
| 6369                        | Thomas Huffman                      | 01/05/2005        | AIA Phase 1                                   | Archaeological Assessment of the Burnstone Gold Mine, Mpumalanga                                                                                                                                                                                                |
| 6784                        | Francois P Coetzee                  | 01/09/2008        | AIA Phase 1                                   | Cultural Heritage Survey of the Proposed Development at Floracardia North and Floracardia South, Heidelberg, Gauteng                                                                                                                                            |
| 6877                        | Thomas Huffman                      | 01/08/2007        | AIA Phase 1                                   | Archaeological Impact Assessment for the Grootvlei-Balfour Powerline, Mpumalanga                                                                                                                                                                                |
| 7753                        | Thomas Huffman                      | 31/12/1999        | AIA Phase 1                                   | Archaeological Survey of Ratunda Extension 8, Heidelberg                                                                                                                                                                                                        |
| 7870                        | Julius CC Pistorius                 | 01/07/2008        | AIA Phase 1                                   | A Phase I Heritage Impact Assessment Study for Sasol's Proposed New Gas and Liquid Pipelines (Along a Corridor) from Sasol Synfuels in Secunda (Mpumalanga) to Sasol Infrachem and Natref in Sasolburg (Free State) on the Highveld in the Republic of South Af |
| 8155                        | Anton Pelser                        | 01/05/2007        | AIA Phase 1                                   | A Report on a Cultural Heritage Impact Assessment on Portion 19 of the Farm Vaaldam Settlement 1777, Vaaldam, near Deneyville, Free State Province.                                                                                                             |
| 49825                       | Anton Pelser, Jaco van der Walt     | 01/11/2010        | AIA Phase 1                                   | A Report on A Heritage Impact Assessment (HIA) for the proposed Sedaven Development of Portions 8 & 25 of the Farm Boschoek 385 IR, Heidelberg, Gauteng                                                                                                         |
| 73258                       | Wouter Fourie                       | 28/08/2012        | Heritage Scoping                              | Heritage Scoping for the proposed mining permit application on a portion of Portion 19 of the farm Kafferskraal 381 IR, Heidelberg, Gauteng Province.                                                                                                           |
| 145862                      | Makhosazana Mngomezulu              | 25/11/2013        | HIA Phase 1                                   | Phase 1 Heritage Impact Assessment for the Proposed Further Education Training (FET) College in Balfour.                                                                                                                                                        |
| 155254                      | Wouter Fourie                       | 15/10/2012        | Heritage Impact Assessment Specialist Reports | Eskom Groovlei PV HIA                                                                                                                                                                                                                                           |
| <b>164647</b>               | <b>Gideon Groenewald</b>            | <b>01/03/2014</b> | <b>Palaeontologic al Specialist</b>           | <b>Grootvlei paleo desktop</b>                                                                                                                                                                                                                                  |



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|        |                                    |            | Reports     |                                                               |
|--------|------------------------------------|------------|-------------|---------------------------------------------------------------|
| 186082 | Gavin Anderson,<br>Louise Anderson | 06/11/2012 | HIA         | The Mitigation Of All Heritage Sites Affected By The NMPP     |
| 304130 | Gavin Anderson                     | 09/07/2010 | HIA Phase 1 | SUMMARY OF THE HERITAGE SITES DAMAGED ALONG THE TRANSNET NMPP |



# SITE SENSITIVITY VERIFICATION CULTURAL HERITAGE, ARCHAEOLOGY AND PALAEONTOLOGY THEME (IN TERMS OF PART A OF THE ASSESSMENT PROTOCOLS PUBLISHED IN GN 320 ON 20 MARCH 2020)

## 1 Introduction

CTS Heritage was appointed by ABO Energy South Africa (Pty) Ltd to undertake a Site Verification and Sensitivity analysis as part of the application for Environmental Authorisation (EA) for the proposed development of the ABO Uvemvane Wind Energy Facility 2 near Heidelberg in the Gauteng Province.

ABO Uvemvane Wind Energy Facility 2 (Pty) Ltd proposes the development of ABO Uvemvane Wind Energy Facility 2 (WEF 2), a commercial wind energy generation facility comprising up to 25 turbines and with a total generation capacity of up to 180 MWac in capacity, as well as associated infrastructure. The proposed WEF would be located 10 km south-east of the town of Heidelberg in the Gauteng Province in the Lesedi Local Municipality/ Midvaal Local Municipality within the Sedibeng District Municipality.

As per the DFFE Screening Tool results, various on-site specialist verifications are required to be undertaken to determine the site sensitivity and the associated Environmental Authorisation process to be followed for the proposed Wind Energy Facility and associated grid infrastructure.

## 2 Site sensitivity verification

The site sensitivity verification was undertaken as follows:

- o A Desktop Study was conducted of relevant reports previously written (please see the reference list for the age and nature of the reports used) including known palaeontological sensitivities. These sources remain relevant for the purposes of sensitivity identification.
- o An archaeologist conducted a field survey of the site and its environs from 12 to 16 November 2024 to determine what archaeological resources are likely to be impacted by the proposed development of the WEF.
- o Seasonality has no impact on the verification of heritage and archaeological sensitivities
- o A palaeontologist conducted a desktop study of the site and its environs to determine what palaeontological resources are likely to be impacted by the proposed development of the WEF.



- o No-development buffers are recommended. In the context of this report, no-development means no disturbance of that area whatsoever including disturbance associated with road upgrades and grid infrastructure unless otherwise specified.

A Heritage Impact Assessment (HIA) process has been undertaken and is reported on in a separate HIA report that will be submitted to the South African Heritage Resources Agency (SAHRA) as is required in terms of Section 38(8) of the National Heritage Resources Act (NHRA).

### **Constraints & Limitations**

The terrain assessed in the WEF Cluster varies widely from flat, level terrain around the boundaries of the WEF's central area, to extremely rugged, mountainous terrain in the centre, especially either side of the valley cut by the Suikerbosrandrivier. The vegetation is well-established and dense in the mountainous areas as these have not previously been ploughed due to the rugged terrain. The lowlands also varied where cattle grazing had not recently taken place and surface visibility was low due to the dense grass cover. The survey relied heavily on the use of historical satellite imagery obtained from the NGI (NGI aerial photographs 1944) and the historic satellite imagery from 2009 and 2011 from GoogleEarth to locate possible areas for Iron Age enclosures and historical settlements before returning to the field to verify these sites in the field. The combination of the two methods worked very well and a great number of sites were located using this method.

## **3 Outcome**

In terms of site sensitivity with specific consideration of heritage resources, clarity on the broader context and its cultural value is important to understand overall heritage sensitivity and in order to contextualise site specific findings. Please find both contextual information as well as site specific information below.

### **Cultural Landscape**

The landscape in which the proposed development is located is mountainous with the Suikerbosrandrivier running through the middle. There are several farm werfs located within the proposed development area. Some of these have associated historical cemeteries indicated on the first edition 1:50 000 topo map. Although the N3 has diverged from historical routes, the R23 still follows along a historical route that might be impacted by the proposed development.

According to Doucakis (2021), one of the farms, Laagerspoort (also known as Lagerspoort) used to be known as Onderstepoort. This was the location of Voortrekker Hendrik Potgieter's lager during the three day campaign (28-30 November 1837). Further details of this conflict is found in Fourie (2016), "*A commando of 330 Voortrekkers and a small group of Barolong under the command of Andries Hendrik Potgieter and Piet Uys attacked the Khumalo Ndebele of Mzilikazi in the vicinity of the Marico River. Of interest for this study is*



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*that they departed Lagerspoort near present-day Heidelberg and travelled via the present-day farm of Deelkraal ... to the Matabele settlements near the Marico River. During the attack some 500 Matabele were killed and 3000 cows taken by the Voortrekker commando. On their way back, the cows were divided amongst the members of the commando on the property today known as Deelkraal (Bergh, 1999)."* The exact location of the lager could not be confirmed, but Doucakis quotes Reverend N. Roberts " Lat. 26 . 37' 30" S. & Long. 28 . 25'E. on the farm LAGERSPOORT 310 [406 IR], situated at the foot of a steep and high mountain, on the right [north] bank of the Sugar Bush River where it emerges from the hills to the North-East of the Heidelberg-Villiers road. From information gathered on the spot it appears that the lager [sic] stood close to the house now occupied by Mr. van Breda."

Most of the nearby sites from SAHRIS are structures associated with the development of railway lines. They have been identified and recorded as part of a project called Footsteps Along the Tracks (FAT). This includes the site identification, documentation and assessment of extant built structures, originally constructed by the Netherlands South African Railway Company (Nederlandsche Zuid-Afrikaansche Spoorwegmaatschappij - NZASM). Although these sites have been graded as having very high levels of regional significance on SAHRIS (Grade II), none of these sites have been formally protected through the publication of a gazette notice in terms of section 27 of the NHRA. Furthermore, the actual cultural value of these sites is likely to be of high or moderate local significance (Grade IIIA or IIIB). Due to the location of these structures being located outside of the area proposed for development, no impact to these resources is anticipated from this proposed development.

Although the N3 has diverged from historical routes, the R23 still follows a historical route. The field assessment noted the scenic and historic value of the R23 and the R103 and as such, a no development buffer of 1km is recommended on either side of these historic scenic routes for turbines, and a 500m buffer on either side for associated WEF infrastructure. Unlike the R23 and the R103, the N3 has lower levels of scenic and historic value and as such, a no development buffer of 500m is recommended on either side of the N3 for turbines and a 250m buffer on either side for associated WEF infrastructure.

Further, in order to avoid a canyon effect, it is recommended that turbines are proposed for only one side of the R103 and N3. It is therefore recommended that turbines are therefore limited to the eastern side of these roads.

Lessons from existing WEFs in similar contexts have revealed that, while the impact of the turbines themselves on the landscape is significant, far more significant is the impact resulting from the associated logistical infrastructure for development in these contexts. This includes the blasting associated with the creation of turbine platforms and the construction of access roads between the turbines. Based on the current information available about how wind farms and their associated infrastructure are constructed, these impacts cannot be mitigated and cannot be rehabilitated once the life of the project is over. These impacts



will permanently scar the significant mountain landscape which has existed in its current state for millions of years. As per the SEA Guidelines published by the CSIR (2018), no WEF development is supported on slopes exceeding 1:10.

### ***Principles***

These principles are derived from international best practice as contained in various International Charters on Conservation and a number of local adaptations, and apply to this cultural landscape assessment.

- Landscape significance - acknowledge the overall natural and cultural landscape, and the layered pattern of settlements in response to the natural landscape over time.
- Landscape integrity - retain the essential character and intactness of wilderness, rural and urban areas in the face of fragmentation through unstructured urbanisation and commercial agriculture.
- Landscape connectivity - retain the continuity and interconnectedness of wilderness and agricultural landscapes, including ecological corridors and green linkages.
- Landscape setting - maintain the role of the natural landscape as a “container” within which settlements are embedded, the landscape providing the dominant setting or backdrop.
- The logic of landscape - recognise the intrinsic characteristics and suitability of the landscape and its influence on land use, settlement and movement patterns, in response to geology, topography, water, soil types and microclimate.

### ***Principles applied to the proposed development site:***

1. Although the proposed site is located within a RED Zone. To address concerns about the cumulative impact of RE facilities within the greater Karoo region, a cautious approach is required in terms of assessing the desirability of such development from a cultural landscape perspective.
2. The proposed site is located adjacent to an existing infrastructural corridor associated with the national grid, which suggests a level of suitability of RE facilities which can link in with the grid. As such, new grid connection infrastructure should cluster with the existing alignments and not form new linear elements within the landscape.
3. Notwithstanding the existing infrastructure, the placement of WE turbines must take cognisance of the very high visual impact on a relatively intact and representative cultural landscape, and the extremely limited ability to visually screen this infrastructural development, particularly in the case of the wind turbines.

### ***WEF Turbine placement - position (“where”):***

The indicators are to be aligned with the visual sensitivity analysis and to include the following:

- Setback from transport corridors by at least 1000m on either side.
- Avoid steep or elevated topography, ridgelines or koppies.
- Setback from graded resources and farmstead settlements IIIA, IIIB (by 1000m) and IIIC (by 500m).
- Setback from farmsteads forming part of the settlement pattern by at least 500m
- Prioritise placement on the slopes of ridges and low-lying areas



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- Concentrate placement in proximity to the existing infrastructure.

### ***Turbine placement - principles (“how”):***

The following general principles apply to the turbine layout:

- Avoid an orthogonal pattern in favour of a more organic pattern.
- Turbines should be clustered or read as single elements in the landscape, as opposed to being aligned in a row in visual spatial proximity of each other.
- Avoid continuous or unbroken swathes of infrastructural interventions
- Avoid a stacking effect of the alignment of turbines. A staggered setback line is preferable.

**Table 1: Best Practice Cultural Landscape Sensitivities (Winter and Wilson, 2021)**

| Heritage Resource                                                                                           | High Sensitivity/<br>No-Go | Medium<br>Sensitivity | Low<br>Sensitivity |
|-------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------|--------------------|
| Cultural landscapes including natural reserves - formally protected or worthy of formal protection (NA)     | 0-3km                      | 3-5km                 | 5-10km             |
| Settlements (towns, villages and hamlets) - formally protected or worthy of formal heritage protection (NA) | 0-2km                      | 2-5km                 | 5-10km             |
| Historic scenic linkage routes such as the R103                                                             | WEF - 1km                  | 1-3km<br>500m-2km     | 3-10km<br>2-5km    |
| Heritage structures worthy of Grade I, II and IIIA heritage status                                          | 0-1km                      | 1-2.5km               | 2.5-5km            |
| Heritage structures worthy of grade IIIB and IIIC heritage status such as Lagerspoort and Malanskraal       | 0-500m                     | 500m-1km              | 1-2km              |
| Burial grounds and graves                                                                                   | 0-100m                     | 100m-250m             | 250m-500m          |
| Water features (rivers, wetlands and dams)                                                                  | 0-250m                     | 250m-500m             | 500m-1km           |
| Topographical features (ridgelines, peaks, scarps)                                                          | 0-250m from<br>apex        | 250m-500m             | >500m              |
| Steep slopes                                                                                                | >1:10 slopes               | >1:10 slopes          | <1:10 slopes       |



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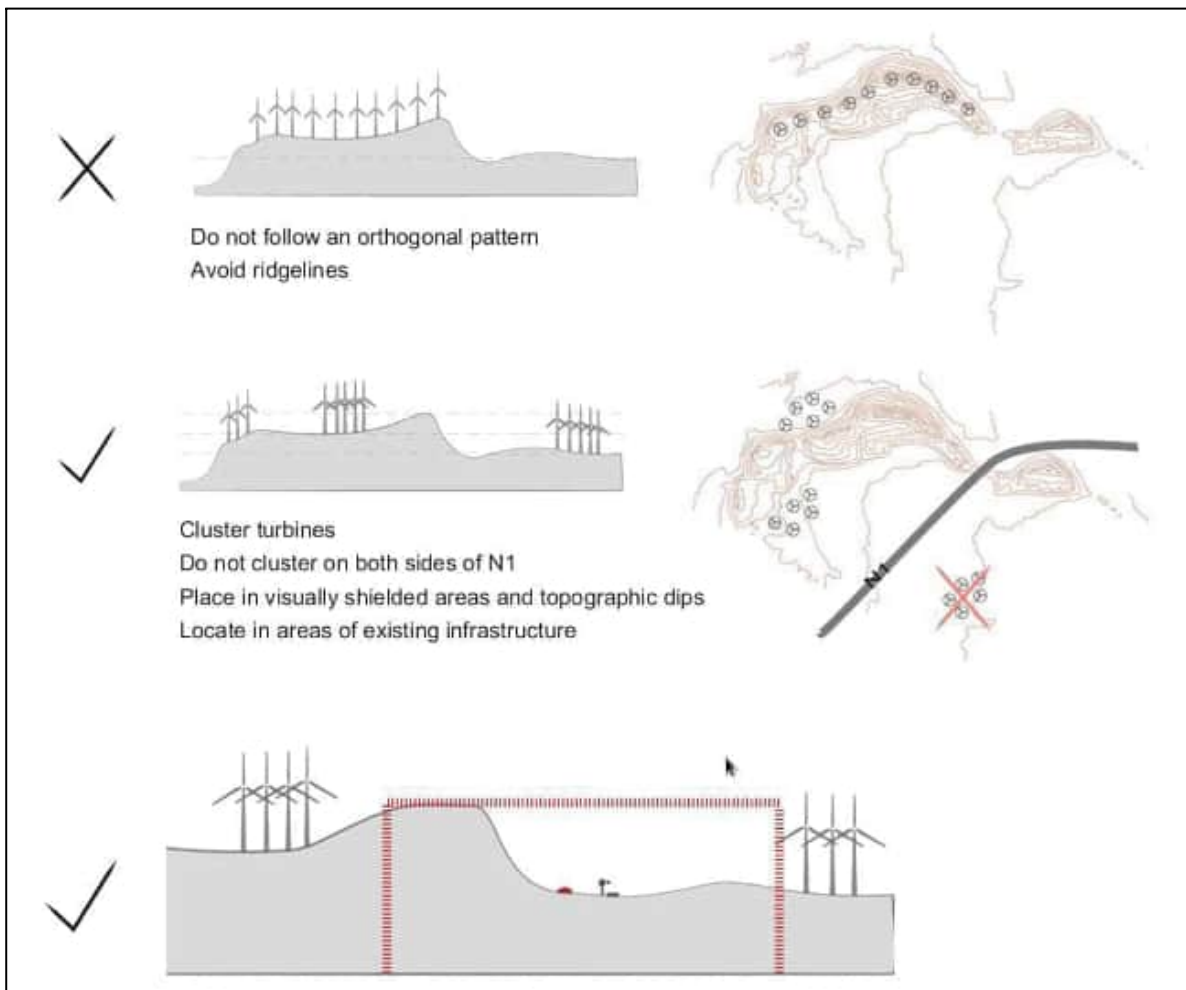


Figure A: Image indicating appropriate layout approaches (Winter and Wilson, 2021)



## Archaeology

Previous archaeological assessments completed in the area, and referenced above, have identified the archaeological sensitivity of the area proposed for development. This very high archaeological sensitivity was verified by the archaeological field assessment completed for this project. This field assessment identified a number of different kinds of heritage resources located within the area proposed for development, ranging from Early Stone Age artefacts dated to more than 200 000 years ago through to the ruins of historic farm werfs and farmworkers cottages from the recent past.

The most dominant archaeological signature within this landscape (over 100 observations noted) relates to the Iron Age occupation of this landscape and the remnants of Iron Age settlements. These sites represent the ruins of stone-walled structures and central kraals that conform to a particular pattern of Iron Age settlement. While the sites mapped in this report reflect the visible evidence of these settlements on the landscape, it is certain that these observations are not discrete but are related and as such, it is very likely that there is buried archaeology associated with these settlements throughout this landscape. The age of these settlements is unknown at this stage, however the scientific value of the buried archaeological material associated with these settlements is high and is therefore graded IIIA. As such, a no development buffer of 100m is recommended around each observed feature. Most of these Iron Age settlement observations are associated with the mountains located within the development area. This association is likely due to the landmark significance of these topographic features in the landscape. Also, due to the steep topography associated with these mountainous areas, these areas have not been subjected to cultivation activities associated with the historic agricultural occupation of the area. While it is possible that iron age settlements extended across the agricultural land in the past, this signature has been disrupted by agricultural activities. This signature remains clear within the mountainous areas.

Due to their landmark value within this cultivated landscape, it is recommended that the higher elevations of these mountains are not suitable for the construction of turbines, and more significantly, the construction of the large-scale roads required to construct these turbines. These areas must be considered as very high sensitivity in the sensitivity maps below. Due to the combined sensitivity from cultural landscape impacts and impacts to buried archaeology, development within this VERY HIGH sensitivity landscape will need to be limited to have minimal impact and align with visual impacts, and carefully considered in terms of micro-siting to prevent impacts to burial archaeology. It is preferred if no new infrastructure development takes place within this very high sensitivity area.

The field assessment identified a significant number of burial grounds and graves located within the area proposed for development. Some of these burials are more formal whereas others are marked only by sandstone cairns or are associated with the Iron Age settlement observations described above. Due to their high local levels of social and spiritual value, these sites are graded IIIA. A no development buffer of 100m is



recommended around each of these sites in order to ensure that the sense of place associated with these burials is retained, and to ensure that no nearby unmarked burials are accidentally impacted by excavations associated with this proposed development.

A number of modern agricultural structures were identified along with the ruins of some historic structures. These sites have no cultural value and as such are determined to be Not Conservation-Worthy (NCW). No further mitigation is recommended for these observations.

The field assessment identified a number of 20th Century farm werfs that have historic contextual value and are graded IIIC. These sites include the Steynskraal farm werf, the Klipplaatdrift farm werf, the Laagerspoort farm werf (see the background section for more information) and the Driefontein farm werf. In order to retain the sense of place associated with these historic farm werfs, a no development buffer of 500m is recommended around each of these sites.

The field assessment also identified a number of historic structures and ruins of structures that have been determined to have lower levels of historic contextual value. These observations include the ruins of historical farm werfs and a number of stone kraals. All of these sites with contextual historic value are graded IIIC and as such, a no development buffer of 50m is recommended around each of these sites. This buffer is recommended in order to ensure that no buried archaeology associated with these resources are accidentally impacted by construction activities associated with this proposed development.

**Table 2: Observations noted during the field assessment - the colour of the rows indicates grading**

| POINT ID | Description                                                                             | Type                         | Period              | Co-ordinates |           | Grading | Mitigation  |
|----------|-----------------------------------------------------------------------------------------|------------------------------|---------------------|--------------|-----------|---------|-------------|
| 3        | Geluk graves, 20th c. Marked by stone cairns, one headstone.<br>About 20 graves         | Graves/<br>Burial<br>Grounds | Modern              | -26,604938   | 28,410406 | IIIA    | 100m Buffer |
| 4        | Well built stone walled kraal, and modern ruin                                          | Structure,<br>Ruin           | Historic            | -26,604957   | 28,409422 | IIIC    | 50m Buffer  |
| 6        | Iron Age stone walled kraals hidden under trees                                         | Ruin                         | Iron Age            | -26,612174   | 28,407944 | IIIA    | 100m Buffer |
| 8        | Lagerspoort sandstone ruins as well as more modern 20th c ruin                          | Ruin                         | Historic,<br>Modern | -26,596735   | 28,411351 | IIIC    | 50m Buffer  |
| 10       | Steynskraal werf, sandstone walls and corrugated iron roofs, early 20th c or earlier    | Structure                    | Historic,<br>Modern | -26,598903   | 28,460894 | IIIC    | 500m Buffer |
| 11       | Strydom family graves, 1907, 1923. About 20 graves under trees with large stone walling | Graves/<br>Burial<br>Grounds | Historic            | -26,598675   | 28,459969 | IIIA    | 100m Buffer |



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|    |                                                                                                             |                              |                          |            |           |      |             |
|----|-------------------------------------------------------------------------------------------------------------|------------------------------|--------------------------|------------|-----------|------|-------------|
| 12 | Farmworkers' graves under gum trees marked by stone cairns and some modern headstones, up to 50 graves here | Graves/<br>Burial<br>Grounds | Modern,<br>Historic      | -26,600095 | 28,459435 | IIIA | 100m Buffer |
| 13 | Local stone built ruin with internal plastering, 20th c, 3c                                                 | Ruin                         | Historic                 | -26,601053 | 28,453526 | IIIC | 50m Buffer  |
| 14 | Stone walled fort on top of small koppie, SA War/2nd Boer War                                               | Ruin                         | Historic                 | -26,600908 | 28,455007 | IIIA | 100m Buffer |
| 15 | IA stone walled kraals                                                                                      | Ruin                         | Iron Age                 | -26,603862 | 28,44707  | IIIA | 100m Buffer |
| 16 | IA stone walled kraals                                                                                      | Ruin                         | Iron Age                 | -26,608417 | 28,452028 | IIIA | 100m Buffer |
| 17 | Long rectangular stone kraal                                                                                | Structure                    | Historic                 | -26,609132 | 28,451527 | IIIC | 50m Buffer  |
| 18 | Historical rectangular stone kraal under trees, well packed walls. Brick ruin at foundation level           | Ruin                         | Historic                 | -26,613101 | 28,450916 | IIIC | 50m Buffer  |
| 19 | Historical stone walled kraals                                                                              | Structure                    | Historic                 | -26,615298 | 28,449083 | IIIC | 50m Buffer  |
| 20 | Small rectangular stone building inside ephemeral kraal, historical                                         | Structure                    | Historic                 | -26,616839 | 28,44956  | IIIC | 50m Buffer  |
| 21 | Large IA enclosures with stone cairn marked grave in the centre                                             | Ruin,<br>Grave               | Iron Age                 | -26,614058 | 28,453236 | IIIA | 100m Buffer |
| 22 | Another large Iron Age enclosure on hill slope                                                              | Ruin                         | Iron Age                 | -26,618461 | 28,450536 | IIIA | 100m Buffer |
| 23 | Mid 20th century farmworkers' graves marked by stone cairns, some headstones, around 20 graves              | Graves/<br>Burial<br>Grounds | Historic                 | -26,612991 | 28,455453 | IIIA | 100m Buffer |
| 25 | Historical stock loading platform in IA enclosures                                                          | Ruin                         | Iron<br>Age,<br>Historic | -26,615071 | 28,457722 | IIIA | 100m Buffer |
| 26 | Klipplaatdrift werf 20th century buildings with green corrugated iron roofs                                 | Structure                    | Modern,<br>Historic      | -26,612356 | 28,478097 | IIIC | 500m Buffer |
| 27 | IA enclosures                                                                                               | Ruin                         | Iron Age                 | -26,623757 | 28,460306 | IIIA | 100m Buffer |
| 28 | IA enclosures                                                                                               | Ruin                         | Iron Age                 | -26,627548 | 28,459616 | IIIA | 100m Buffer |



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|    |                                                                                                                |                                  |                  |            |           |      |             |
|----|----------------------------------------------------------------------------------------------------------------|----------------------------------|------------------|------------|-----------|------|-------------|
| 29 | 20th century werf, white walls and red roof                                                                    | Structure                        | Modern, Historic | -26,626428 | 28,467488 | IIIC | 500m Buffer |
| 31 | Prominent koppies, cl features and IA sites                                                                    | Ruin, Cultural Landscape Feature | Iron Age         | -26,632015 | 28,452245 | IIIA | 100m Buffer |
| 32 | IA enclosures                                                                                                  | Ruin                             | Iron Age         | -26,624785 | 28,455025 | IIIA | 100m Buffer |
| 36 | Ruined historical kraal, ruined werf and brick building. Marked as cemetery on old topo map but no graves seen | Graves/ Burial Grounds, Ruin     | Historic         | -26,64111  | 28,380382 | IIIA | 100m Buffer |
| 47 | Steynskraal werf, stone walled kraals, late 19th and early 20th c buildings                                    | Structure                        | Modern, Historic | -26,612115 | 28,440795 | IIIC | 500m Buffer |
| 48 | Stone walled kraal                                                                                             | Structure                        | Historic         | -26,614207 | 28,43744  | IIIC | 50m Buffer  |
| 49 | Tuin van Eden campsite and Laagerspoort werf, sandstone building, and 20th c buildings                         | Structure                        | Historic, Modern | -26,619911 | 28,437361 | IIIC | 500m Buffer |
| 50 | IA enclosures                                                                                                  | Ruin                             | Iron Age         | -26,623305 | 28,440868 | IIIA | 100m Buffer |
| 51 | Large rectangular stone kraal with ruined building, also local stone, in centre, historical                    | Ruin                             | Historic         | -26,625262 | 28,441559 | IIIA | 100m Buffer |
| 52 | IA enclosures                                                                                                  | Ruin                             | Iron Age         | -26,622167 | 28,433015 | IIIA | 100m Buffer |
| 55 | IA and historical enclosures, late IA                                                                          | Ruin                             | Iron Age         | -26,619945 | 28,428362 | IIIA | 100m Buffer |
| 56 | Jacobs family graves surrounded by agricultural fields, 1908, at least 10 graves                               | Graves/ Burial Grounds           | Historic         | -26,612566 | 28,438267 | IIIA | 100m Buffer |
| 61 | IA enclosures                                                                                                  | Ruin                             | Iron Age         | -26,633665 | 28,423343 | IIIA | 100m Buffer |
| 62 | Large historical stone walled kraal                                                                            | Ruin                             | Historic         | -26,629315 | 28,415407 | IIIA | 100m Buffer |
| 63 | IA enclosures                                                                                                  | Ruin                             | Iron Age         | -26,655052 | 28,394357 | IIIA | 100m Buffer |
| 75 | Modipa family graves, 1990s to present, stone cairns and headstones, partially broken fence. Around 30 graves  | Graves/ Burial Grounds           | Modern           | -26,634941 | 28,45496  | IIIA | 100m Buffer |
| 76 | Ruined hut foundations lined with stone                                                                        | Ruin                             | Historic         | -26,635024 | 28,455275 | IIIC | 50m Buffer  |



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|    |                                                                                |                              |                     |            |           |      |             |
|----|--------------------------------------------------------------------------------|------------------------------|---------------------|------------|-----------|------|-------------|
| 86 | Wilbebeestfontein farmworkers' graves, about 40 marked by stone cairns, 20th c | Graves/<br>Burial<br>Grounds | Historic,<br>Modern | -26,630372 | 28,478703 | IIIA | 100m Buffer |
|----|--------------------------------------------------------------------------------|------------------------------|---------------------|------------|-----------|------|-------------|

### Palaeontology

According to the SAHRIS Palaeosensitivity Map, the proposed development is mostly underlain by sediments of Low palaeontological sensitivity, with some small areas underlain with Moderate fossil sensitivity. According to the extract from the Council of GeoScience Map CGS 2628 East Rand Geology Map the development area is underlain by sediments from Pv: Vryheid Formation in the Eccu Group, Ra: Alberton, and Rw: Westonaria, both in the Rk: Klipriviersberg Group, Rb: Booyens, Rjo: Johannesburg, and Rt: Turffontein Formations in the Central Rand Group, Rg: Government, and Rj: Jeppestown Formations in the West Rand Group, Q-a: Quaternary Alluvium and V-di: Diabase.

Most of the proposed development is underlain by the Klipriviersberg Group (Rk), and the Turffontein Formation (Rt) in the Central Rand Group. According to the Palaeotechnic report of Gauteng (Groenewald and Groenewald, 2014), the **Klipriviersberg Group**, which also contains the **Ra: Alberton, and Rw: Westonaria Formations**, has **Low** palaeontological sensitivity, with no fossils recorded. **Turffontein Formation** (Rt) in the Central Rand Group falls in the Witwatersrand Supergroup Which, according to the SAHRIS Fossil Heritage Browser, has **Insignificant or Zero** palaeontological sensitivity.

Other underlying sediments with **Insignificant/ Zero** palaeontological sensitivity, belong to the Witwatersrand SuperGroup: Rb: Booyens, and Rjo: Johannesburg Formations in the Central Rand Group, Rg: Government, and Rj: Jeppestown Formations in the West Rand Group.

The sediments marked as having Moderate sensitivity on the SAHRIS Palaeosensitivity Map, are **Quaternary Alluvium**. Groenewald and Groenewald (2014) note that "*Superficial deposits of Quaternary and Tertiary age can contain important fossils. Most notable are fossils associated with, for example, the Tswaing Impact Crater north of Pretoria (Johnson et al, 2006). The superficial deposits are allocated a moderate palaeontological sensitivity due to the fact that many fossiliferous rocks might be covered in a thin layer of soil, where fossils are only found where the topsoil has been removed by erosion.*" The Alluvial deposits, however, have **Low** palaeontological sensitivity, being "*Recent sandy and clayey deposits along water courses*" These sediments are known to contain a "*wide range of fossils possible, including mammalian bones and teeth, tortoise remains, ostrich egg etc.*"

### Recommendations for impacts to Cultural Heritage, Archaeology and Palaeontology

Based on the above findings, a sensitivity map of the development area has been drafted indicating areas that are and are not appropriate for the WEF development within the identified development areas. Overall, however, it must be noted that the overall heritage sensitivity of the development areas for WEF 1 range from moderate to very high. The areas identified as having high heritage sensitivity should be considered as



“tread-lightly” and the areas identified as having moderate sensitivity must be considered more closely for development activities.

As noted above, due to their landmark value within this cultivated landscape, it is recommended that the higher elevations of these mountains are not suitable for the construction of turbines, and more significantly, the construction of the large-scale roads required to construct these turbines. These areas must be considered as very high sensitivity in the sensitivity maps below. Due to the combined sensitivity from cultural landscape impacts and impacts to buried archaeology, development within this VERY HIGH sensitivity landscape will need to be limited to have minimal impact and align with visual impacts, and carefully considered in terms of micro-siting to prevent impacts to burial archaeology. It is preferred if no new infrastructure development takes place within this very high sensitivity area.

The following recommendations are made:

- The no-development buffer recommendations indicated in Table 2 must be implemented
- The very high sensitivities areas and no-go buffers identified in Figures 1.1 and 1.2 are adhered to for all associated development activities.
- The high sensitivity areas identified in Figures 1.1 and 1.2 are considered as “tread-lightly” areas with limited infrastructure considered for these areas
- Ongoing community access to the identified burials, as well as their conservation, and the conservation of the significant Iron Age resources into the future, must be ensured. This can be managed through the development of a Heritage Management Plan for the Iron Age resources and burials to be implemented for the duration of the project. This plan can be drafted as a condition of the granting of the EA.
- Implementation of a Fossil Chance Find Protocol
- No additional mitigation measures are required for geological formations with low or insignificant sensitivity.
- Any fossils uncovered during construction should be reported to heritage authorities for evaluation and preservation.
- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

## 4 National Environmental Screening Tool

Table 2: SSVR Table

| Theme             | DFFE Screening Tool Report Sensitivity | Specialist Sensitivity | Rating Confirmed/ disputed and Reasons                                                                                                                                                                     | Compliance Statement or Full Assessment |
|-------------------|----------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Cultural Heritage | VERY HIGH                              | VERY HIGH              | <b>Confirmed</b><br>The cultural value of the broader area has significance in terms of its settler and agricultural history, with intact cultural landscape resources located within the development area | Full Assessment                         |
| Archaeology       | VERY HIGH                              | VERY HIGH              | <b>Confirmed</b><br>Significant Iron Age archaeological heritage was identified within the development area                                                                                                | Full Assessment                         |
| Palaeontology     | VERY HIGH                              | LOW                    | <b>Disputed</b><br>It is anticipated that the impact of the development will mainly be <b>LOW</b> as none of the development area is underlain by the sensitive Vryheid Formation.                         | Full Assessment                         |

## 5 Conclusion

It is confirmed that the site sensitivities identified in the specialist study have been verified as per section 4 above.



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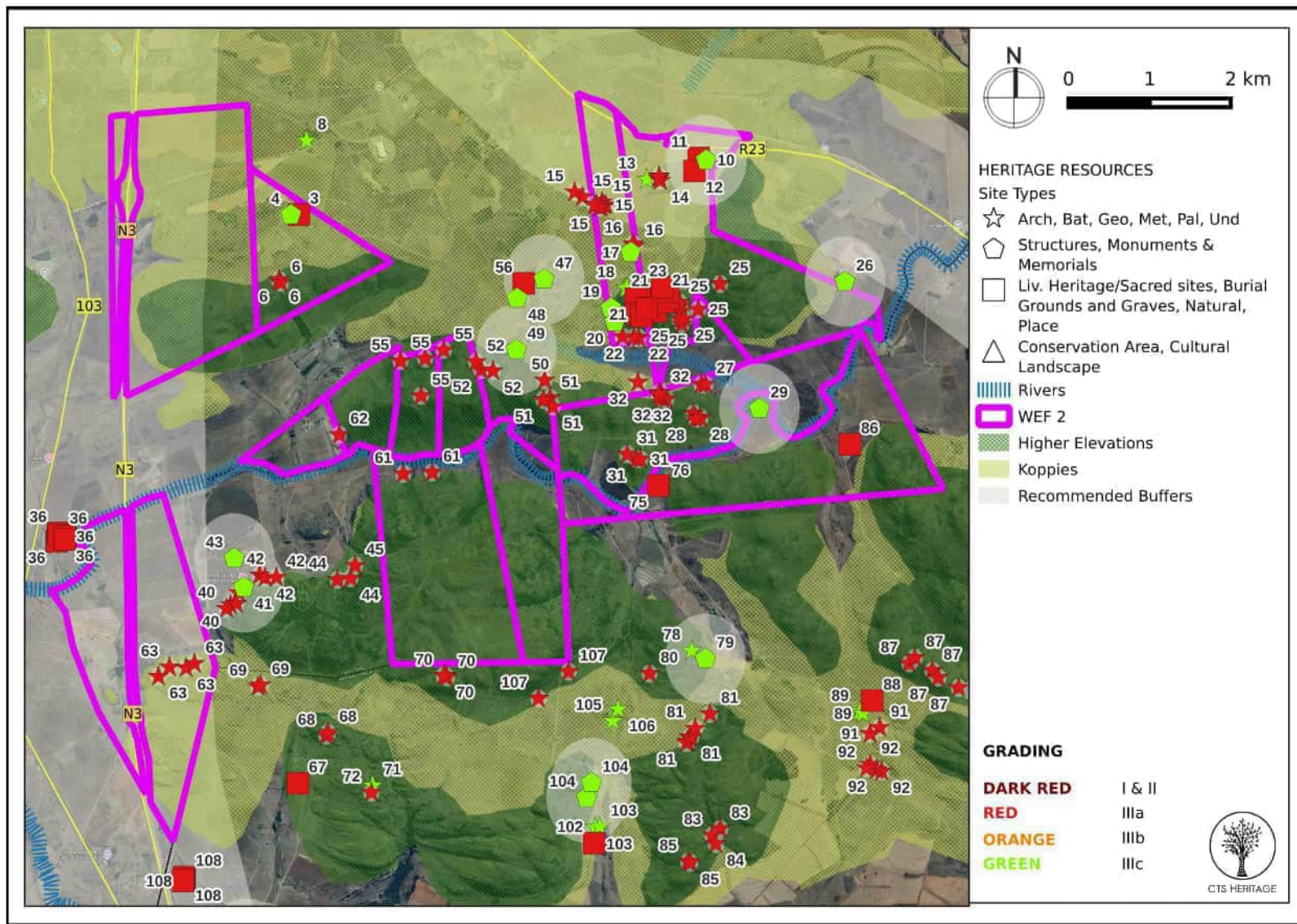


Figure 1.1: All heritage resources within proximity to the development area with recommended mitigation measures

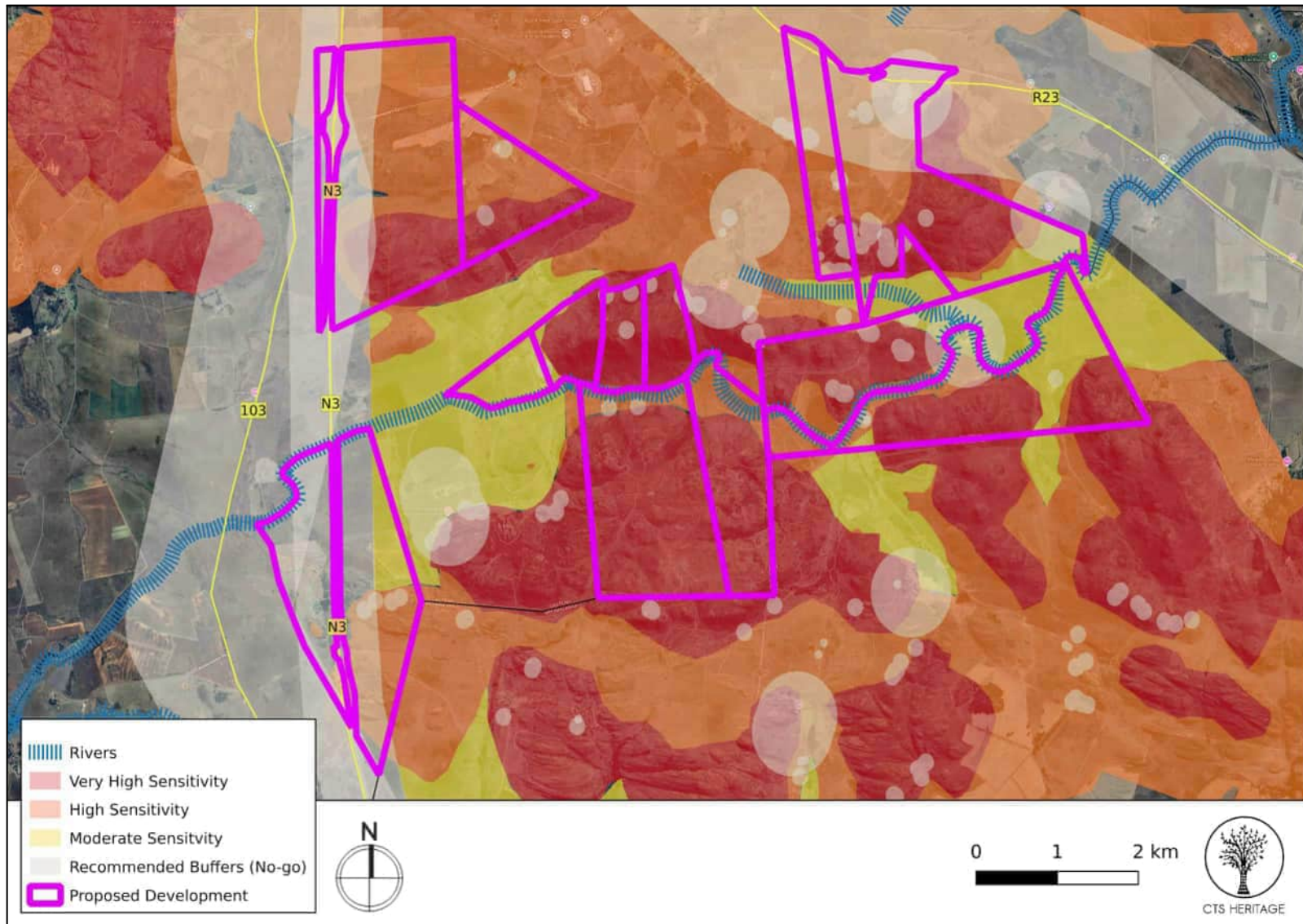


Figure 1.2: Heritage sensitivity map of WEF 2 based on the findings of the cultural heritage and archaeology assessment

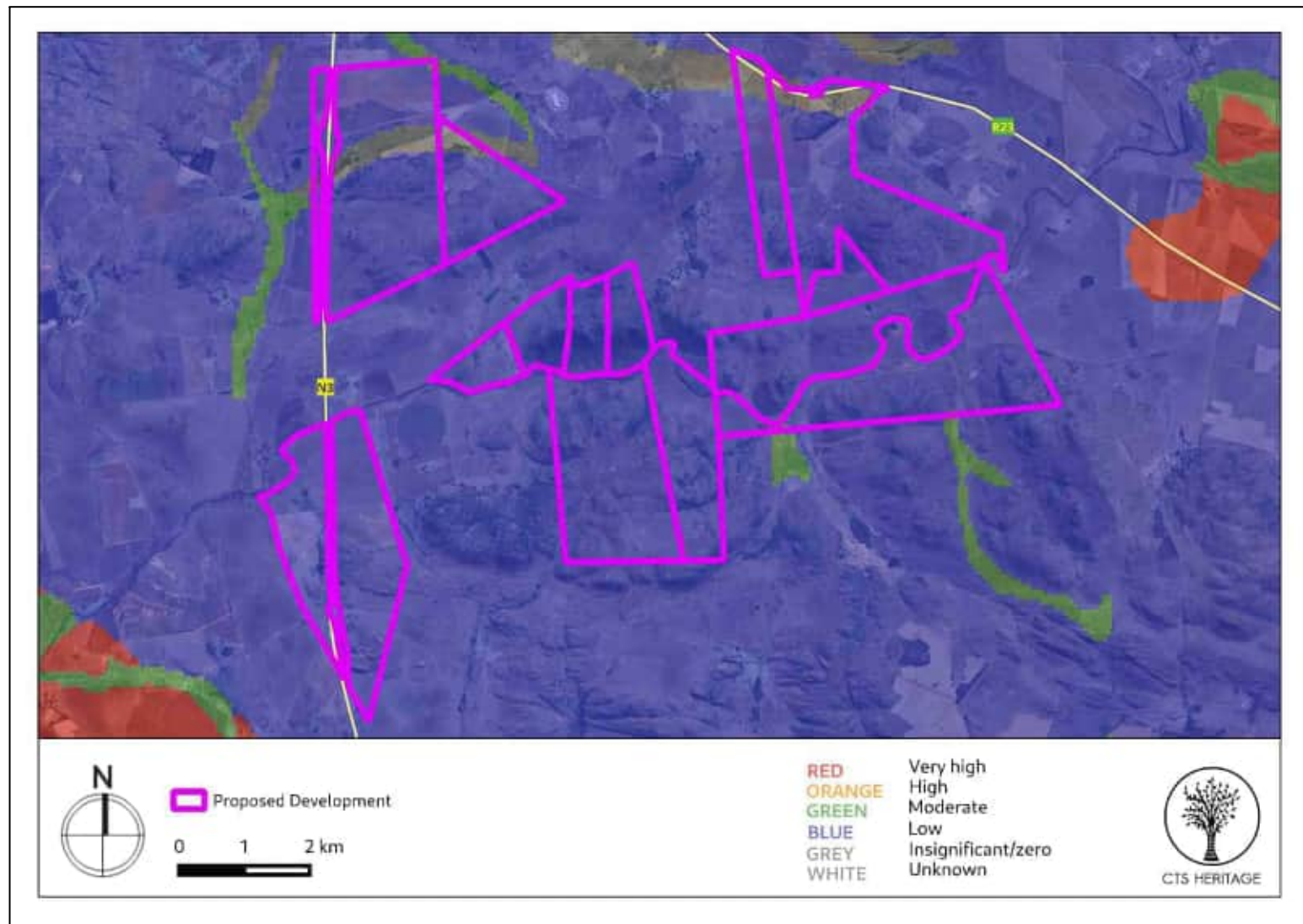


Figure 2.1: Palaeontological sensitivity of the development area from SAHRIS



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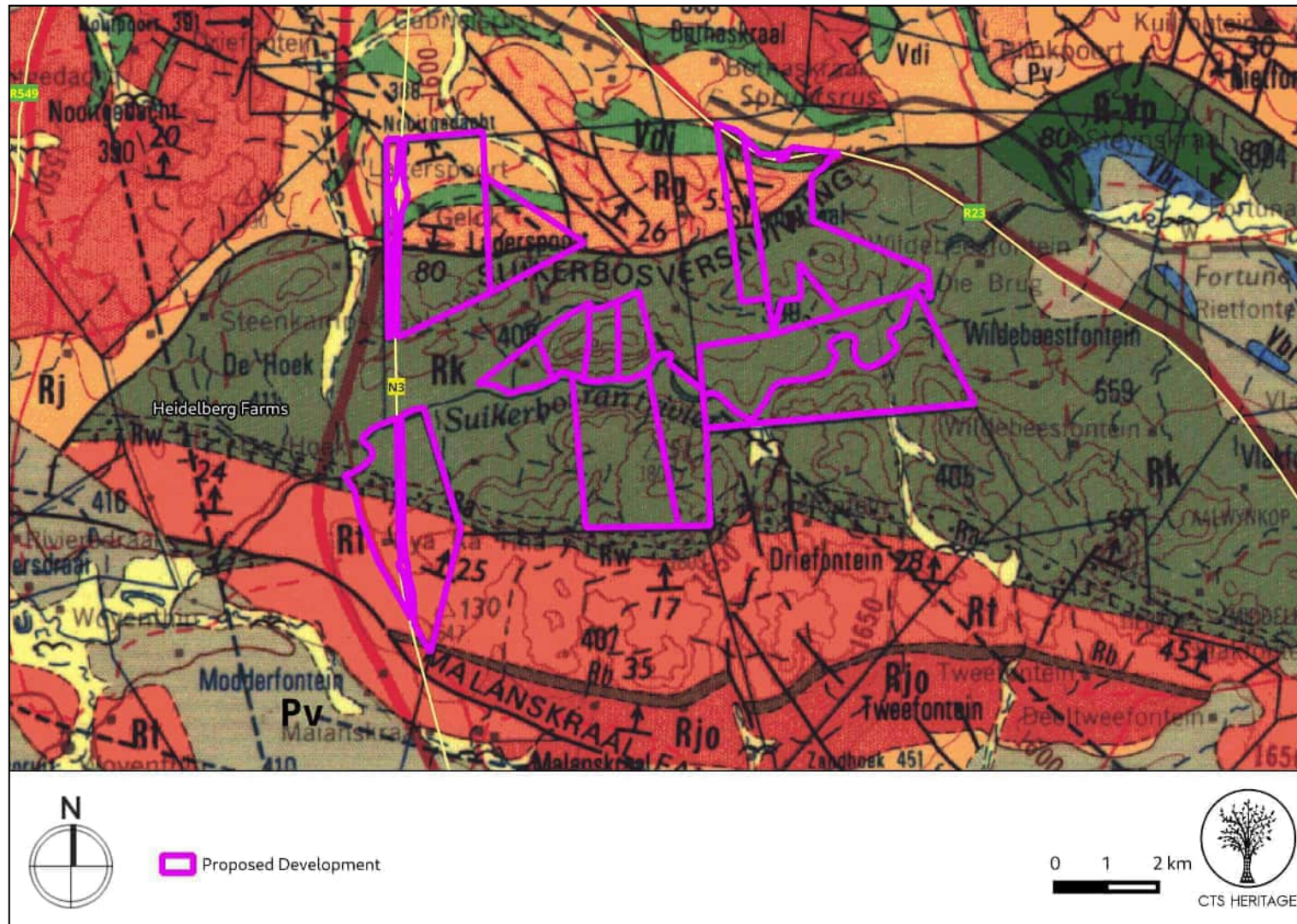


Figure 2.2 Geology Map. Extract from the CGS 2628 East Rand Geology Map indicating that the development area is underlain by Pv: Vryheid Formation in the Ecca Group, Ra: Alberton, and Rw: Westonia, both in the Rk: Klipriviersberg Group, Rb: Booyssens, Rjo: Johannesburg, and Rt: Turffontein Formations in the Central Rand Group, Rg: Government, and Rj: Jeppeshtown Formations in the West Rand Group, Q-a: Quaternary Alluvium and V-di: Diabase.

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|-----------------------------|-------------------------------------|-------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NID                         | Author(s)                           | Date              | Type                                          | Title                                                                                                                                                                                                                                                           |
| 4892                        | Jaco van der Walt                   | 02/06/2008        | AIA Phase 1                                   | Heritage Impact Assessment: Application for Mining Permits for the Arup Transnet Nmpp Alliance Borrow-Pits, Gauteng                                                                                                                                             |
| 5051                        | Johnny Van Schalkwyk, J van den Bos | 01/12/1999        | AIA Phase 1                                   | Scoping Report on Cultural Resources for the Proposed Clarens to Suikerbosrand Pipeline                                                                                                                                                                         |
| <b>5053</b>                 | <b>Julius CC Pistorius</b>          | <b>01/03/2003</b> | <b>AIA Phase 1</b>                            | <b>A Heritage Impact Assessment (HIA) of a Portion of the Farm Nooitgedacht 390 IR in the Heidelberg District of Gauteng</b>                                                                                                                                    |
| 5055                        | Francois P Coetzee                  | 01/09/2003        | AIA Phase 1                                   | Archaeological Investigation of the Proposed Heidelberg Kloof Estate Development, Heidelberg, Gauteng                                                                                                                                                           |
| 5056                        | Cobus Dreyer                        | 03/07/2006        | AIA Phase 1                                   | First Phase Archaeological and Cultural Heritage Assessment of the Proposed Feedlot Extensions at Elandsfontein 412 IR, Heidelberg, Gauteng Province                                                                                                            |
| 6369                        | Thomas Huffman                      | 01/05/2005        | AIA Phase 1                                   | Archaeological Assessment of the Burnstone Gold Mine, Mpumalanga                                                                                                                                                                                                |
| 6784                        | Francois P Coetzee                  | 01/09/2008        | AIA Phase 1                                   | Cultural Heritage Survey of the Proposed Development at Floracardia North and Floracardia South, Heidelberg, Gauteng                                                                                                                                            |
| 6877                        | Thomas Huffman                      | 01/08/2007        | AIA Phase 1                                   | Archaeological Impact Assessment for the Grootvlei-Balfour Powerline, Mpumalanga                                                                                                                                                                                |
| 7753                        | Thomas Huffman                      | 31/12/1999        | AIA Phase 1                                   | Archaeological Survey of Ratunda Extension 8, Heidelberg                                                                                                                                                                                                        |
| 7870                        | Julius CC Pistorius                 | 01/07/2008        | AIA Phase 1                                   | A Phase I Heritage Impact Assessment Study for Sasol's Proposed New Gas and Liquid Pipelines (Along a Corridor) from Sasol Synfuels in Secunda (Mpumalanga) to Sasol Infrachem and Natref in Sasolburg (Free State) on the Highveld in the Republic of South Af |
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| 49825                       | Anton Pelser, Jaco van der Walt     | 01/11/2010        | AIA Phase 1                                   | A Report on A Heritage Impact Assessment (HIA) for the proposed Sedaven Development of Portions 8 & 25 of the Farm Boschoek 385 IR, Heidelberg, Gauteng                                                                                                         |
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| <b>164647</b>               | <b>Gideon Groenewald</b>            | <b>01/03/2014</b> | <b>Palaeontologic al Specialist</b>           | <b>Grootvlei paleo desktop</b>                                                                                                                                                                                                                                  |



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|        |                                    |            | Reports     |                                                               |
|--------|------------------------------------|------------|-------------|---------------------------------------------------------------|
| 186082 | Gavin Anderson,<br>Louise Anderson | 06/11/2012 | HIA         | The Mitigation Of All Heritage Sites Affected By The NMPP     |
| 304130 | Gavin Anderson                     | 09/07/2010 | HIA Phase 1 | SUMMARY OF THE HERITAGE SITES DAMAGED ALONG THE TRANSNET NMPP |

# Appendix C.5

## **AVIFAUNA SSVR**



**THE PROPOSED ABO UVEMVANE WIND ENERGY FACILITY  
1 NEAR BALFOUR, GAUTENG AND MPUMALANGA  
PROVINCES:**

**Scoping Phase: Final Avifaunal Pre-Application Monitoring & Site  
Sensitivity Verification Report**



**JANUARY 2026**

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Avifaunal Consultant **Miqayla Stofberg** completed her PhD in Biological Sciences at the FitzPatrick Institute of African Ornithology in 2023. Miqayla also holds a Bachelor of Science (Honours) in Biological Sciences and a Bachelor of Science in Applied and Marine Biology, all from the University of Cape Town. She has published research in international peer-reviewed journals and has presented her research at international conferences. In addition to her academic pursuits, Miqayla is an avid birder and a skilled fieldwork biologist. She has assisted on diverse projects, including, bird monitoring at the Ukuwela Game Reserve in Hluhluwe, KwaZulu-Natal and has previously been involved in GPS tagging initiatives for Verreaux's Eagles and Black Harriers of the Western Cape. Miqayla's interest in environmental consulting started during her tenure at the Department of Environmental Affairs' Environmental Law Enforcement Directorate. Here, she actively supported Environmental Management Inspectors with their investigations into alleged unlawful environmental activities and assisted with compliance inspections and administrative enforcement. Since joining Holland and Associates Environmental Consultants, she has assisted with the compilation of avifaunal impact assessment reports, site sensitivity verification reports, avifaunal pre-application monitoring reports, and avian species compliance statements for numerous proposed renewable energy and agricultural development projects. Miqayla is a registered Candidate Natural Scientist (Ecological Science: 400037/16) with **SACNASP** and is an active member of the South African affiliate of the International Association for Impact Assessment (**IAIASa**).

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| 2.7    | Ramsar Convention on Wetlands of International Importance, Ramsar, 1971 .....                                                                                                                                                                       | 3  |
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## **1 Introduction**

ABO Uvemvane Wind Energy Facility 1 (Pty) Ltd is interested in the development of ABO Uvemvane Wind Energy Facility 1 (WEF 1), located near Balfour over the border of the Mpumalanga and Gauteng provinces.

It will consist of a commercial wind energy generation facility comprising up to 27 turbines and with a total generation capacity of up to 170 MWac in capacity, as well as associated infrastructure.

Each of the projects would require its own Environmental Authorisation and its own impact assessment report, with the assessment of cumulative impacts being considered.

ABO appointed Holland & Associates Environmental Consultants' (H&A) in-house avifaunal specialist Anja Albertyn to conduct avian specialist services required for the Environmental Authorisation process, in line with all applicable legislation and best practice guidelines.

This scoping phase report presents the findings of one year of avifaunal pre-application monitoring conducted from November 2023 to October 2024 for the proposed ABO Uvemvane WEF 1 and Control sites and serves to provide information to inform the project design, if any red flags have been identified, and to serve as a Site Sensitivity Verification Report in terms of the National Web-based Screening Tool.

## **2 Applicable Legislation**

South African environmental legislation contains a plethora of environmentally related statutes, guidelines and protocols, many of which place onerous responsibilities on landowners, developers, environmental assessment practitioners (EAPs) and independent specialist consultants. The legislation considered most pertinent in the context of undertaking a legally compliant avifaunal assessment, is outlined below.

### **2.1 The International Union for Conservation of Nature**

The International Union for Conservation of Nature (IUCN), established in 1948, unites international governments and non-governmental organisations, scientists and experts to protect nature, to guide and support conservation activities, and to inform government policies using a science-based approach. South Africa joined the IUCN on 23 July 1993. The IUCN has published a series of guidelines and conservation tools including the below which apply to the assessment of impacts of the proposed development on avifauna.

#### **2.1.1 IUCN Red List of Threatened Species**

The IUCN's Red List of Threatened Species was established in 1964 and has become the world's most comprehensive source on the global extinction risk status of species, identifying species in need of targeted recovery and guiding conservation and funding priorities ([iucnredlist.org](http://iucnredlist.org)). It has assessed and listed the status of all 833 bird species that occur in South Africa, of which six are listed as globally Critically Endangered, 24 as Endangered, 29 as Vulnerable, and 39 as Near Threatened. The remainder are listed as Least Concern, with no species listed as Data Deficient. Critically Endangered, Endangered, Vulnerable and Near threatened species are known or expected to occur in the area.

### *2.1.2 IUCN Guideline for Project Developers: Mitigating biodiversity impacts associated with solar and wind energy developments*

The IUCN Wind & Solar Guideline was published in 2021 and includes an outline of the potential impacts of wind energy facilities and their associated infrastructure on avifauna, as well as detailing tested and potential mitigation measures to minimise these impacts.

## **2.2 The Convention on Biological Diversity, 1993**

The Convention on Biological Diversity (CBD) is the international legal instrument for the conservation of biological biodiversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising from the utilisation of genetic resources. It has been ratified by 196 nations<sup>1</sup>. The overall objective of the CBD is to encourage actions which will lead to a sustainable future. States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction. Each contracting party shall, in accordance with its particular conditions and capabilities develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity and integrate the conservation and sustainable use of biological diversity.

## **2.3 The Convention on the Conservation of Migratory Species of Wild Animals, 1983**

The Convention on Migratory Species (CMS), also known as the Bonn Convention, is an environmental treaty of the United Nations that provides a global platform for the conservation and sustainable use of terrestrial, aquatic and avian migratory animals and their habitats.<sup>2</sup>

Parties that are range states of a migratory species listed as endangered shall endeavour to conserve, and where feasible and appropriate restore the habitats of the species which are of importance in removing the species from danger of extinction, and to prevent, remove, compensate or minimise as appropriate, the adverse effects of activities or obstacles that seriously impede or prevent the migration of the species, and to prevent, reduce or control factors that are endangering or are likely to further endanger the species.

## **2.4 The Agreement on the Conservation of African-Eurasian Migratory Waterbirds, 1999**

The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) is an intergovernmental treaty dedicated to the conservation of migratory waterbirds and their habitats across Africa, Europe, the Middle East, Central Asia, Greenland and the Canadian Archipelago<sup>3</sup>.

Developed under the framework of the Convention on Migratory Species (CMS) and administered by the United Nations Environment Programme (UNEP), AEWA brings together countries and the wider international conservation community to establish coordinated conservation and management of migratory waterbirds throughout their entire migratory range.

AEWA covers migratory waterbirds that are ecologically dependent on wetlands for at least a part of their annual life cycle. These include divers, grebes, pelicans, gannets, cormorants, herons

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<sup>1</sup> [www.cbd.int](http://www.cbd.int)

<sup>2</sup> [www.cms.int](http://www.cms.int)

<sup>3</sup> [Unep-awea.org](http://Unep-awea.org)

and egrets, storks, ibises and spoonbills, flamingos, ducks, geese and swans, cranes and rails, waders, gulls, terns, skimmers, tropic and frigate birds, auks and the African Penguin.

All AEWA species cross international boundaries during their migrations and require good quality habitat for breeding as well as a network of suitable sites to support their annual journeys. International cooperation across their entire migratory range, as provided by AEWA, is therefore essential for the conservation and management of migratory waterbird populations and the habitats on which they depend.

## **2.5 African Convention on the Conservation of Nature and Natural Resource (Maputo Convention)**

The Maputo Convention was adopted in 2003, ratified by South Africa in 2013, came into force in 2016 and was amended in 2017. It aims to *'enhance environmental protection'* and *'foster the conservation and sustainable use of natural resources'*, as well as to support the creation of a conservation area network and science-based environmental management. Signatories are obliged to *'maintain and enhance species and genetic diversity of plants and animals'* with particular emphasis on *'socially, economically and ecologically valuable species that are threatened.'*

## **2.6 Memorandum of Understanding on the Conservation of Migratory Birds of Prey in Africa and Eurasia**

The Signatories agree to take coordinated measures to achieve and maintain the favourable conservation status of birds of prey throughout their range and to reverse their decline when and where appropriate.

## **2.7 Ramsar Convention on Wetlands of International Importance, Ramsar, 1971**

The Convention on Wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

## **2.8 The Convention on the International Trade in Endangered Species of Wild Flora and Fauna, Washington DC, 1973**

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement between governments to ensure that international trade in specimens of wild animals and plants does not threaten their survival.

## **2.9 The Constitution of the Republic of South Africa, 1996**

The Constitution of the Republic of South Africa provides in the Bill of Rights that: Everyone has the right – (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that – (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

## **2.10 National Environmental Management Act No. 107 of 1998**

The National Environmental Management Act (NEMA) No. 107 of 1998, as amended, is the legislative framework that gives effect to the environmental rights in the Constitution and sets out guiding principles that apply to organs of state that may affect the environment. One of the key principles of the NEMA is sustainable development and the precautionary approach. Regulations promulgated in terms of the NEMA that are relevant to this study are detailed below.

### **2.10.1 *Environmental Impact Assessment Regulations, 2014, as amended***

The Environmental Impact Assessment (EIA) Regulations 2014, as amended, set out requirements for the appointment of specialists, the general requirements of specialists, and the disqualification of specialists. Appendix 6 of the EIA Regulations, 2014, as amended sets out the Contents of Specialist Reports.

### **2.10.2 *The National Web-based Screening Tool***

On 5 July 2019, in Government Gazette 42561 (GN 960), the Minister of Environment, Forestry and Fisheries published notice that the submission of a report generated from the National Web-based Environmental Screening Tool (hereafter referred to as 'the ST') will be compulsory when submitting an application for environmental authorisation in terms of regulation 19 and 21 in the EIA Regulation, 2014, as amended, after 90 days from the date of publication of the notice.

### **2.10.3 *Protocols for the assessment and minimum criteria for reporting on identified environmental themes in terms of Section 24(5) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation.***

On 20 March 2020, in Government Gazette No. 43110 (GN 320) the Minister of Environment, Forestry and Fisheries prescribed general requirements for undertaking site sensitivity verification and for protocols for the assessment and minimum report requirements of environmental impacts for environmental themes for activities requiring environmental authorisations. When the requirements of a protocol apply, they replace the requirements of Appendix 6 of the EIA Regulations, 2014, as amended. The '*Protocol for the Specialists Assessment and Minimum Report Content Requirements for Environmental Impacts on Avifaunal Species by onshore wind generation facilities where the electricity output is 20W or more.*' published in the same gazette therefore applies to the proposed development (hereafter referred to as '**the Avifauna & Wind Protocol**'). The Avifauna & Wind Protocol includes the following text regarding pre-application/pre-construction monitoring:

- *'The process for undertaking the Avifaunal Impact Assessment comprises of three phases:*
  - *a reconnaissance study;*
  - *the preparation of a pre-application avifaunal monitoring plan; and*
  - *the undertaking of an avifaunal impact assessment and the preparation of a report.*
- *All tasks of the Avifaunal Specialist Assessment must be undertaken by an avifauna specialist registered with the South African Council for Natural Scientific Professionals (SACNASP).*

- *All tasks are to be undertaken on the site being submitted as the preferred site and on a Control Site located in accordance with the latest version of the Bird and Wind-Energy Best-Practice Guideline, and must identify:*
  - *the extent of the impact of the proposed development on priority species species; and*
  - *whether the proposed development will have an unacceptable impact on priority or threatened bird species.*
- *The Avifaunal Specialist Assessment must be undertaken based on the results of a site-specific Pre-Application Avifaunal Monitoring Plan that is informed by a Reconnaissance Study, as well as data collected over four seasons (i.e. summer, autumn, winter and spring) on the preferred site and the Control Site.*
- *The Reconnaissance Study is to be based on a desktop study of relevant information as well as a 2 to 4-day on-site inspection of both sites.*
  - *The occurrence of target species is to be identified, including seasonality of occurrence and migratory patterns of the species.*
  - *The study must define the study area (avifaunal impact zone).*
  - *The study is to produce a site-specific Pre-Application Avifaunal Monitoring Plan.*
- *The Pre-application Avifaunal Monitoring Plan as a minimum, must include:*
  - *the study area and its characteristics which must be mapped including the extent, habitat, special features including topographical and water features, quarries, drainage lines, known breeding sites, existing uses of land, existing infrastructure such as power lines and roads, and existing operational wind energy facilities within 30km of the site;*
  - *target avifaunal species that are likely to occur on the preferred site and for which monitoring is required;*
  - *pre-application monitoring requirements for both the site as well as the Control Site, that must include the following:*
    - *the monitoring intervals including the number and duration of monitoring events which must be based on the latest version of the BirdLife South Africa Bird and Wind-Energy Best-Practice Guideline or a motivation provided for the deviation;*
    - *the location of monitoring points;*
    - *aspects to be monitored (for example, bird abundance and flight activity, presence of target species, proportion of flying time each target species spends at turbine rotor height, preferred flight paths, risk of identified target species to collision, areas for specific monitoring if any, etc.);*
    - *equipment to be used;*
    - *monitoring methodology for the abundance or activity monitoring and for direct observation or vantage point surveys, the latest version of the BirdLife South Africa Bird and Wind-Energy Best-Practice Guideline must be followed or a motivation provided for the deviation;*
    - *numbers of observers to be used; and*
    - *data to be captured including a pro-forma data capturing template consistent with that envisaged by the national bird monitoring database, once operational.*

- *Monitoring according to the plan is to be carried out for a period of not less than four seasons.'*

The Avifauna & Wind Protocol defines sensitivity areas as follows:

- **Very high:** Areas likely to provide critical habitat for priority species sensitive to wind energy development and/or whose population is reliant on highly localized and unique roosting, nesting and/or foraging sites. These areas are potentially unsuitable for development owing to there being recent, confirmed evidence that the priority species are present.
- **High:** Includes habitat likely to be of importance to priority species sensitive to wind energy developments, Critically Endangered, Endangered bird species and/or Vulnerable bird species; and habitat likely to be of importance to endemic and/or range-restricted bird species that are susceptible to impacts from wind energy facilities. These areas are potentially sensitive to development.
- **Medium:** Areas with limited potential for supporting priority populations of threatened species that are susceptible to impacts from wind energy facilities.
- **Low:** Areas that possibly do not support priority populations of threatened species that are susceptible to impacts from wind energy facilities. These areas are probably suitable for development.

An Avifaunal Specialist Assessment is to be undertaken for all sensitivity ratings provided by the National Web-based Screening Tool under the avian wind theme, as the Screening Tool does not contain sufficient information for the whole country.

In addition, on 30 October 2020 the "*Protocol for the Specialists Assessment and Minimum Report Content Requirements for Environmental Impacts on Animal Species*" (GN 1150 of 30 October 2020, as amended), was published which replaces the requirements of Appendix 6 of the EIA Regulations (hereafter referred to as '**the Animal Species Protocol**').

According to the Animal Species Protocol, before commencing with a specialist assessment, the current use of the land and the potential environmental sensitivity of the site under consideration identified by the screening tool must be confirmed by undertaking a site sensitivity verification in line with the requirements of the Animal Species Protocol, as amended.

The animal species theme defines sensitivity for animal species as follows:

- **Very high:** (1) Critical habitat for range-restricted SCC<sup>4</sup> with a global range < 10 km<sup>2</sup>, or (2) Critically Endangered, Endangered or vulnerable SCC according to the IUCN Red List 3.1 Categories and Criteria or listed as Nationally Rare; (3) species aggregations that represent ≥1% of the global population size of a species, over a season, and during one or more key stages of its life cycle; (4) the number of mature individuals that ranks the site among the largest 10 aggregations known for the species. These areas are irreplaceable for SCC.
- **High:** (1) Confirmed habitat for SCC; (2) SCC listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable, according to the IUCN Red List 3.1 Categories and Criteria and under the

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<sup>4</sup> Species of Conservation Concern

national category of Rare. These areas are unsuitable for development due to a very likely impact on SCC.

- **Medium:** (1) Suspected habitat for SCC based either on historical records (prior to 2002) or being a natural area included in a habitat suitability model for this species. (2) SCC listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable, according to the IUCN Red List 3.1 Categories and Criteria and under the national category of Rare. These areas represent suspected habitat for SCC based on occurrence records for these species collected prior to 2002 or is based on habitat suitability models. The presence or likely presence must be investigated through a site inspection by a specialist registered with the SACNASP with a field of practice relevant to the taxonomic group (Aves), to confirm the presence, likely presence or confirmed absence of the identified SCC.
- **Low:** (1) Areas where no natural habitat remains. (2) Natural areas where there is no suspected occurrence of SCC.

On a site identified as being of very high or high sensitivity for animal species, an Animal Species Specialist Assessment must be conducted by a specialist registered with SACNASP with a field of practice relevant to the taxonomic group (in this case, Aves – Birds), for which the assessment is being undertaken. The assessment must be undertaken following the Species Environmental Assessment Guideline (SANBI, 2022).

The Department of Forestry, Fisheries and the Environment published three iterations of a draft protocol for comment for 'The specialist assessment and minimum report content requirements for environmental impacts on Cape Vulture by onshore wind energy generation facilities' (hereafter referred to as '**the Cape Vulture Protocol**'). The comment period on the third draft has closed but the Cape Vulture Protocol has not been gazetted to date, and therefore there is no legislated requirement for this protocol.

#### 2.10.4 *The BirdLife South Africa Best Practice Guidelines*

The Avifauna & Wind Protocol requires that pre-construction/pre-application monitoring is conducted in line with applicable BirdLife South Africa's latest Best Practice Guidelines. The following guidelines have been published by BirdLife South Africa pertaining to wind energy developments:

- The Birds & Wind Energy Best Practice Guidelines (Jenkins et al. 2015)<sup>5</sup>;
- The Verreaux's Eagle Guidelines<sup>6</sup>
- The Black Harrier Guidelines<sup>7</sup>
- The Cape Vulture Guidelines<sup>8</sup>
- Secretarybird Guidance Note (Birdlife SA 2022)<sup>9</sup>

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<sup>5</sup> Jenkins AR, van Rooyen CS, Smallie, JJ, Harrison JA, Diamond M, Smit-Robinson HA & Paton S. *Birds and Wind-Energy Best-Practice Guidelines*. Third Edition, 2015. Birdlife South Africa / Endangered Wildlife Trust

<sup>6</sup> Ralston-Paton S & Murgatroyd M. 2021. Verreaux's Eagle and Wind Farms Guidelines for impact assessment, monitoring, and mitigation. Birdlife South Africa.

<sup>7</sup> Simmons RE, Ralston-Paton S, Colyn R & Garcia-Heras. 2020. Black Harriers and Wind Energy. Guidelines for impact assessment, monitoring and mitigation. Birdlife South Africa.

<sup>8</sup> Pfeiffer M & Ralston-Paton S. 2018. Cape Vulture and Wind Farms. Guidelines for impact assessment, monitoring and mitigation. Birdlife South Africa.

<sup>9</sup> Brink C. 2022. Minimising the impacts of infrastructure development on Secretarybirds *Sagittarius serpentarius*. Birdlife South Africa Guidance Note

- BirdLife SA Highlands Grasslands and Wetlands Statement<sup>10</sup>
- Blade Patterning Guidelines (October 2024)<sup>11</sup>

The Animal Species Protocol requires that the assessment must be undertaken following the Species Environmental Assessment Guideline (SANBI, 2022), which states that existing guidance should be consulted where available and applicable to a particular development. Therefore, the above-listed guidelines are also applicable in terms of the Animal Species Protocol.

### 3 The Proposed Project

*(Note: The proposed project description in this section has been provided by the Environmental Assessment Practitioner for the project.)*

ABO Uvemvane Wind Energy Facility 1 (Pty) Ltd proposes the development of ABO Uvemvane Wind Energy Facility 1 (WEF 1), a commercial wind energy generation facility comprising up to 27 turbines and with a total generation capacity of up to 170 MWac in capacity, as well as associated infrastructure. The proposed WEF would be located approximately 9 km west of the town of Balfour in the Mpumalanga Province in the Dipaleseng Local Municipality within the Gert Sibande District Municipality and approximately 14km south-east of the town Heidelberg in the Gauteng Province in the Lesedi Local Municipality within the Sedibeng District Municipality. It is anticipated that the proposed WEF would have a total (permanent) development footprint of up to 110 ha, which is approximately 1.43% of the total site (i.e., affected properties) area<sup>12</sup>.

The affected properties are indicated in Table 1.

**Table 1: WEF 1 Property Information (Farm names marked in red are to be confirmed as Title Deed has not been received)**

| Affected Property                                                      | SG Code               |
|------------------------------------------------------------------------|-----------------------|
| Remaining Extent of Portion 4 of the Farm De Hoek 411                  | T0IR00000000041100004 |
| The Farm Orion No 413                                                  | T0IR00000000041300000 |
| Portion 7 of the Farm Driefontein 405                                  | T0IR00000000040500007 |
| Remaining Extent of Portion 1 of the Farm Driefontein 405              | T0IR00000000040500001 |
| Portion 5 (a Portion of Portion 1) of the Farm Driefontein 405         | T0IR00000000040500005 |
| Remaining Extent of Portion 9 of the Farm Malanskraal No 407           | T0IR00000000040700009 |
| Remaining Extent of Portion 2 of the Farm Malanskraal Number 407       | T0IR00000000040700002 |
| Portion 12 (a Portion of Portion 2) of the Farm Malanskraal Number 407 | T0IR00000000040700012 |

<sup>10</sup> Critical reminders for avifaunal impact assessments for large-scale infrastructure in High-Altitude Grasslands, Mesic Highveld Grasslands and associated wetlands of South Africa. BirdLife SA. May 2024.

<sup>11</sup> Guidance note for avian specialists recommending patterned blades as a mitigation to reduce avian impacts at South African wind farms. An initiative of the South African Wind Energy Association, Birdlife South Africa and the Bird and Renewable Energy Specialist Group.

<sup>12</sup> Note regarding proposed facility capacity, footprint, turbine number and maximum turbine capacity: Note that the proposed development entails a proposed maximum development footprint for a combination of factors, namely facility capacity in terms of overall MWac, development footprint in terms of extent turbine numbers which caps the proposed number of turbines that could be developed within the facility as well as maximum turbine capacity for any given turbine, whereby any given aspect has maximum development parameters that has been assessed and the first lowest parameter achieved in this regard would determine the remaining specifications within the said maximum limits (i.e. all maximum parameters could not be achieved simultaneously).

| Affected Property                                                                   | SG Code               |
|-------------------------------------------------------------------------------------|-----------------------|
| Remaining Extent of Portion 2 of the Farm Driefontein Number 405                    | T0IR00000000040500002 |
| Remaining Extent of the Farm Driefontein 405                                        | T0IR00000000040500000 |
| Remainder of Portion 6 (Kingsmead) of the Farm Malanskraal 407                      | T0IR00000000040700006 |
| Portion 17 (a Portion of Portion 8) of the Farm Malanskraal No 407                  | T0IR00000000040700017 |
| Portion 16 (a Portion of Portion 4) of the Farm Malanskraal No 407                  | T0IR00000000040700016 |
| Remainder of Portion 18 (a Portion of Portion 3) of the Farm Malanskraal 407        | T0IR00000000040700018 |
| Portion 20 (a Portion of Portion 13) of the Farm Malanskraal 407                    | T0IR00000000040700020 |
| Remaining Extent of Portion 13 (a Portion of Portion 2) of the Farm Malanskraal 407 | T0IR00000000040700013 |
| Portion 1 of the Farm Weltevreden Nr. 449                                           | T0IR00000000044900001 |
| Farm Bothas Spruit Nr. 404                                                          | T0IR00000000040400000 |
| The Remaining Extent of Portion 2 of the Farm Lagerspoort Number 406                | T0IR00000000040600002 |
| Portion 17 of the Farm Lagerspoort Number 406                                       | T0IR00000000040600017 |
| Portion 24 (a portion of Portion 23) of the Farm Steynskraal 399                    | T0IR00000000039900024 |
| Remaining Extent of Portion 2 of the Farm Modderfontein 410                         | T0IR00000000041000002 |
| Portion 7 of the Farm Lagerspoort Number 406                                        | T0IR00000000040600007 |
| Portion 35 of the Farm Lagerspoort 406                                              | T0IR00000000040600035 |
| Portion 15 of the Farm Lagerspoort 406                                              | T0IR00000000040600015 |
| Remaining Extent of Portion 5 of the Farm Lagerspoort 406                           | T0IR00000000040600005 |
| Portion 32 (a Portion of Portion 5) of the Farm Lagerspoort Nr 406                  | T0IR00000000040600032 |
| Remaining Extent of Portion 1 of the Farm Steynskraal 399                           | T0IR00000000039900001 |
| Portion 25 (a Portion of Portion 11) of the Farm Steynskraal 399                    | T0IR00000000039900025 |
| Remaining Extent of Portion 11 (a Portion of Portion 1) of the Farm Steynskraal 399 | T0IR00000000039900011 |

A development area (i.e., the full extent of the affected properties as well as beyond, where appropriate) has been identified for the proposed development. Within this identified development area, a development footprint has been defined in a manner which has considered the environmental sensitivities present on the affected properties and intentionally remains outside of highly sensitive areas. All affected properties in their entirety are being considered in this S&EIA process (which includes the independent specialists' assessments undertaken hereunder) and assessed in terms of the suitability from an environmental and social perspective. The location of the proposed project and the siting of the project infrastructure within the assessed study area has been informed by the recommendations of the specialists following their field assessments, where relevant.

It is important to note at the outset that the exact specifications of the proposed project components will be determined during the detailed engineering design phase prior to construction (subsequent to the issuing of an EA, should such an authorisation be granted), but that the information provided below is seen as the maximum development scenario for the proposed development.

The proposed facility would comprise the following (to be located within the proposed development footprint):

- Up to 27 turbines with the following maximum specifications:
  - Maximum hub height 180 m;
  - Maximum blade length 100 m;
  - Maximum rotor diameter 200 m;
  - Maximum capacity per turbine 10 MW;
  - A transformer at the base of each turbine;
  - Concrete turbine foundations up to 1 ha each;
  - Turbine, crane, and blade hardstands (included in the abovementioned 1 ha).
- Primary/main access roads as well as internal road reticulation (note that existing roads/disturbed areas would be used as far as possible, and for the proposed roads, a corridor of up to 12 m wide may be temporarily impacted upon during construction and be rehabilitated to up to 10 m wide after construction), inclusive of stormwater infrastructure where relevant.
- 6 Temporary laydown areas/ construction compounds (includes concrete batching), totalling up to 23 ha, would be fenced with access control; and/or
- Battery Energy Storage System (BESS) to be located within the electrical infrastructure hub described under “associated infrastructure” below.

Associated infrastructure would include the following (to be located within the proposed development footprint):

- Associated internal electrical reticulation/ cabling (i.e., low- and medium voltage powerlines), underground as far as is feasible, and to run within the proposed road footprint/route as far as possible;
- A 33 kV overhead/underground line to connect the northern and southern portions of the facility; and
- On-site electrical infrastructure hub up to 7 ha in extent (note there are 4 locations to be assessed as options, however only 1 will be constructed) consisting of:
  - On-site substation and associated infrastructure,
  - Additional step-up/ transformation/ collector/switchyard infrastructure,
  - Auxiliary buildings (including, but not limited to, Operation and Maintenance (O&M) building/s, admin building/s, workshop/s, gatehouse/s, security building/s, control centre/s, office/s, visitor centre/s, warehouse/s, etc.),

- May include the installation of a communications tower and lighting mast on site with a maximum height of 32 m and 25m respectively, and/or
- BESS.

Four access points are proposed, four of these are off existing unnamed farm roads (originating from the R23, D1220 and P243/1), and one is off Lagerspoort Road. The details of the access would be as per the recommendations in the Transport Impact Assessment. Access roads would be developed both to the site and within the site (i.e., between project components).

The operations of the proposed facility would require some servicing, noting that the operational electrical requirements would be nominal and would be supplied by the facility on site. Water would be required for sanitation use by operational staff (drinking and washing hands, food, etc) as well as for cleaning of equipment, and scheduled internal cleaning of building, and dust control on internal roads (where needed). Water would ideally be sourced from the local municipality, in terms of a Service Level Agreement established between the Municipality and the Proponent. If this is not possible, then further options, such as sourcing water from a private services provider, will be investigated. Where required, a storage tank (i.e., Jo-Jo tank) of up to approximately 10,000L may be used on site for temporary water storage. Sanitation requirements would be minimal, given that there would not be many operational staff. Sanitation for auxiliary buildings would be connected to the existing municipal sewage system. If the Municipality does not approve, or have capacity for, such a connection, sewage would be stored in the conservancy tank and collected either by a honey-sucker truck or by a service provider (Contractor) for treatment at a licensed disposal site. Alternatively, a standalone system would be used (i.e., porta-loos) which would be regularly serviced by an independent contractor. Note that it is not intended to make use of soakaways or on-site treatment solutions. Refuse/solid waste produced would also be nominal (approximately two wheelie bins per week) and would ideally be removed by the Municipality, however, if this is not possible, the Operator would employ private contractors to remove the refuse and dispose of it appropriately.

The construction phase would also require water and sanitation, with these aspects being the primary responsibility of the Contractor. However, it would be preferable for water to be sourced from the local Municipality (where available), with alternative arrangements (for example, bringing water in with trucks) being made where necessary. Solid waste would also be produced and would be managed in accordance with the requirements in the Environmental Management Programme (EMPr).

Stormwater drainage systems may be constructed on site to ensure that stormwater run-off from site is appropriately managed. Water from these systems is not likely to contain any chemicals or hazardous substances and would be released into the surrounding environment based on the natural drainage contours.

Temporary water pipelines may be installed on site during construction for water supply to *inter alia* the concrete batching plant and the O&M building complex for domestic use and sanitation. Possible groundwater abstraction on site for purposes of the batching plant could be considered, if required, considering any necessary and relevant legal requirements. There would be no other specific stormwater and/or landscaping initiatives undertaken as part of the proposed WEF, other than any interventions prescribed by the relevant specialist/s through the S&EIA process.

Blade patterning may be implemented as a recommended avian mitigation, in accordance with the Blade Patterning Guidelines (SAWEA & BirdLife South Africa, 2024).

The connection for the project within could occur via a new loop-in-loop-out connection or via a direct connection to one of the two nearby substations. Note that the EGI component of the WEFs will be subject to separate environmental impact assessments.

### **Alternatives:**

The proposed development as described above will be assessed with the following alternatives:

- 1) BESS Technology: With regard to the proposed BESS, the technology thereof is dynamic and so the specific type/technology to be developed would be selected based on market demands and technology availability at the time of construction. Therefore, both Lithium-ion and redox-flow are assessed as technology alternatives, with Lithium-ion being the current preferred technology.
- 2) The No-go alternative will be assessed, noting that the property does hold existing development rights (i.e., Agriculture) and so, not developing the proposed development does not necessarily mean that there would be no changes or impacts on the site.

## **4 Methodology**

### **4.1 Approach**

The methodology for the avifaunal pre-construction monitoring to inform an avifaunal specialist assessment is based on the Avifauna & Wind Protocol (GN 320 of 20 March 2020), and the Animal Species Protocol (GN 1150 of 30 October 2020, as amended), and the associated '*South African Best Practice Guidelines for Pre-construction Monitoring at Proposed Wind Energy Facilities*' (Jenkins, et al., 2015) and the '*Species Environmental Assessment Guidelines*' (SANBI, 2022).

The Avifauna & Wind Protocol requires that pre-construction/pre-application monitoring is conducted in line with applicable BirdLife South Africa's latest Best Practice Guidelines.

The BirdLife South Africa '*South African Best Practice Guidelines for Pre-construction Monitoring at Proposed Wind Energy Facilities*' (Jenkins, et al., 2015) apply to the proposed project and were followed in the survey design.

The BirdLife South Africa '*Verreaux's Eagle and Wind Farms. Guidelines for impact assessment monitoring and mitigation. Birdlife South Africa.*' (Ralston-Paton & Murgatroyd, 2021), hereafter referred to as the Verreaux's Eagle Guidelines, were initially assumed to not be applicable to the site from a desktop level, as the Screening Tool did not identify the site as potentially suitable for Verreaux's Eagle, and the SABAP2 reporting rate for Verreaux's Eagle in the nine pentads covering and adjacent to the project site was found to be very low at 1.5%. However, Verreaux's Eagle was recorded on the site during the first survey and the Pre-application Monitoring Plan was revised and sampling effort was increased to 72 hours per VP per year, in order to be in line with the Verreaux's Eagle Guidelines (Ralston-Paton & Murgatroyd, 2021). As no Verreaux's Eagle nests were located within 7 km of the site, the Verreaux's Eagle Risk Assessment model, which relies on nest locations to estimate collision risks and is recommended to be run by the Verreaux's Eagle Guidelines, could not be run for this project.

BirdLife South Africa's '*Black Harriers and Wind Energy. Guidelines for impact assessment, monitoring and mitigation. Birdlife South Africa*' (Simmons, et al., 2020), were assumed to not apply to the project due to SABAP2 not having any records of the species in the area with the closest pentad with Black Harrier records being located approximately 20 km to the north-west of

the site boundary with a low reporting rate of 4.5%<sup>13</sup>. Black Harrier was, however, recorded once at the Control site. Since the sampling effort according to Verreux's Eagle Guidelines aligns with the VP sampling effort of the Black Harrier Guidelines, the Pre-application Monitoring Plan did not require further revision.

The BirdLife South Africa '*Cape Vulture and Wind Farms: Guidelines for impact assessment, monitoring and mitigation*' (Pfeiffer & Ralston-Paton, 2018) were assumed to not be applicable as the Screening Tool Animal Species Theme did not identify the site as potentially suitable for Cape Vulture. However, the Screening Tool's Vulture Species Theme identified the study area as of medium sensitivity for vulture species due to the area affecting between 5% - 10% of the population. The survey effort was in line with the Cape Vulture Guidelines; therefore, the Pre-application Avifaunal Monitoring Plan did not require further revision, as the collected data is deemed sufficient to represent the majority of vulture movement on site. In addition, supplementary data from Vulpro were obtained to inform the study for an area 50 km from the site boundary.

#### **4.2 The Project Area of Influence**

The proposed development's Project Area of Influence (PAOI) is considered to be an area of 7 km surrounding the proposed AOI, in line with the SANBI Species Assessment Guideline (South African National Biodiversity Institute, 2022) and Verreux's Eagle Guidelines (Ralston Paton & Murgatroyd, 2021).

#### **4.3 Desktop Study**

The following data sources were used to inform a desktop study of the avifauna of the proposed development's PAOI:

- Vegetation Map of South Africa, Lesotho and Swaziland. 2018, South African National Biodiversity Institute (SANBI);
- Gauteng Conservation Plan (GCP) Version 3.3. 2012, Gauteng Department of Agriculture & Rural Development (GARD);
- Mpumalanga Biodiversity Sector Plan (MBSO). 2014, Mpumalanga Tourism & Parks Agency (MTPA);
- National Freshwater Ecosystem Priority Areas (NFEPA). 2011. Council for Scientific & Industrial Research (CSIR);
- Terrestrial Ecosystem Threat Status and Protection Level. 2018. (SANBI);
- The Department of Forestry, Fisheries and the Environment (DFFE) National Web-based Screening Tool;
- National Geo-spatial Information (NGI) Topographic Data 2015.
- South African Bird Atlas Project 2 (SABAP2) (Brooks and Ryan 2025);
- Important Bird and Biodiversity Areas (Birdlife South Africa 2015);
- The 2015 Eskom Red Data Book of Birds (Taylor, et al., 2015);
- The International Union for Red List of Threatened Species ([www.iucnredlist.org](http://www.iucnredlist.org));
- South Africa Protected Areas Database (DFFE 2024 Q4);
- South African Conservation Areas (DFFE 2024 Q4);

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<sup>13</sup> <https://sabap2.birdmap.africa/species/169>

- South African National Land Cover (DEA 2020);
- Cape Farm Mapper 3 ([gis.elsenburg.com/apps/cfm](https://gis.elsenburg.com/apps/cfm));
- Relevant peer-reviewed literature and publications; and
- Publicly available satellite imagery, elevation, and topographical maps and data.

#### **4.4 The Pre-application Avifaunal Monitoring Plan**

The Pre-application Avifaunal Monitoring Plan was compiled following the desktop study and a 2-day reconnaissance study/site inspection in November 2023.

The reconnaissance study/site inspection was conducted over two days on 8 and 9 November 2023, during which the locations of vantage points, walked and driven transects were confirmed (Figure 1). A Control Site was selected approximately 5 km from the proposed WEF site, which matched the proposed WEF site as closely as possible in terms of avifaunal habitats and environmental conditions.

The first survey was conducted from 9 – 17 November 2023 in line with the Best Practice Guidelines (Jenkins, et al., 2015) with a sampling effort of 48 hours per VP per year. However, a pair of Verreaux's Eagle was recorded on five different days from four different VPs with high flight durations during this first survey. Therefore, the Verreaux's Eagle Guidelines (Ralston Paton & Murgatroyd, 2021) were determined as applicable to the proposed development area. According to the Verreaux's Eagle Guidelines, wind turbines must be placed outside of core eagle territory. To determine this, all suitable breeding habitats within 7 -10 km from proposed turbine locations must be thoroughly searched for evidence of nesting, and the pre-application monitoring effort must be increased from 48 hours per VP per year to 72 hours per VP per year. The Pre-application Monitoring Plan was amended accordingly following the first survey, with the sampling effort increased to 72 hours per VP per year and the addition of a dedicated raptor nest survey.

The second survey was conducted from 31 January 2023 to 10 February 2024, the third survey was conducted from 04 – 18 April 2024, the fourth survey was conducted from 10 – 22 June 2024, the fifth survey was conducted from 13 - 25 August 2024, and the sixth survey was conducted from 16 – 29 October 2024. The surrounding areas were searched for raptor nests throughout these surveys as far as possible, with three days added to the August survey scope for dedicated searching for large raptor nests.

This Final Monitoring Report presents the findings of the one year of pre-application/pre-construction monitoring and is a suitable baseline for Avifaunal Specialist Assessments in terms of both applicable protocols. It also presents recommendations, avifaunal constraints buffers and other likely mitigation measures required for the proposed development.

#### **4.5 Vantage Point Surveys**

Vantage Point (VP) surveys were conducted by a team of observers recording the flightpaths of all SCC and priority species as per (Retief, et al., 2014) and other notable flights (such as non-priority species raptors, large flocks or waterbirds) within a 2 km radius on a GIS-referenced topographical map. All flights were mapped on topographical field maps, and their duration, height, and changes in height were recorded, together with details of the observed individual and environmental conditions. Heights were recorded in meter estimates.

Initially, six vantage points (VPs) were surveyed on the WEF site and one on a Control Site (CVP) of a similar habitat that was accessible within 5 km of the WEF site (Figure 1). A cover of approximately 75% of the WEF site was achieved based on an approximate 2 km viewshed surrounding each VP, as per the requirement of the Best Practice Guidelines (Jenkins, et al., 2015). During each survey, VPs were surveyed for a minimum of 12 hours in different hour sessions on different days, at different times of day, where practically possible, to get as wide a spread of environmental conditions as possible (refer to Appendix A for survey details). ABO requested that VP1 and VP2 be removed from the survey scope following the second survey. To maintain sufficient cover of the WEF Site, VP3a was moved slightly to VP3b and VP7 was added. The new VP was surveyed longer to make up for the previous seasons. VP1 and VP2 were added back into the survey area from the fourth survey onward, and these were surveyed longer in subsequent surveys to achieve a minimum of 72 hours per VP per annum (refer to Annexure A for details).. A total of seven VPs on the WEF site were surveyed.

#### **4.6 Walked Transects**

Seven walked transects (WTs) were surveyed on the WEF site and two walked transects on the Control Site (CWT). The walked transects were sampled three times each, at different times of day, as far as practically possible (refer to Appendix B for survey details; Figure 1). All birds seen or heard were recorded, including their perpendicular distance from the transect, as well as notes on their biology and behaviour, where possible. The purpose of walked transects is to sample the general avifauna of the area, in particular smaller species, to achieve an understanding of species occurrence and an indication of relative species abundances.

#### **4.7 Driven Transects**

Two driven transects (DT) were established across the WEF site, and one traversing the Control Site (CDT). Driven transects were sampled twice during each survey (refer to Appendix C for survey details; Figure 1), by driving slowly with windows open along a pre-determined route and recording all large terrestrial species and raptors. The purpose of driven transects is to sample abundances and occurrence of terrestrial species which are otherwise not recorded or detected with other sample methods.

#### **4.8 Focal Sites**

Focal sites are potential nesting areas of priority species, such as cliffs, known nests, large stands of trees, wetlands, waterpoints and powerlines. Two focal sites were identified during the March survey, one focal site was added during the April survey and an additional focal site was added during the June survey. Each focal site was surveyed twice during the following surveys (refer to Appendix D for survey details).

#### **4.9 Incidental Records**

All priority species encountered throughout the survey, outside of the survey methods outlined above while traversing the site, as well as up to 5 km from the site boundary were recorded as incidental sightings with GPS coordinates, and details of the individuals and behaviour and environmental conditions.

#### **4.10 Checklist Survey**

Each observer kept a bird list for the survey for the WEF Site and the Control Site. These were combined for the WEF and Control Site following the survey, and any new birds were added to the list following subsequent surveys.

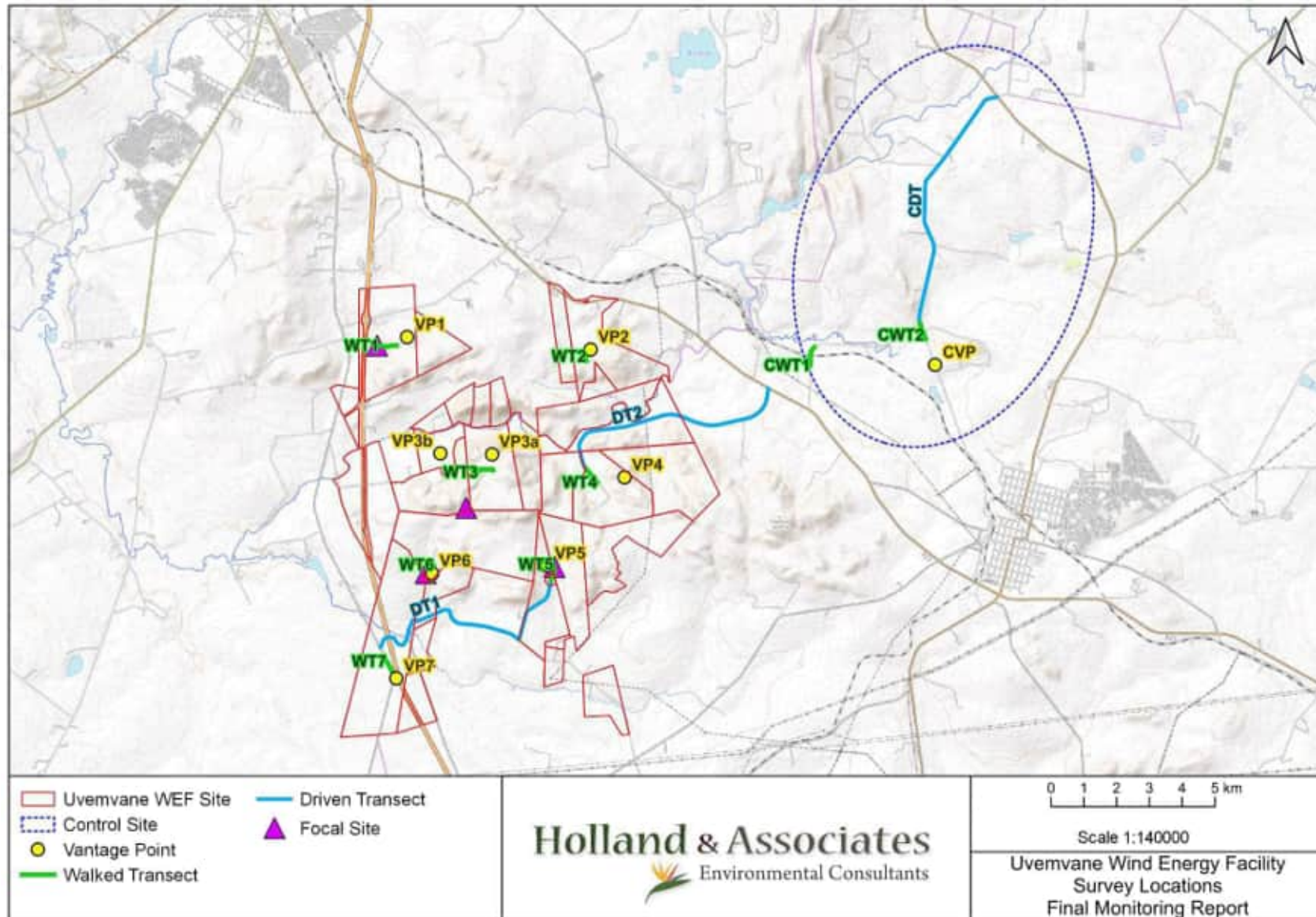


Figure 1: Pre-application Bird Monitoring Survey Locations

#### **4.11 Assumptions & Limitations**

A precautionary approach was taken in the analysis and interpretation of data. All flights recorded at heights between 20 and 300 m were considered to be potentially at risk height in order to take observer error into account, as well as future changes in turbine design. If height was not recorded, the flight was assumed to be at risk height in the analysis of data.

All unidentified species recorded on Vantage Points were assumed to be Priority Species and included in the calculations of overall passage rates of priority species.

Avifaunal monitoring is prone to observer bias, in particular when estimating heights and distances. The recorded flight maps and resulting maps are therefore considered to be estimates of the location and not accurate recordings. Observer skills also vary particularly in the identification of small passerine species. Therefore, in the interpretation of the data more emphasis was placed on overall abundance recorded on walked transects, than on the species and number of species recorded.

Data obtained from VulPro consists of 928 datapoints from tracking data of 16 individual Cape Vultures and 15 datapoints from one individual White-backed Vulture which were recorded within a 50 km area from the proposed Uvemvane WEF, over a period of over 7 years. The White-backed Vulture datapoints were recorded over the course of 2 days in 2017. As it is not known if the tagged birds were alone, or how long they were tagged, the data is interpreted as confirmed presence in the area at that time, without an indication of the frequency and the numbers of the species being present, which is information that is gathered through pre-application monitoring.

While no dedicated nocturnal surveys were carried out due to Health & Safety concerns, nocturnal birds that could potentially occur are included in the list of potentially occurring species. Nocturnal birds such as Greater Flamingo, Barn Owl, Cape Eagle Owl and Marsh Owl, that were recorded during the day, are assumed to fly across the site at night.

The regional red list (Lee, et al., 2025) and global red list (IUCN, 2025) were consulted to identify SCC and the higher status was selected, as per the Species Assessment Guidelines (SANBI, 2022)

## **5 Results and Discussion**

### **5.1 Vantage Point Monitoring Results**

A total of 311 flight paths by 25 priority species were recorded during 513 h 00 m of vantage point (VP) surveys on seven vantage points and across six seasonal surveys on the WEF site. Of these, 279 flightpaths were estimated to be at or go through risk height (between 20 and 300 meters) (Refer to Appendix E).

Table 2 presents the priority species recorded over six surveys of vantage point surveys on the WEF site. African Black Swift (Least Concern) was the most abundant species recorded across all six surveys with 311 flights and 279 of these recorded going through risk height (Refer to Appendix E). This was due to a single flight event at VP7 in the south-western boundary of the WEF site with a flock of approximately 120 individuals recorded during the sixth survey. African Black Swift are a locally common species in southern Africa and typically occur in mixed-species foraging flocks where prey is caught both aerially and on the ground.

This was followed by Black-winged Kite (Near Threatened) with 54 flights recorded across all seasons and 43 of these recorded at risk height (Refer to Appendix E). This was due to flights across all VPs on the WEF site. Although non-migratory, Black-winged Kites are nomadic, with their activity influenced by prey availability and weather conditions.

A total of 28 Common Buzzard (Least Concern) flights were recorded across all surveys with 24 of these recorded going through risk height (Refer to Appendix E). Common Buzzard was observed flying across all VPs on the WEF site.

A total of 28 flights were recorded for Verreaux's Eagle (Vulnerable) across all surveys with 24 of these recorded at risk height (Refer to Appendix E). Most of Verreaux's Eagle flights were recorded at VP7 in the south-western region of the WEF site.

Sixteen flights were recorded for Greater Flamingo (Near Threatened) across all surveys with 13 of these recorded at risk height (Refer to Appendix E). Greater Flamingo flights were observed predominately at VP7 in the south-western of the WEF site where the VP stands in close proximity to a NFEPA river.

Twelve flights were recorded for Black Sparrowhawk (Least Concern) across all surveys with 10 of these recorded going through risk height (Refer to Appendix E). Black Sparrowhawk flights occurred predominantly in the north and south-eastern region of the WEF site.

Other observations included Lanner Falcon (Near Threatened), with seven flights recorded across all surveys, six of which were at risk height. Six flights were recorded for African Fish Eagle (Least Concern), Jackal Buzzard (Least Concern), and Red-footed Falcon (Least Concern). Five African Fish Eagle flights were at risk height, while all flights by Jackal Buzzard and Red-footed Falcon (Vulnerable) were at risk height. Three flights by African Harrier Hawk (Least Concern), Alpine Swift (Least Concern), European Honey Buzzard (Least Concern), Little Sparrowhawk (Least Concern), and Yellow-billed Kite (Least Concern) were recorded. Of these, a single flight of African Harrier Hawk went through risk height, all flights by Alpine Swift, European Honey Buzzard, and Little Sparrowhawk occurred at risk height, while none of the flights for Yellow-billed Kite went through risk height. Two flights of African Goshawk (Least Concern), Amur Falcon (Least Concern), and Brown Snake Eagle (Least Concern) were recorded, all of which went through risk height. During all surveys one single flight was recorded for African Marsh Harrier (Vulnerable), Black-chested Snake Eagle (Least Concern), Booted Eagle (Least Concern), Long-crested Eagle (Least Concern), Northern Black Korhaan (Least Concern), Secretarybird (Endangered), and Southern Bald Ibis (Near Threatened). All of these flights went through risk height except for the Secretarybird flight (Refer to Appendix E).

On the Control Site, a total of 45 flight paths by ten priority species were recorded during 72 h 00 of VP watches across all surveys on one VP. All except one of these flights (which was by Black-shouldered Kite) were estimated to be at or go through risk height (Refer to Appendix F).

Table 3 presents the priority species recorded over six surveys of vantage point surveys on the Control site. On the Control Site, Black-winged Kite was the most abundant species recorded across all surveys, with 23 flights observed, all but one of which went through risk height (Appendix F). This was followed by Amur Falcon with seven flights across all surveys, Verreaux's Eagle with six flights, and both African Harrier Hawk and Common Buzzard with two flights each. A single flight was recorded for Black Harrier (Endangered), Black Sparrowhawk, Jackal Buzzard, Secretarybird, and Yellow-billed Stork (Vulnerable). All flights for these species went through risk height (Refer to Appendix F).

Passage rates across all surveys of monitoring on the WEF site totaling 513 hours of VP monitoring ranged from 0.002 priority species flights per hour (Black-chested Snake Eagle, Booted Eagle, Long-crested Eagle, Southern Bald Ibis, African Marsh Harrier, Northern Black Korhaan and Secretarybird) to 0.234 priority species flights per hour (African Black Swift). The overall passage rate across all surveys was 0.606 priority species flights per hour and 0.544 priority species flights per hour which went through risk height (Table 2). When considering flight duration, Black-winged Kite was recorded flying at risk height the longest (12 h 15 m 00 s) during VP monitoring on the WEF site, followed by Verreaux's Eagle (07 h 35 m 48 s), African Black Swift (06 h 16 m 00 s), Red-footed Falcon (02 h 31 m 25 s), Common Buzzard (01 h 17 m 11 s), Greater Flamingo (44 m 51 s) and European Honey Buzzard (28 m 47 s) (Table 2).

On the Control Site, passage rates across all surveys totaling 72 hours of VP monitoring, ranged from 0.014 priority species flights per hour (Secretarybird, Jackal Buzzard, Yellow-billed Stork, Black Sparrowhawk and Black Harrier) to 0.306 priority species flights per hour (Black-winged Kite). The overall passage rate across all surveys on the Control Site was 0.625 priority species flights per hour and 0.611 priority species flights per hour which went through risk height (Table 3). When considering flight duration, Black-winged Kite was the species recorded flying at risk height the longest (13 h 52 m 02 s) during VP monitoring on the Control Site, followed by Verreaux's Eagle (43 m 07 s), Secretarybird (32 m 16 s), Jackal Buzzard (15 m 33 s), Amur Falcon (09 m 36 s), African Harrier Hawk (08 m 22 s) and Common Buzzard (07 m 58 s). The sampling effort at the Control Site was lower than at the WEF site, therefore the number of flights, passage rates, durations and species recorded are not comparable.

While migratory species were recorded flying at the proposed WEF, such as Amur Falcon, European Honey Buzzard, Greater Flamingo and Yellow-billed Kite, the VP data do not indicate any major flyways or migratory paths over the site area. South Africa is the wintering foraging ground for these migrants and while they may migrate in flocks and along specific flyways, they spread out and disperse significantly in their non-breeding range in Southern Africa.

**Table 2: Combined Passage Rates of Priority Species recorded during 513h of VP Watches during Pre-application Monitoring at the WEF Site (SCC in Bold)**

| Species                      | Red Data Status        | WEF Priority Score | Passage Rate | Passage Rate at risk height (RH) | Duration at risk height (RH) (hh:mm:ss) |
|------------------------------|------------------------|--------------------|--------------|----------------------------------|-----------------------------------------|
| <b>Black-winged Kite</b>     | <b>Near Threatened</b> |                    | 0.105        | 0.084                            | 12:15:00                                |
| <b>Verreaux's Eagle</b>      | <b>Vulnerable</b>      | <b>290</b>         | <b>0.055</b> | <b>0.047</b>                     | <b>07:35:48</b>                         |
| African Black Swift          | Least Concern          |                    | 0.234        | 0.234                            | 06:16:00                                |
| <b>Red-footed Falcon</b>     | <b>Vulnerable</b>      | <b>190</b>         | <b>0.012</b> | <b>0.012</b>                     | <b>02:31:25</b>                         |
| Common Buzzard               | Least Concern          | 300                | 0.055        | 0.047                            | 01:17:11                                |
| <b>Greater Flamingo</b>      | <b>Near Threatened</b> |                    | <b>0.031</b> | <b>0.025</b>                     | <b>00:44:51</b>                         |
| European Honey Buzzard       | Least Concern          | 210                | 0.006        | 0.006                            | 00:28:47                                |
| African Fish Eagle           | Least Concern          | 230                | 0.012        | 0.010                            | 00:22:07                                |
| Black Sparrowhawk            | Least Concern          | 175                | 0.023        | 0.019                            | 00:21:34                                |
| <b>Lanner Falcon</b>         | <b>Near Threatened</b> | <b>170</b>         | <b>0.014</b> | <b>0.012</b>                     | <b>00:18:31</b>                         |
| Jackal Buzzard               | Least Concern          | 230                | 0.012        | 0.012                            | 00:18:11                                |
| Black-chested Snake Eagle    | Least Concern          | 180                | 0.002        | 0.002                            | 00:17:20                                |
| Brown Snake Eagle            | Least Concern          | 210                | 0.004        | 0.004                            | 00:14:20                                |
| African Goshawk              | Least Concern          |                    | 0.004        | 0.004                            | 00:07:26                                |
| Booted Eagle                 | Least Concern          | 290                | 0.002        | 0.002                            | 00:03:23                                |
| Long-crested Eagle           | Least Concern          | 250                | 0.002        | 0.002                            | 00:03:14                                |
| Little Sparrowhawk           | Least Concern          | 300                | 0.006        | 0.006                            | 00:02:57                                |
| Amur Falcon                  | Least Concern          |                    | 0.004        | 0.004                            | 00:02:55                                |
| <b>Southern Bald Ibis</b>    | <b>Near Threatened</b> | <b>190</b>         | <b>0.002</b> | <b>0.002</b>                     | <b>00:01:55</b>                         |
| <b>African Marsh Harrier</b> | <b>Vulnerable</b>      | <b>180</b>         | <b>0.002</b> | <b>0.002</b>                     | <b>00:01:44</b>                         |
| Alpine Swift                 | Least Concern          | 174                | 0.006        | 0.006                            | 00:01:30                                |
| African Harrier Hawk         | Least Concern          | 320                | 0.006        | 0.002                            | 00:01:24                                |
| Northern Black Korhaan       | Least Concern          | 330                | 0.002        | 0.002                            | 00:00:39                                |
| <b>Secretarybird</b>         | <b>Endangered</b>      | <b>360</b>         | <b>0.002</b> | <b>0.000</b>                     | <b>00:00:00</b>                         |
| Yellow-billed Kite           | Least Concern          |                    | 0.006        | 0.000                            | 00:00:00                                |
| <b>Grand Total</b>           | <b>8 SCC</b>           | <b>19 PS</b>       | <b>0.606</b> | <b>0.544</b>                     | <b>33:28:12</b>                         |

**Table 3: Combined Passage Rates of Priority Species recorded during 72h of VP Watches during Pre-application Monitoring at the Control Site (SCC in bold)**

| Species                    | Red Data Status        | WEF Priority Score | Passage Rate | Passage Rate at risk height (RH) | Duration at risk height (RH) (hh:mm:ss) |
|----------------------------|------------------------|--------------------|--------------|----------------------------------|-----------------------------------------|
| <b>Black-winged Kite</b>   | <b>Near Threatened</b> | 175                | 0.319        | 0.306                            | 13:52:02                                |
| <b>Verreaux's Eagle</b>    | <b>Vulnerable</b>      | <b>360</b>         | <b>0.083</b> | <b>0.083</b>                     | <b>00:43:07</b>                         |
| <b>Secretarybird</b>       | <b>Endangered</b>      | <b>320</b>         | <b>0.014</b> | <b>0.014</b>                     | <b>00:32:16</b>                         |
| Jackal Buzzard             | Least Concern          | 250                | 0.014        | 0.014                            | 00:15:33                                |
| Amur Falcon                | Least Concern          | 210                | 0.097        | 0.097                            | 00:09:36                                |
| African Harrier Hawk       | Least Concern          | 190                | 0.028        | 0.028                            | 00:08:22                                |
| Common Buzzard             | Least Concern          | 210                | 0.028        | 0.028                            | 00:07:58                                |
| <b>Yellow-billed Stork</b> | <b>Vulnerable</b>      | <b>330</b>         | <b>0.014</b> | <b>0.014</b>                     | <b>00:03:21</b>                         |
| Black Sparrowhawk          | Least Concern          | 170                | 0.014        | 0.014                            | 00:03:16                                |
| <b>Black Harrier</b>       | <b>Endangered</b>      | <b>345</b>         | <b>0.014</b> | <b>0.014</b>                     | <b>00:01:21</b>                         |
| <b>Grand Total</b>         | <b>5 SCC</b>           | <b>10 PS</b>       | <b>0.625</b> | <b>0.611</b>                     | <b>15:56:52</b>                         |

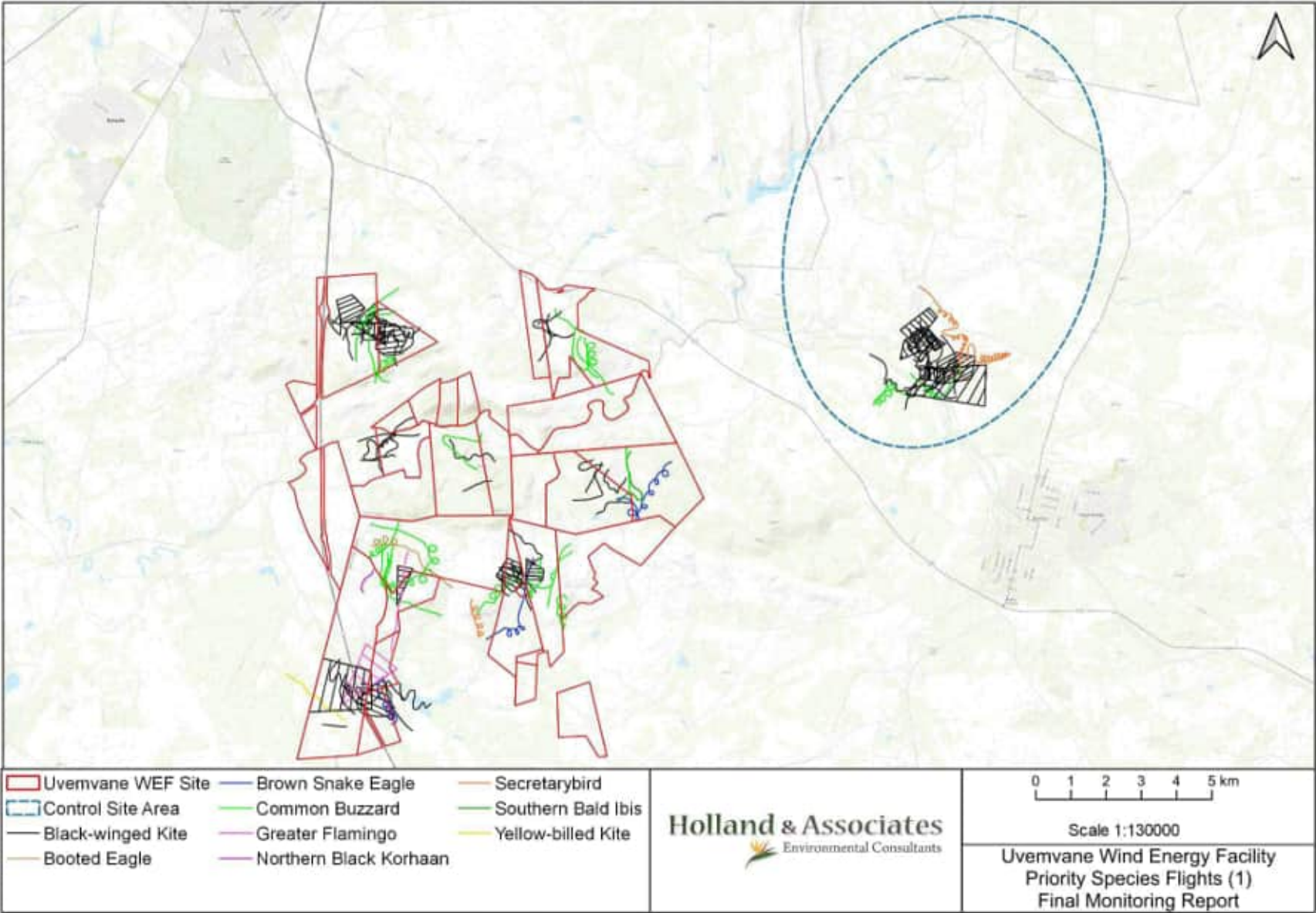


Figure 2: Priority Species Flights at the Uvemvane WEF S1 - S6 Pre-application Monitoring (1)

Uvemvane WEF 1 Scoping Phase  
Final Avifaunal Pre-application Monitoring  
and Site Sensitivity Verification Report

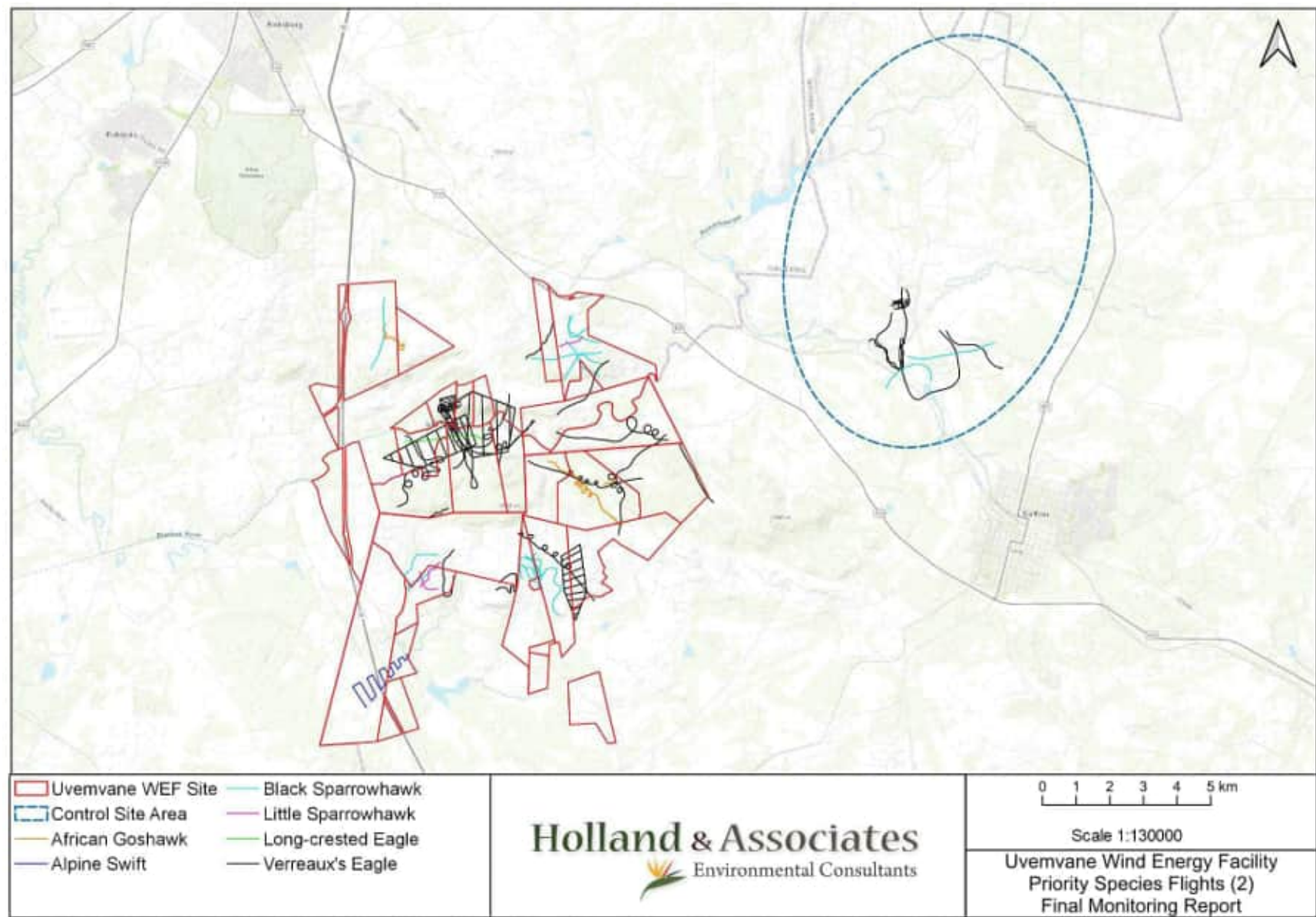


Figure 3: Priority Species Flights at the Uvemvane WEF S1 - S6 Pre-application Monitoring (2)

Uvemvane WEF 1 Scoping Phase  
Final Avifaunal Pre-application Monitoring  
and Site Sensitivity Verification Report

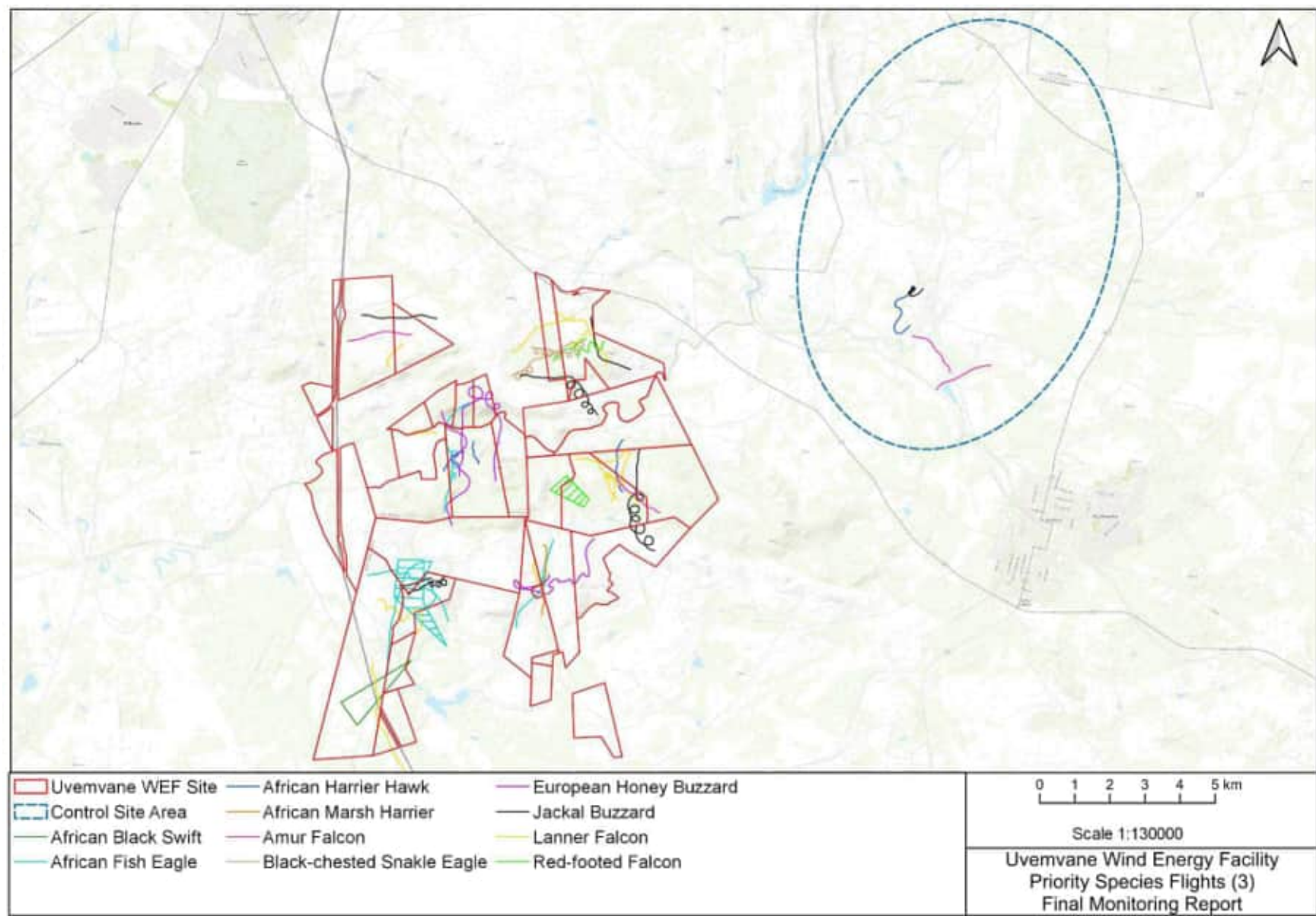


Figure 4: Priority Species Flights at the Uvemvane WEF S1 - S6 Pre-application Monitoring (3)

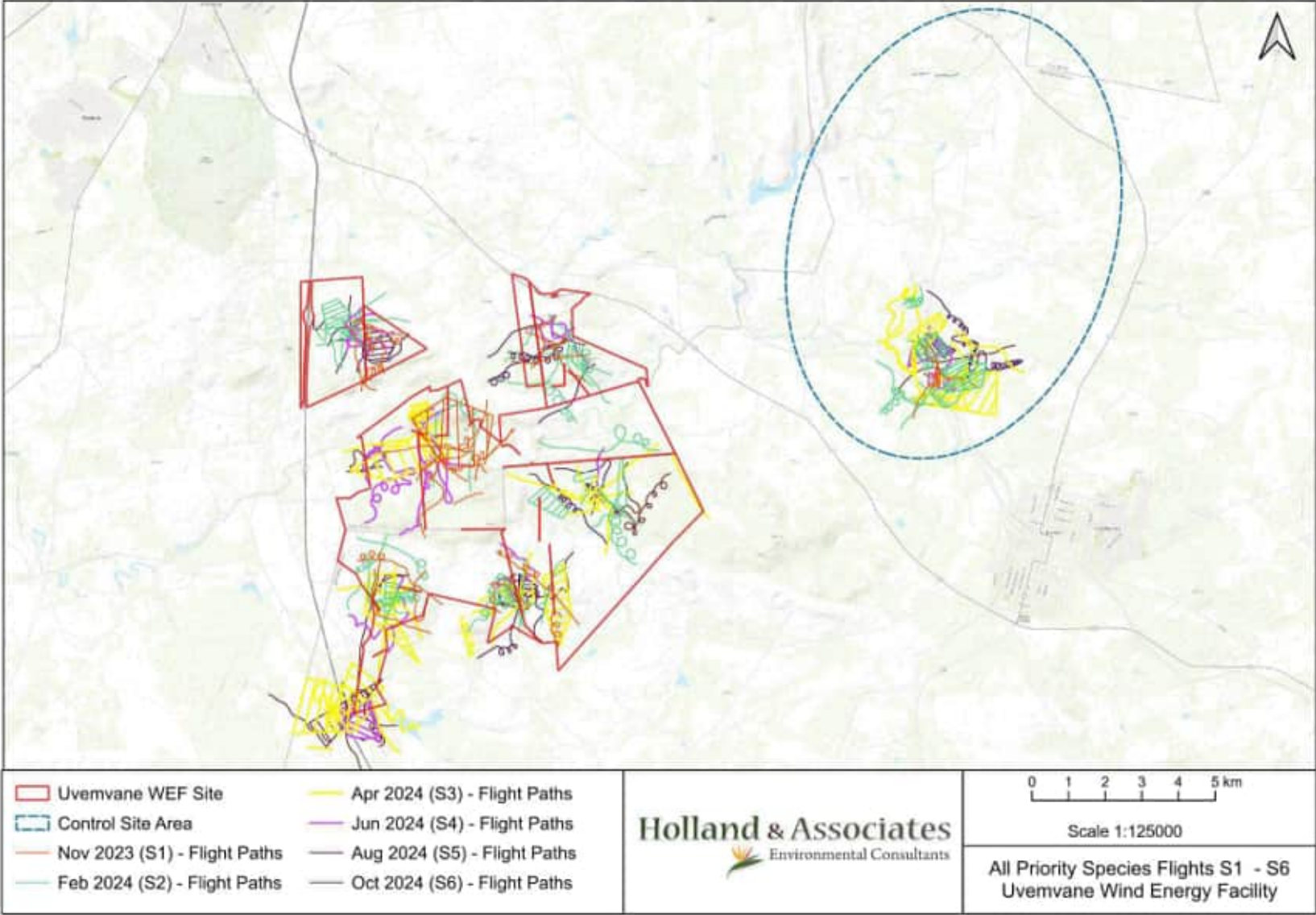


Figure 5: All Priority Species Flights recorded at the Uvemvane WEF S1 – S6

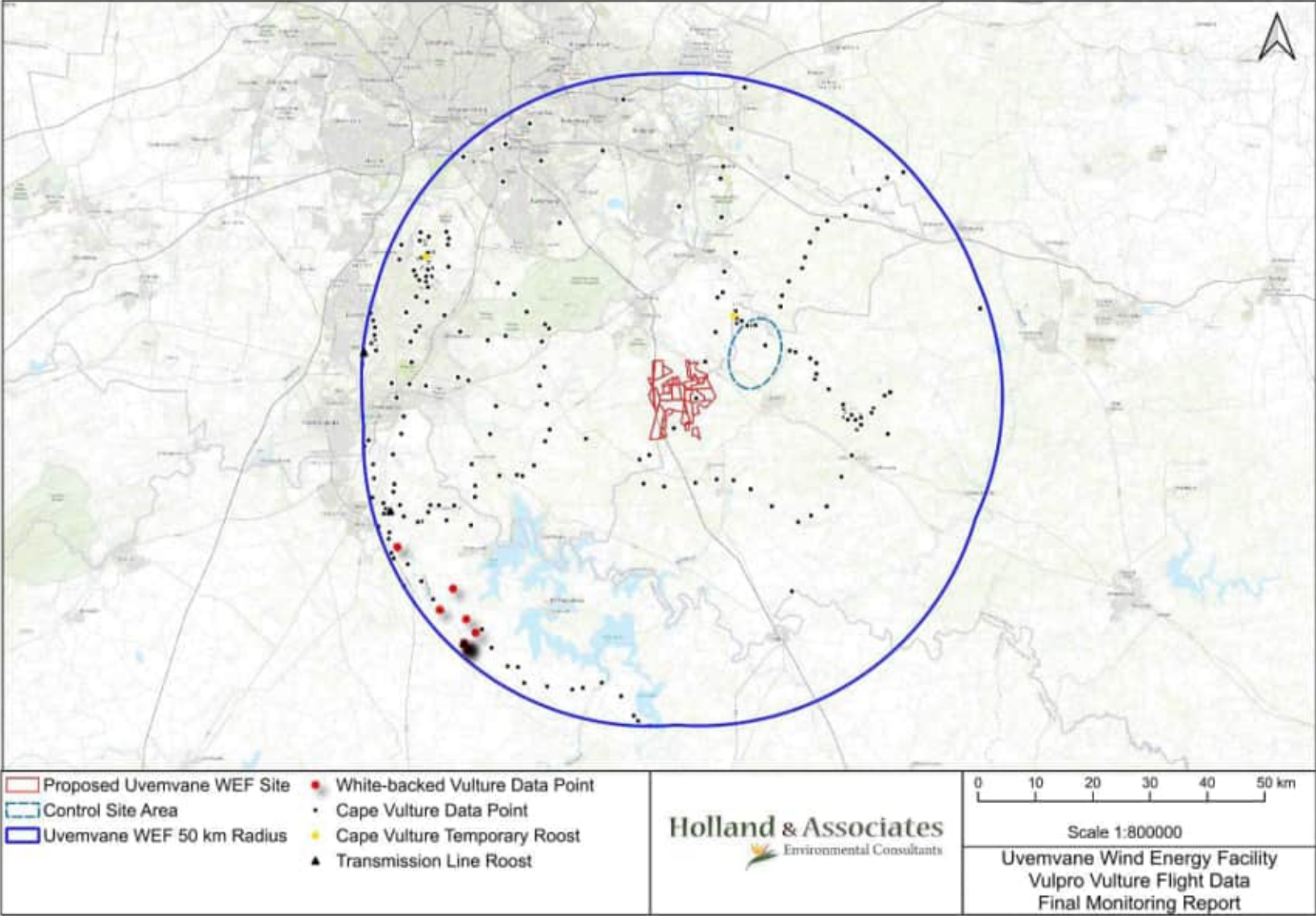


Figure 6: Vulpro Vulture Records within 50 km of the Uvempvane WEF

## **5.2 Vulpro Vulture Tracking Data**

Vulpro has collected GPS records of vultures from 2017 to 2024 as part of ongoing research efforts. The data obtained from Vulpro for the specified time period consisted of 928 records of 16 individual Cape Vultures (Vulnerable) (Figure 6) and 15 records of a single individual White-backed Vulture (Critically Endangered). Most of the flights for Cape Vulture within 50 km of the proposed WEF site were recorded in the far western and north-eastern area of the 50 km radius. A single flight/individual (as indicated by the time and proximity of the GPS points associated with the flight) went through the eastern region of the proposed WEF site. All the GPS records obtained for White-backed Vulture were recorded approximately 50 km from the WEF site in a south-westerly direction.

No colonies or permanent roost sites for either White-backed Vulture or Cape Vulture are known within a 50 km radius of the WEF site as per the Vulpro tracking data (Figure 6). The closest breeding colonies (Scheerpoort and Nootgedaght) are located along the Magaliesburg Mountain Range which is approximately 115 km from the WEF site. However, two rocky ridges or trees ~45 km north-west and 11 km northeast of the WEF site have been used as occasional roosts/overnight stops by Cape Vulture.

In terms of powerline roost sites, the vulture tracking data showed that three transmission power line pylons located on the south-western edge of the 50 km buffer zone were used as overnight roost sites by both Cape Vulture and White-Backed Vulture. The tracking data shows no evidence that the pylons are being used as permanent roost sites (refer to Appendix G for Vulpro Tracking Data Report).

No vultures were recorded during six seasonal surveys of pre-application monitoring and vultures appear to not be utilising the site on any regular basis.

## **5.3 Walked Transect Results**

A total of 160 species of birds were recorded on the WEF site during 126 walked transects, with a total of 18672 birds (excluding unidentified species) recorded across all six surveys. 110 species were recorded on the Control Site, which is likely due to a lower number of transects sampled than on the WEF site. The most abundant birds recorded on the WEF site were Red-billed Quelea (3368), Cape Weaver (3260), Southern Masked Weaver (834), Speckled Pigeon (696), Southern Red Bishop (658), Common Waxbill (594) and Helmeted Guineafowl (567) while on the Control Site Cape Weaver (1491), Red-billed Quelea (1057), Southern Red Bishop (997) and Southern Masked Weaver (462) were recorded most frequently (Refer to Appendix H).

The Index of Kilometric Abundance (IKA = birds per km) across all walked transects on the WEF site ranged from 225.12 to 422.26 birds per kilometer, with an average IKA of 292.43 (Table 4). The highest IKA across all walked transects on the WEF and across all surveys was recorded for WT7 followed by WT5 and WT3. The highest IKA recorded for WT7 was due to large groups of Red-billed Quelea and Cape Weaver recorded across all surveys. The lowest IKA across all walked transects on the WEF was recorded for WT2, which is likely due to the lower number of iterations sampled.

Overall, the abundance and number of small passerine species can be considered moderately high compared to other areas proposed for wind energy developments in South Africa. The control and WEF sites appear to be comparable in terms of recorded species and their abundance.

**Table 4: Results and the combined Index of Kilometric Abundance (IKA) for Walked Transects (WT) during S1 - S6 of Pre-application Monitoring**

| Walked Transect      | Number of birds recorded |             |             |             |             |             |              | No. of species recorded | IKA (birds per km) |
|----------------------|--------------------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------------------|--------------------|
|                      | S1                       | S2          | S3          | S4          | S5          | S6          | Total        |                         |                    |
| WT1                  | 478                      | 411         |             | 643         | 596         | 456         | 2584         | 82                      | 260.06             |
| WT2                  | 416                      | 254         |             | 361         | 649         | 342         | 2022         | 83                      | 225.12             |
| WT3                  | 176                      | 152         | 478         | 512         | 560         | 683         | 2561         | 99                      | 274.14             |
| WT4                  | 115                      | 939         | 438         | 223         | 346         | 335         | 2396         | 94                      | 259.98             |
| WT5                  | 344                      | 406         | 329         | 300         | 1418        | 392         | 3189         | 94                      | 373.77             |
| WT6                  | 589                      | 316         | 210         | 262         | 248         | 331         | 1956         | 93                      | 231.70             |
| WT7                  |                          |             | 289         | 676         | 1056        | 1977        | 3998         | 60                      | 422.26             |
| <b>WEF Total</b>     | <b>2118</b>              | <b>2478</b> | <b>1744</b> | <b>2977</b> | <b>4873</b> | <b>4516</b> | <b>18706</b> | <b>160</b>              | <b>292.43</b>      |
| CWT1                 | 484                      | 578         | 498         | 247         | 338         | 397         | 2542         | 85                      | 262.49             |
| CWT2                 | 1227                     | 1371        | 363         | 751         | 1268        | 1156        | 6136         | 97                      | 658.09             |
| <b>Control Total</b> | <b>1711</b>              | <b>1949</b> | <b>861</b>  | <b>998</b>  | <b>1606</b> | <b>1553</b> | <b>8678</b>  | <b>110</b>              | <b>460.29</b>      |

#### 5.4 Driven Transect Results

A total of 10 target species were recorded during 24 driven transects, with a total of 38 birds recorded at the WEF site, while nine species, with a total of 90 birds were recorded on the Control Site. The most abundant bird species recorded on the WEF were Black-winged Kite and Common Buzzard while on the Control Site, Black-winged Pratincole and Black-winged Kite were most abundant (Table 5).

**Table 5: Total number of birds recorded on Driven Transects (DT) during S1 - S6 of Pre-application monitoring**

| Species                 | DT 1 | DT 2 | WEF totals | CDT |
|-------------------------|------|------|------------|-----|
| African Black Duck      | 0    | 2    | 2          | 0   |
| African Harrier-Hawk    | 0    | 0    | 0          | 1   |
| Amur Falcon             | 0    | 1    | 1          | 0   |
| Black Sparrowhawk       | 2    | 0    | 2          | 1   |
| Black Stork             | 0    | 1    | 1          | 0   |
| Black-winged Kite (NT)  | 14   | 8    | 22         | 25  |
| Black-winged Pratincole | 0    | 0    | 0          | 40  |
| Common Buzzard          | 3    | 1    | 4          | 12  |
| European Honey Buzzard  | 0    | 1    | 1          | 0   |
| Grey-winged Francolin   | 2    | 0    | 2          | 5   |
| Lanner Falcon (NT)      | 0    | 0    | 0          | 1   |
| Red-footed Falcon (VU)  | 0    | 1    | 1          | 0   |
| Secretarybird (EN)      | 0    | 2    | 2          | 0   |
| Verreaux's Eagle (VU)   | 0    | 0    | 0          | 1   |

| Species            | DT 1      | DT 2      | WEF totals | CDT       |
|--------------------|-----------|-----------|------------|-----------|
| Yellow-billed Kite | 0         | 0         | 0          | 4         |
| <b>Grand Total</b> | <b>21</b> | <b>17</b> | <b>38</b>  | <b>90</b> |

## 5.5 Focal Sites

A total of 41 species of water-associated birds were recorded at the four dam focal sites, of which seven species were SCC. FS4 had the highest number of birds across all surveys with 295 birds of 24 species recorded. This was due to frequent records of White-faced Whistling Duck and Yellow-billed Duck (Near Threatened) at FS4. Yellow-billed Duck was the most abundant species recorded across all focal sites and across all six surveys with 141 individuals. This was followed by Blacksmith Lapwing, Egyptian Goose, Cape Wagtail, White-faced Whistling Duck and Spur-winged Goose (Table 6).

**Table 6: Focal Site Monitoring Results S1-S6 Surveys**

| Species                 | FS1 | FS2 | FS3 | FS4 | Grand Total |
|-------------------------|-----|-----|-----|-----|-------------|
| African Black Duck      | 0   | 4   | 0   | 0   | 4           |
| African Darter (NT)     | 12  | 7   | 3   | 6   | 28          |
| African Sacred Ibis     | 3   | 1   | 3   | 0   | 7           |
| African Spoonbill       | 0   | 2   | 1   | 3   | 6           |
| Barn Swallow            | 3   | 0   | 0   | 0   | 3           |
| Black-headed Heron      | 1   | 1   | 10  | 0   | 12          |
| Blacksmith Lapwing      | 26  | 28  | 25  | 21  | 100         |
| Brown-throated Martin   | 0   | 1   | 0   | 0   | 1           |
| Cape Teal               | 0   | 0   | 0   | 2   | 2           |
| Cape Wagtail            | 15  | 42  | 22  | 4   | 83          |
| Common Moorhen          | 0   | 0   | 0   | 3   | 3           |
| Egyptian Goose          | 26  | 48  | 12  | 8   | 94          |
| Giant Kingfisher        | 0   | 1   | 0   | 0   | 1           |
| Glossy Ibis             | 0   | 0   | 0   | 17  | 17          |
| Great Egret (NT)        | 1   | 0   | 0   | 0   | 1           |
| Greater Striped Swallow | 0   | 0   | 1   | 3   | 4           |
| Grey Heron              | 3   | 4   | 4   | 10  | 21          |
| Hadada Ibis             | 8   | 3   | 46  | 0   | 57          |
| Hamerkop (NT)           | 2   | 1   | 1   | 1   | 5           |
| Intermediate Egret      | 2   | 1   | 0   | 0   | 3           |
| Little Egret            | 1   | 3   | 0   | 1   | 5           |
| Little Grebe            | 10  | 2   | 10  | 14  | 36          |
| Malachite Kingfisher    | 1   | 1   | 0   | 0   | 2           |
| Pied Kingfisher         | 0   | 2   | 0   | 0   | 2           |
| Purple Heron            | 2   | 0   | 0   | 0   | 2           |
| Red-billed Quelea       | 0   | 0   | 50  | 0   | 50          |
| Red-billed Teal (NT)    | 8   | 0   | 4   | 16  | 28          |

| Species                    | FS1        | FS2        | FS3        | FS4        | Grand Total |
|----------------------------|------------|------------|------------|------------|-------------|
| Red-knobbed Coot           | 3          | 3          | 0          | 24         | 30          |
| Reed Cormorant             | 5          | 0          | 0          | 4          | 9           |
| South African Shelduck     | 9          | 4          | 0          | 0          | 13          |
| Southern Red Bishop        | 27         | 0          | 0          | 0          | 27          |
| Spur-winged Goose          | 63         | 16         | 0          | 0          | 79          |
| Three-banded Plover        | 5          | 32         | 0          | 8          | 45          |
| Unidentified               | 4          | 4          | 4          | 4          | 16          |
| Western Cattle Egret       | 23         | 4          | 0          | 4          | 31          |
| White-backed Duck (NT)     | 0          | 0          | 0          | 2          | 2           |
| White-breasted Cormorant   | 3          | 3          | 0          | 3          | 9           |
| White-faced Whistling Duck | 0          | 0          | 26         | 57         | 83          |
| White-throated Swallow     | 0          | 1          | 0          | 1          | 2           |
| White-winged Tern          | 0          | 0          | 0          | 2          | 2           |
| Yellow-billed Duck (NT)    | 26         | 0          | 38         | 77         | 141         |
| Yellow-billed Stork (VU)   | 0          | 1          | 0          | 0          | 1           |
| <b>Grand Total</b>         | <b>292</b> | <b>220</b> | <b>260</b> | <b>295</b> | <b>1067</b> |

## 5.6 Incidental Records

A total of 123 incidental records of 246 birds of 23 target species were made across all six surveys of pre-application monitoring, of which six species were Species of Conservation Concern (SCC) (Table 7). It is important to note that incidental records were made daily, and likely frequently of the same individual(s), and that the number is not a measure of abundance. The distribution of incidental records is presented in Figure 7 and Figure 8. Black-winged Kite was the most frequently recorded bird across all six surveys with a total of 60 birds recorded. This was followed by Greater Flamingo with 60 individual birds recorded in a single observation approximately 18 km north of the WEF during the second survey (Table 7).

**Table 7: Incidental Records S1 - S6 Surveys (SCC in bold)**

| Species                  | Red Data Status <sup>14</sup> ,<br>WEF priority Score <sup>15</sup> | Number of birds<br>recorded | Number of records |
|--------------------------|---------------------------------------------------------------------|-----------------------------|-------------------|
| African Black Duck       | LC, LC 0                                                            | 3                           | 6                 |
| African Fish Eagle       | LC, LC 290                                                          | 1                           | 1                 |
| African Goshawk          | LC, LC 0                                                            | 1                           | 1                 |
| African Harrier-Hawk     | LC, LC 190                                                          | 1                           | 1                 |
| Black Sparrowhawk        | LC, LC 170                                                          | 13                          | 13                |
| <b>Black-winged Kite</b> | <b>NT, LC 175</b>                                                   | <b>49</b>                   | <b>60</b>         |
| Brown Snake Eagle        | LC, LC 180                                                          | 1                           | 1                 |
| Common Buzzard           | LC, LC 210                                                          | 12                          | 13                |
| <b>Greater Flamingo</b>  | <b>NT, LC 290</b>                                                   | <b>1</b>                    | <b>60</b>         |
| Grey-winged Francolin    | LC, LC 190                                                          | 6                           | 16                |

<sup>14</sup> LC = Least Concern; NT = Near Threatened; VU = Vulnerable; EN = Endangered

<sup>15</sup> Retief et al. 2014

| Species                     | Red Data Status <sup>14</sup> ,<br>WEF priority Score <sup>15</sup> | Number of birds<br>recorded | Number of records |
|-----------------------------|---------------------------------------------------------------------|-----------------------------|-------------------|
| Jackal Buzzard              | LC, LC 250                                                          | 2                           | 2                 |
| <b>Lesser Flamingo</b>      | <b>NT, NT 290</b>                                                   | <b>1</b>                    | <b>17</b>         |
| <b>Lesser Kestrel</b>       | <b>VU, LC 214</b>                                                   | <b>2</b>                    | <b>6</b>          |
| Little Sparrowhawk          | LC, LC 0                                                            | 4                           | 4                 |
| <b>Marsh Owl</b>            | <b>NT, LC 190</b>                                                   | <b>1</b>                    | <b>1</b>          |
| Northern Black Korhaan      | LC, LC 180                                                          | 10                          | 11                |
| <b>Red-footed Falcon</b>    | <b>VU, NT 174</b>                                                   | <b>1</b>                    | <b>1</b>          |
| Rufous-breasted Sparrowhawk | LC, LC 170                                                          | 1                           | 1                 |
| <b>Secretarybird</b>        | <b>VU, EN 320</b>                                                   | <b>3</b>                    | <b>4</b>          |
| Spotted Eagle-Owl           | LC, LC 170                                                          | 3                           | 5                 |
| <b>Verreaux's Eagle</b>     | <b>VU, LC 360</b>                                                   | <b>5</b>                    | <b>5</b>          |
| Western Barn Owl            | LC, LC 0                                                            | 1                           | 1                 |
| <b>Yellow-billed Stork</b>  | <b>VU, LC 330</b>                                                   | <b>1</b>                    | <b>16</b>         |
| <b>Grand Total</b>          |                                                                     | <b>123</b>                  | <b>246</b>        |

Uvempvane WEF 1 Scoping Phase  
Final Avifaunal Pre-application Monitoring  
and Site Sensitivity Verification Report

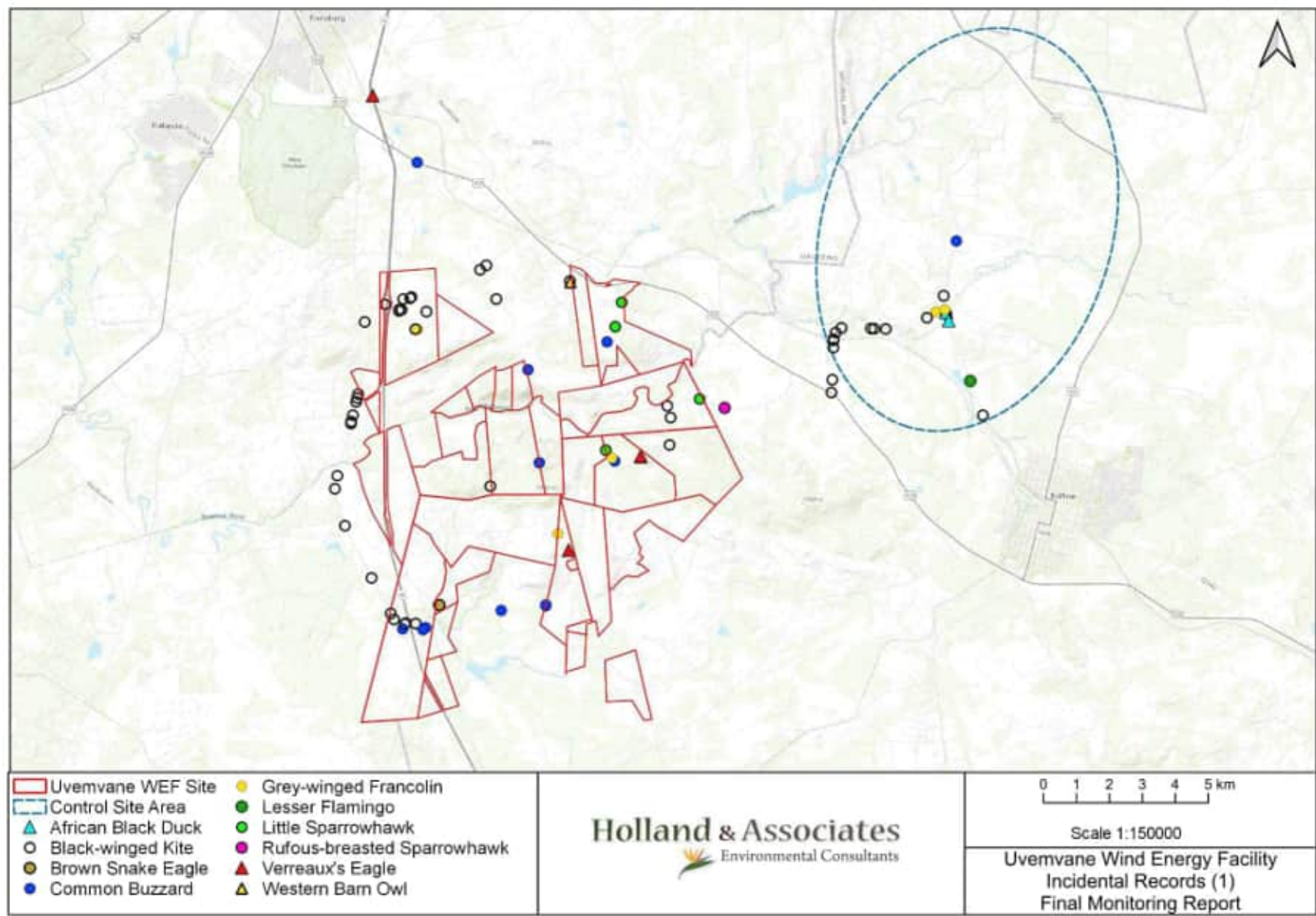


Figure 7: Uvempvane WEF Incident Records (1) S1 - S6 Surveys

Uvemvane WEF 1 Scoping Phase  
Final Avifaunal Pre-application Monitoring  
and Site Sensitivity Verification Report

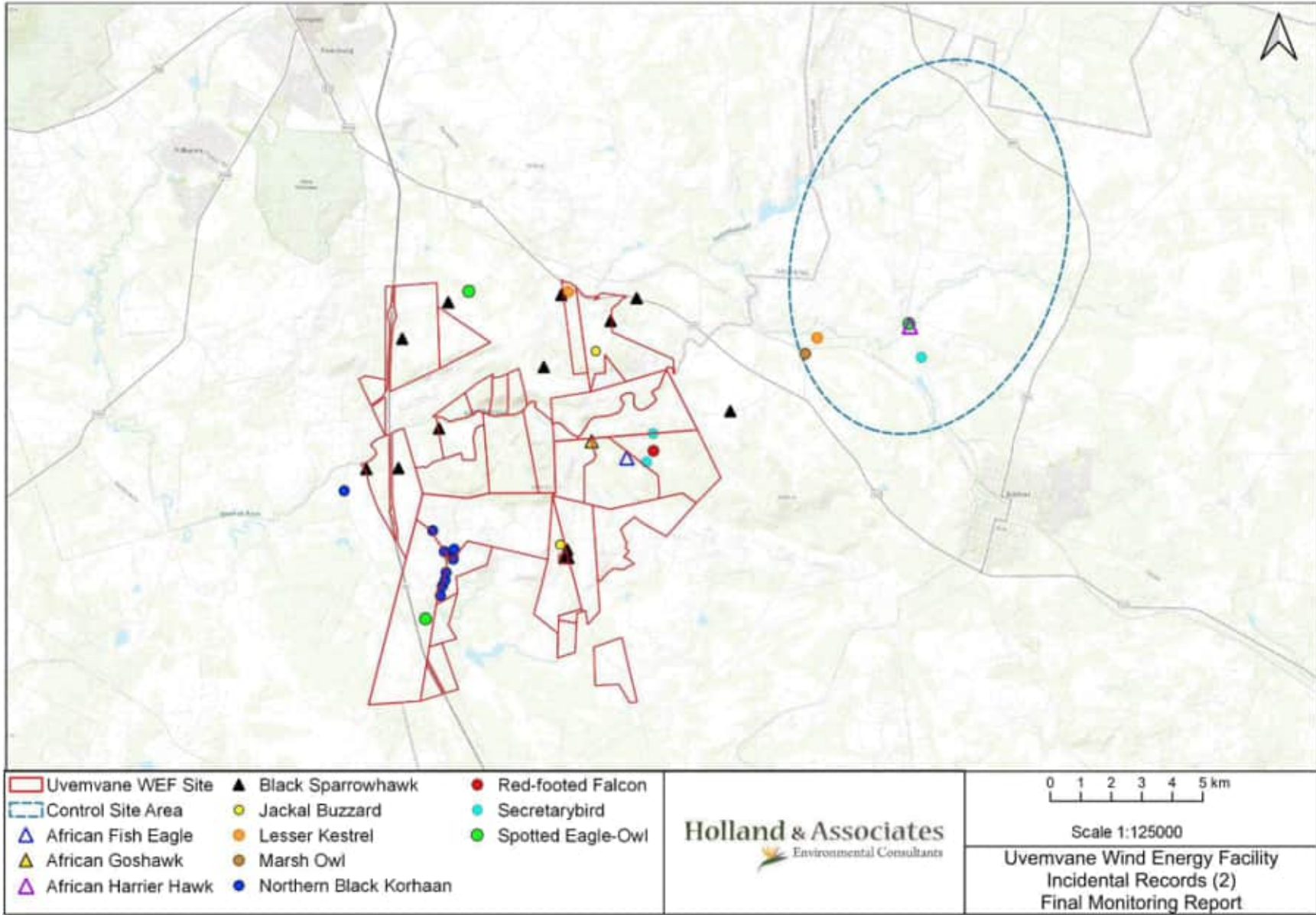


Figure 8: Uvemvane WEF Incidental Records (2) S1 - S6 Surveys

## **5.7 Checklist Survey**

The total number of bird species that has been recorded at the WEF and Control site to date is 219 species (Appendix I). This includes twelve Species of Conservation Concern (Red Data listed as Near-threatened, Vulnerable, Endangered or Critically Endangered): African Marsh-Harrier, Black Harrier, Secretarybird and Yellow-billed Stork listed as Endangered, Black Stork, Lanner Falcon, Southern Blad Ibis and Verreaux's Eagle listed as Vulnerable, and Black-winged Pratincole, Greater Flamingo, Lesser Flamingo and Red-footed Falcon listed as Near Threatened. Overall, the species abundance is relatively moderate compared to other areas proposed for wind energy developments in South Africa, with a moderate number of potentially occurring SCC.

## **5.8 Avifaunal Constraints**

An avifaunal constraints map (Figure 9) has been developed which considers the following features:

- NFEPA rivers by 200 m
- NFEPA wetlands (artificial and natural) by 100 m
- Critical Biodiversity Areas (CBAs)
- Nests and roosts
- Areas of high flight activity including rocky ridges, scarps and steep slopes

Turbines are not supported within river and wetland buffers, but linear infrastructure such as powerlines or roads may be acceptable with mitigations.

It must be noted that large areas of the site fall within areas mapped as irreplaceable and important Critical Biodiversity Areas (CBAs). It is generally recommended to avoid all CBAs by development planning as far as possible and to exclude the irreplaceable CBAs from the proposed development footprint, even though it does not appear that these areas are irreplaceable for avifauna in particular. The footprint of a wind energy facility is relatively small compared to the size of a wind energy facility development site, and therefore the loss of avifaunal habitat is relatively small compared to other types of development. Therefore, minimised wind energy facility development within a CBA may be found acceptable from an avifaunal perspective.

Due to the presence of Verreaux's Eagle in the area, development on steep slopes (> 1:4) and on scarps, ridges and rocky outcrops is not recommended. These areas should be avoided by development as far as possible. Should turbine placement be proposed in these areas, then additional mitigation measures on these turbines will be required, such as blade pattering, and potentially shut-down-on-demand or other adaptive measures.

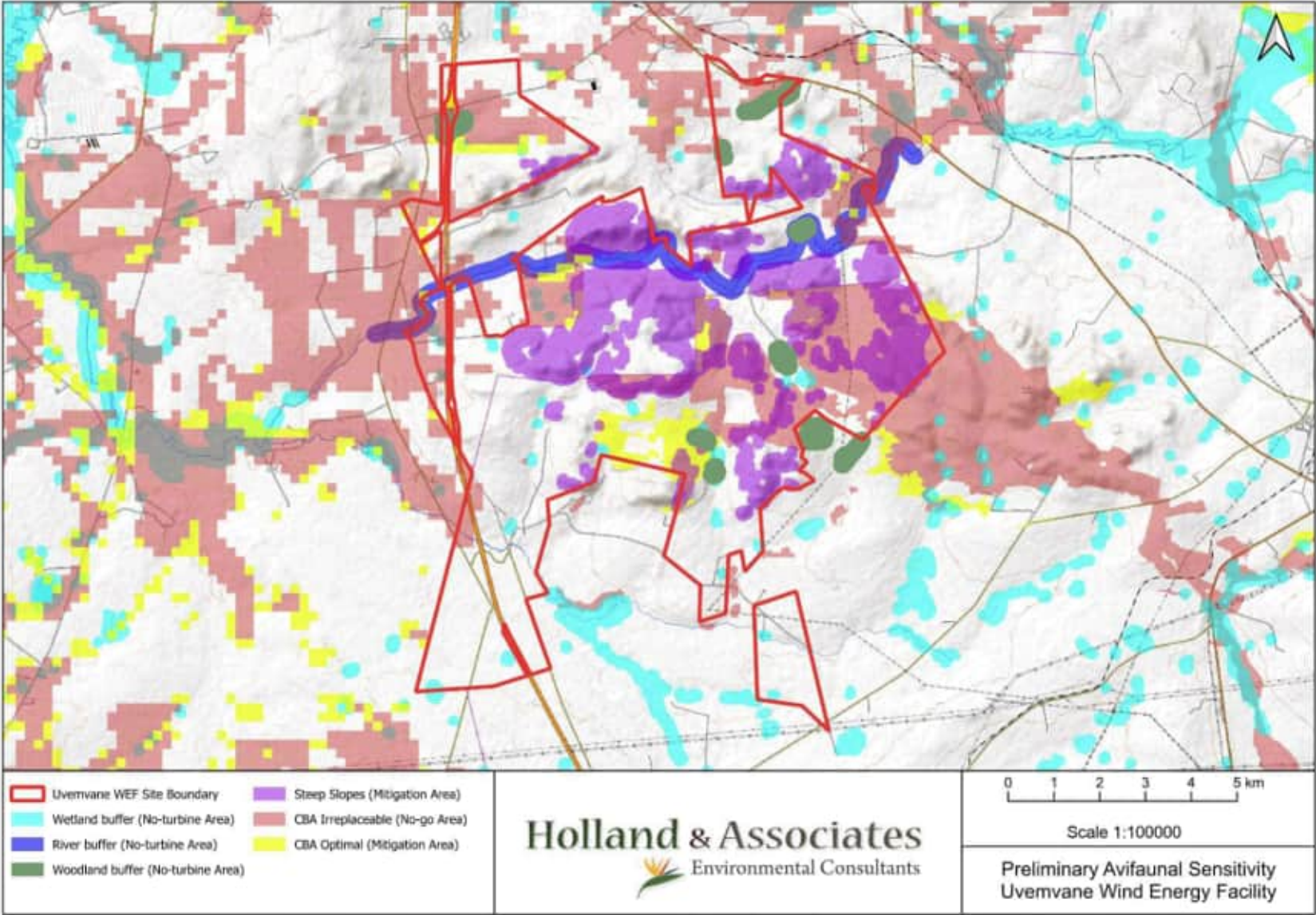


Figure 9: Avifaunal Constraints Map

## 5.9 Site Sensitivity Verification

The Screening Tool Report identified the area within 5 km of the project site as of high sensitivity for the avian species of conservation concern (SCC) African Marsh Harrier (*Circus ranivorus*), Secretarybird (*Sagittarius serpentarius*), Lanner Falcon (*Falco biarmicus*), White-bellied Bustard (*Eupodotis senegalensis*) and Yellow-billed Stork (*Mycteria ibis*) in terms of the animal species theme, that could be affected by the proposed development. (Refer to Appendix I). Therefore, according to the Screening Tool Report, an avifaunal specialist impact assessment and an avian species specialist impact assessment is required, unless the land use or sensitivity identified by the Screening Tool is disputed.

The Site Inspection and one year of avifaunal pre-application/pre-construction monitoring confirmed that the site is of high sensitivity for 12 SCC as listed in section 4.7 above, in terms of the National Web-based Screening Tool classification, and that an Animal Species Specialist Assessment must be conducted by a specialist registered with SACNASP with a field of practice relevant to the taxonomic group (in this case Aves – Birds), for which the assessment is being undertaken. The assessment must be undertaken following the Species Environmental Assessment Guideline (SANBI, 2022).

## 5.10 Identification of Potential Impacts of the Proposed Project on Avifauna

### 5.10.1 Displacement through disturbance

Disturbance during the construction, operational and decommissioning phases can negatively affect all avifauna on an individual or population level by increasing stress, decreasing food and habitat availability, causing displacement into potentially less suitable neighbouring environments, and ultimately potentially decreasing reproductive success (Bennun, et al., 2021; Jenkins, et al., 2017; Madders & Whitfield, 2006; Marques, et al., 2021). An avoidance of the WEF at a macro scale (barrier effect), can lead to displacement, but can also lead to no response (if the bird avoiding the WEF area does not alter its habitat use otherwise) (Laranjeiro, et al., 2018; May, 2015).

In a review of 71 peer-reviewed studies on displacement of avifauna in Europe and North America (Marques, et al., 2021) about half of these studies found no effects of displacement, 40.6% found displacement effects and 7.7% found attraction effects, i.e., an increased abundance at the site during operation against pre-application results. A study on long-established wind farms in India indicates that certain bird species avoided wind-turbine dominated sites, affecting their distribution pattern (Kumara, et al., 2022). Displacement effects have been reported for large raptors in other countries, but the studies are often inconclusive due to lack of baseline and collision data.

Five of eight wind farms in a study in South Africa in 2017 (Ralston-Paton, 2017) reported an increase in the total number of species on site after construction, even though this difference was not statistically significant.

Different species vary in their susceptibility to disturbance. The risk of displacement from disturbance is higher for shy, secretive species not habituated to human activities.

#### 5.10.2 *Mitigation of disturbance*

Disturbance can be managed and mitigated most effectively at the design stage by avoiding important nesting, roosting and foraging areas of sensitive species during site selection and layout design. The disturbance footprint can be minimised by restricting activities to the smallest possible footprint and demarcating this area, with outside areas declared no-go areas during all phases. A pre-construction avifaunal walkthrough conducted within the month prior to commencement of construction can mitigate residual impacts by identifying areas that require additional mitigation during construction and limit negative impacts on sensitive species.

#### 5.10.3 *Displacement through habitat loss*

The construction of the proposed development will require the transformation of indigenous vegetation. Any transformation of vegetation leads to habitat loss for avian species utilising that vegetation, causing displacement into areas which are potentially less suitable or already occupied by competing individuals or species (Frid & Dill, 2002; Percival, 2005; Dwyer, et al., 2018). Once constructed, the development infrastructure, and any available perches within the facility may be used as nesting and roosting substrate by some less-sensitive species and create new habitat, which would be lost during decommissioning.

Many bird species will persist within the operational WEF site, due to the relatively small footprint, compared to the size of the development area, however, avian species sensitive to disturbance will be displaced from the area.

#### 5.10.4 *Mitigation of habitat loss*

Mitigation of habitat loss from construction of the facility is mainly achieved through site selection and the avoidance of sensitive areas. Following site selection (avoidance), minimisation is only marginally possible by retaining as much of the indigenous vegetation as possible, minimising the footprint of all associated infrastructure, including buildings, electrical infrastructure and the width and length of roads. Residual impacts can be mitigated by rehabilitating as many disturbed areas as possible following construction. Before construction and decommissioning an avifaunal walkthrough can identify any active nesting and breeding sites, which must be protected until the breeding has concluded. Installed infrastructure should be of a bird-friendly design with anti-perching structures installed and electricity pylons that do not offer nesting opportunities.

#### 5.10.5 *Mortality from collisions with turbines*

Bird collisions with wind turbine blades has been well documented worldwide and can be devastating to avian populations in certain locations (Drewitt & Langston, 2006; Dwyer, et al., 2018; Laranjeiro, et al., 2018). Birds can collide with wind turbines and the monopoles (Kunz, et al., 2007), and their ability to avoid turbines can be site-, species-, weather-, and turbine-specific (Cook et al. 2014, Drewitt & Langston 2006, Marques et al. 2014). Mortalities from collisions with turbines can vary greatly between sites (Sovacool, 2009), and the impact of these mortalities on a species population can vary greatly depending on the species resilience, with large-bodies, long-living species with a low reproductive rate and slow maturation rates being disproportionately affected. In addition to being more prone to collisions due to body size, even low fatality rates can have population-level effects, particularly for SCC that are already heavily impacted (Carrete, et al., 2009; Drewitt & Langston, 2006; Marques, et al., 2014).

A high number of species are affected by WEFs in South Africa. According to a recent report on the impact of operational WEFs on birds in the country, 202 bird species were recorded as fatalities between 2015 and 2023. Of these, 198 species were recorded as turbine collision incidents (BirdLife South Africa, 2025) with more than 10% of these carcasses belonging to SCC. The report showed that diurnal raptors were the most affected by turbine collisions making up 29% of the carcasses found under turbines. This was followed by songbirds and swifts, swallows and martins which made up 29% and 16% respectively (BirdLife South Africa, 2025).

#### *5.10.6 Mitigation of collisions with turbines*

The main mitigation measure for the avoidance of collisions is the placement of turbines outside of areas likely to be frequented by collision-prone bird species (avoidance mitigation). Avifaunal pre-application monitoring in line with all applicable Best Practice Guidelines, is therefore completed to inform the selection of the turbine locations.

#### *5.10.7 Mortality from collisions with powerlines*

Collisions with powerlines is a well-known and increasing threat for many bird species worldwide (Bernardino, et al., 2018; Jenkins, et al., 2015; Loss, et al., 2014). In South Africa, a number of endemic and threatened species are known to be significantly affected by collisions (Taylor, et al., 2015). For raptors, collisions appear to be a less frequent source of mortality compared to electrocutions (Loss, et al., 2014; Slater, et al., 2020). This is likely due to a combination of their good eyesight, high aspect-ratio wings, and often high flight altitude while engaged in thermal soaring (Bevanger, 1998; Martin & Shaw, 2010; Janss, 2000; Slater, et al., 2020). However, powerline collisions increase when lines intersect with home ranges or if lines span regularly used flight paths between nesting and foraging grounds (Rollan, et al., 2010; Slater, et al., 2020). For some raptor species collisions with powerlines are a major conservation concern, such as the Bonelli's Eagle in Spain (Rollan, et al., 2010).

#### *5.10.8 Mitigation of collisions with overhead powerlines*

The impact could be completely avoided by burying all overhead powerlines. To minimise collisions with overhead powerlines, the length of powerlines should be the minimum distance that avoids identified no-overhead powerline buffers. To mitigate residual impacts line markers such as dynamic and static bird flight diverters (BFDs) are being widely used with some success, and dynamic models are believed to be more likely to increase visibility for a range of species (Silva, et al., 2022). Overhead powerlines should be placed parallel to existing infrastructure as far as practically possible, with wires as low and thick as the current Eskom Technical Standard allows (Silva, et al., 2022). Some evidence has emerged that suggests that the staggering of pylons could reduce bustard mortality. In one study in Namibia and South Africa of 134 bustard collisions 87.3% were confirmed as having occurred away from towers, in the intermediate and mid-span sections of the powerline (Pallett, et al., 2022). Therefore, the pylons should be staggered against existing or other proposed pylons to increase the powerline visibility, where technically possible. All pylons must be of a bird-friendly design as per Eskom Technical Standards with anti-perching devices installed. A single monopole pylon that does not allow nest-building should be used where technically possible. Diagonal braces on horizontal insulators can prevent birds from perching on the monopoles and reduce the risk of collisions.

#### 5.10.9 *Mortality from electrocutions on electrical infrastructure*

Normally, energised components on overhead powerlines are not insulated but are elevated to place them safely out of people's reach, which elevates energised wires into places that are also attractive perches for birds (Dwyer, et al., 2017). Large birds can be electrocuted or incur electric shock injuries when simultaneously contacting two uninsulated energised components of differing electric potential (phase-to-phase electrocution), or when contacting an uninsulated energised component and a path to ground (phase-to-ground - electrocution) (Dwyer, 2006; APLIC, 2006). Because electrocutions result from birds bridging airgaps, larger birds with larger wingspans, such as Martial Eagle, are disproportionately affected (Slater, et al., 2020). Most bird electrocutions occur at relatively low and medium voltage distribution systems, rather than with transmission systems where the separations created by longer insulators and wider airgaps around wires are larger (APLIC, 2006; Bennun, et al., 2021; Slater, et al., 2020).

#### 5.10.10 *Mitigation of mortality from electrocutions*

Bird electrocutions can be easily avoided by burying overhead powerlines, and by creating separation between conductors of differing electrical potential at substations and electrical infrastructure, and by placing insulation over conductors, or by redirecting birds to perch or nest away from conductors (APLIC, 2006; Dwyer, et al., 2017).

If all installed electrical infrastructure is of a bird-friendly design, in line with the latest Eskom Technical Standards, with a phase-phase and phase-earth clearance of at least 1.8 m, with any exposed electrical infrastructure within the substations also of a bird-friendly insulated design, and with bird perches installed on monopole pylons, the impact can be completely mitigated.

#### 5.10.11 *Cumulative Impacts*

The EIA Regulations 2014, as amended, define cumulative impacts as *"in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities."*

Cumulative impacts include the combination of all the impacts for a project, which may be higher than the sum of impacts, as well as all known past, present and proposed projects in an area of 30 km surrounding the proposed development.

Projects to be included in the cumulative assessment in the EIA Phase (provided by the EAP) are presented in Figure 10.

The only real mitigation possible in order to minimise cumulative impacts, beyond minimising impacts for each project separately during the EIA process, is for the Competent Authority to ensure only projects that are practically mitigatable to an acceptable level are authorised, and that do not lead to unacceptable negative impacts, including cumulative impacts, and to ensure the correct implementation of authorised Environmental Management Programmes through compliance audits and enforcement.



## 6 Conclusion and Plan for Environmental Impact Assessment

Six seasonal surveys of pre-application monitoring and a specialist raptor nests survey have been conducted from November 2023 to October 2024, in line with the Best Practice Guidelines (Jenkins, et al., 2015), the Verreaux's Eagle Guidelines (Ralston Paton & Murgatroyd, 2021), the Black Harrier Guidelines (Simmons, et al., 2020) and the Cape Vulture Guidelines (Pfeiffer & Ralston-Paton, 2018).

Pre-application monitoring, conducted in line with South African Best Practice Guidelines, did not result in any apparent red flags for the project that would prohibit potential wind energy development at the proposed Uvemvane WEF site.

A total of 12 SCC have been confirmed as present on the site. No nests or breeding sites of SCC were identified on the site.

The following potential impacts of the proposed development have been identified and will be assessed in the EIA Phase of the project, according to the methodology presented in Appendix K:

- Displacement through disturbance
- Displacement through habitat loss
- Mortality from collisions with turbines
- Mortality from collisions with powerlines
- Mortality from electrocutions on electrical infrastructure
- Cumulative impacts

If the proposed development layout takes into account all avifaunal habitat constraints identified as per Section 4.8 and Figure 9, and all mitigation measures that will be recommended by the specialist will be implemented, it is the specialist's opinion that the project can be advanced to the impact assessment phase, as it is unlikely to result in unacceptable impacts on avifauna.

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## APPENDIX A: Vantage Point Survey Details

| VP   | Coordinates          | S1                                     |                                           |             | S2                                                   |                                                                  |             | S3                                                                 |                                                                                   |             |
|------|----------------------|----------------------------------------|-------------------------------------------|-------------|------------------------------------------------------|------------------------------------------------------------------|-------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------|
|      |                      | Dates                                  | Times                                     | Total Hours | Dates                                                | Times                                                            | Total Hours | Dates                                                              | Times                                                                             | Total Hours |
| VP1  | -26.6071°/ 28.4019°  | 11/11/2023<br>13/11/2023<br>16/11/2023 | 14:10-18:10<br>10:00-14:00<br>05:40-09:40 | 12h00m      | 30/01/2024<br>08/02/2024<br>10/02/2024               | 14:30 - 18:30<br>10:00 - 14:00<br>06:10 - 10:10                  | 12h00m      |                                                                    |                                                                                   |             |
| VP2  | -26.6100°/ 28.4581°  | 12/11/2023<br>14/11/2023<br>16/11/2023 | 05:35-09:35<br>14:00-18:00<br>10:45-14:45 | 12h00m      | 30/01/2024<br>04/02/2024<br>09/02/2024               | 09:40 - 13:40<br>14:45 - 18:45<br>05:50 - 09:50                  | 12h00m      |                                                                    |                                                                                   |             |
| VP3a | -26.6391°/ 28.4283°  | 10/11/2023<br>15/11/2023               | 11:05-18:05<br>05:50-10:50                | 12h00m      | 02/02/2024<br>07/02/2024                             | 12:30 - 18:30<br>06:40 - 12:40                                   | 12h00m      |                                                                    |                                                                                   |             |
| VP3b | -26.6391°/28.412507  |                                        |                                           |             |                                                      |                                                                  |             | 16/04/2024<br>17/04/2024<br>18/04/2024                             | 08:00 - 12:00<br>12:15 - 17:15<br>07:15 - 10:15                                   | 12h00m      |
| VP4  | -26.6451°/ 28.4690°  | 09/11/2023                             | 08:45-12:45                               | 04h00m      | 31/01/2024<br>06/02/2024<br>08/02/2024<br>09/02/2024 | 12:00 - 18:00<br>06:00 - 12:00<br>14:35 - 18:35<br>10:30 - 14:30 | 20h00m      | 10/04/2024<br>12/04/2024<br>15/04/2024                             | 12:25 - 17:25<br>06:40 - 10:40<br>08:00 - 11:00                                   | 12h00m      |
| VP5  | -26.6697°/ 28.4456°  | 11/11/2023<br>13/11/2023<br>17/11/2023 | 05:50-09:50<br>14:25-18:25<br>10:00-14:00 | 12h00m      | 01/02/2024<br>03/02/2024<br>05/02/2024               | 10:30 - 14:30<br>05:55 - 09:55<br>14:10 - 18:10                  | 12h00m      | 09/04/2024<br>11/04/2024<br>13/04/2024                             | 13:00 - 17:30<br>06:45 - 11:15<br>10:55 - 13:55                                   | 12h00m      |
| VP6  | -26.6721°/ 28.4104°  | 10/11/2023<br>15/11/2023<br>17/11/2023 | 05:45-09:45<br>11:25-15:25<br>14:15-18:15 | 12h00m      | 01/02/2024<br>03/02/2024<br>05/02/2024               | 05:55 - 09:55<br>14:30 - 18:30<br>09:50 - 13:50                  | 12h00m      | 09/04/2024<br>11/04/2024<br>14/04/2024                             | 07:35 - 12:35<br>12:30 - 17:30<br>08:30 - 10:30                                   | 12h00m      |
| VP7  | -26.70116°/28.39978° |                                        |                                           |             |                                                      |                                                                  |             | 13/04/2024<br>14/04/2024<br>16/04/2024<br>17/04/2024<br>18/04/2024 | 06:15 - 10:15<br>11:00 - 15:00<br>12:40 - 16:40<br>07:50 - 11:50<br>10:50 - 12:50 | 18h00m      |
| CVP  | -26.6131°/ 28.5637°  | 09/11/2023<br>12/11/2023<br>14/11/2023 | 13:50-17:50<br>10:30-14:30<br>06:15-10:15 | 12h00m      | 29/01/2024<br>31/01/2024<br>04/02/2024               | 14:00 - 18:00<br>06:40 - 10:40<br>10:30 - 14:30                  | 12h00m      | 10/04/2024<br>12/04/2024<br>15/04/2024                             | 07:00 - 11:00<br>11:40 - 15:40<br>13:10 - 17:10                                   | 12h00m      |

Uvemvane WEF 1 Scoping Phase  
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| VP   | Coordinates            | S4                                     |                                                 |             | S5                                                                 |                                                                                   |             | S6                                                                                             |                                                                                                                     |             |
|------|------------------------|----------------------------------------|-------------------------------------------------|-------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-------------|
|      |                        | Dates                                  | Times                                           | Total Hours | Dates                                                              | Times                                                                             | Total Hours | Dates                                                                                          | Times                                                                                                               | Total Hours |
| VP1  | -26.6071°/ 28.4019°    | 16/06/2024<br>21/06/2024<br>22/06/2024 | 09:35 - 12:35<br>07:05 - 12:05<br>12:55 - 16:55 | 12h00m      | 18/08/2024<br>21/08/2024<br>21/08/2024<br>25/08/2024<br>12/08/2024 | 13:00 - 17:30<br>06:55 - 10:25<br>10:25 - 12:25<br>08:40 - 12:40<br>08:30 - 12:30 | 18h00m      | 19/10/2024<br>21/10/2024<br>27/10/2024                                                         | 05:50 - 11:50<br>11:45 - 17:45<br>10:15 - 16:15                                                                     | 18h00m      |
| VP2  | -26.6100°/ 28.4581°    | 17/06/2024<br>19/06/2024<br>21/06/2024 | 07:10 - 11:10<br>12:35 - 16:35<br>12:30 - 16:30 | 12h00m      | 16/08/2024<br>20/08/2024<br>25/08/2024<br>12/08/2024               | 06:55 - 10:55<br>08:35 - 12:35<br>13:00 - 17:00<br>13:00 - 17:00                  | 16h00m      | 19/10/2024<br>20/10/2024<br>25/10/2024<br>27/10/2024<br>29/10/2024                             | 12:15 - 18:15<br>11:20 - 17:20<br>14:10 - 18:10<br>05:35 - 09:35<br>09:40 - 13:40                                   | 24h00m      |
| VP3a | -26.6391°/ 28.4283°    |                                        |                                                 |             |                                                                    |                                                                                   |             |                                                                                                |                                                                                                                     |             |
| VP3b | -26.63909°/ 28.412507° | 12/06/2024<br>20/06/2024<br>22/06/2024 | 12:20 - 17:20<br>07:15 - 11:15<br>09:20 - 12:20 | 12h00m      | 15/08/2024<br>19/08/2024<br>23/08/2024                             | 06:55 - 11:55<br>13:00 - 17:30<br>08:15 - 14:45                                   | 16h00m      | 18/10/2024<br>24/10/2024                                                                       | 13:00 - 18:00<br>05:45 - 08:45                                                                                      | 08h00m      |
| VP4  | -26.6451°/ 28.4690°    | 10/06/2024<br>13/06/2024<br>19/06/2024 | 07:50 - 11:50<br>12:40 - 16:40<br>07:25 - 11:25 | 12h00m      | 14/08/2024<br>16/08/2024<br>20/08/2024                             | 07:00 - 11:00<br>11:35 - 15:35<br>13:00 - 17:00                                   | 12h00m      | 21/10/2024<br>23/10/2024<br>25/10/2024                                                         | 05:55 - 09:55<br>13:50 - 17:50<br>09:35 - 13:35                                                                     | 12h00m      |
| VP5  | -26.6697°/ 28.4456°    | 11/06/2024<br>14/06/2024<br>18/06/2024 | 07:20 - 11:20<br>11:55 - 15:55<br>12:05 - 16:05 | 12h00m      | 13/08/2024<br>17/08/2024<br>21/08/2024                             | 06:50 - 10:50<br>11:35 - 15:35<br>13:10 - 17:10                                   | 12h00m      | 17/10/2024<br>22/10/2024<br>26/10/2024                                                         | 05:55 - 09:55<br>14:00 - 18:00<br>09:25 - 13:25                                                                     | 12h00m      |
| VP6  | -26.6721°/ 28.4104°    | 11/06/2024<br>14/06/2024<br>18/06/2024 | 12:30 - 16:30<br>07:20 - 11:20<br>07:25 - 11:25 | 12h00m      | 13/08/2024<br>17/08/2024<br>22/08/2024                             | 11:55 - 15:55<br>07:05 - 11:05<br>13:15 - 17:15                                   | 12h00m      | 17/10/2024<br>22/10/2024<br>26/10/2024                                                         | 10:25 - 14:25<br>06:15 - 10:15<br>13:40 - 17:40                                                                     | 12h00m      |
| VP7  | -26.70116°/28.39978°   | 12/06/2024<br>16/06/2024<br>20/06/2024 | 07:05 - 12:05<br>13:00 - 17:00<br>11:30 - 14:30 | 12h00m      | 15/08/2024<br>19/08/2024<br>23/08/2024                             | 12:20 - 17:20<br>06:50 - 11:50<br>11:20 - 13:20                                   | 12h00m      | 17/10/2024<br>18/10/2024<br>22/10/2024<br>24/10/2024<br>26/10/2024<br>28/10/2024<br>28/10/2024 | 14:30 - 18:30<br>05:45 - 12:45<br>10:45 - 13:30<br>09:30 - 15:30<br>05:35 - 08:35<br>06:30 - 10:30<br>11:40 - 14:55 | 30h00m      |

| VP  | Coordinates         | S4                                     |                                                 |             | S5                                     |                                                 |             | S6                                     |                                                 |             |
|-----|---------------------|----------------------------------------|-------------------------------------------------|-------------|----------------------------------------|-------------------------------------------------|-------------|----------------------------------------|-------------------------------------------------|-------------|
|     |                     | Dates                                  | Times                                           | Total Hours | Dates                                  | Times                                           | Total Hours | Dates                                  | Times                                           | Total Hours |
| CVP | -26.6131°/ 28.5637° | 10/06/2024<br>13/06/2024<br>17/06/2024 | 14:50 - 16:50<br>07:25 - 12:25<br>11:25 - 16:25 | 12h00m      | 14/08/2024<br>18/08/2024<br>22/08/2024 | 12:30 - 17:00<br>07:05 - 11:35<br>09:50 - 12:50 | 12h00m      | 16/10/2024<br>20/10/2024<br>23/10/2024 | 13:30 - 17:30<br>06:10 - 10:10<br>09:00 - 13:00 | 12h00m      |

## APPENDIX B: Walked Transect Survey Details

| WT  | Start Coordinates              | End Coordinates                | Length | Dates Conducted S1                                       | Dates Conducted S2                                                                               | Dates Conducted S3                                       |
|-----|--------------------------------|--------------------------------|--------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| WT1 | -26.6095409;<br>28.3933666     | -26.60951052;<br>28.39870119   | 552 m  | 11/11/2023 18:10<br>13/11/2023 09:40<br>16/11/2023 05:16 | 30/01/2024 18:40<br>08/02/2024 09:35<br>10/02/2024 05:53                                         |                                                          |
| WT2 | -26.61315158,<br>28.45689130   | -26.609180086;<br>28.458604948 | 499 m  | 12/11/2023 05:21<br>14/11/2023 18:02<br>16/11/2023 10:29 | 30/01/2024 09:19<br>06/02/2024 17:32<br>09/02/2024 05:36                                         |                                                          |
| WT3 | -26.644075201;<br>28.424074991 | -26.64356617;<br>28.42874749   | 519 m  | 10/11/2023 10:46<br>10/11/2023 18:06<br>15/11/2023 05:34 | 02/02/2024 10:37<br>02/02/2024 18:32<br>07/02/2024 06:23                                         | 16/04/2024 12:04<br>17/04/2024 17:16<br>18/04/2024 07:04 |
| WT4 | -26.64290780;<br>28.45718181   | -26.64651367;<br>28.46063649   | 512 m  | 09/11/2023 08:06                                         | 31/01/2024 18:01<br>06/02/2024 05:40<br>08/02/2024 18:40<br>09/02/2024 10:16<br>09/02/2024 15:12 | 10/04/2024 17:24<br>12/04/2024 06:25<br>15/04/2024 11:01 |
| WT5 | -26.67349909;<br>28.44692342   | -26.66921855;<br>28.44744477   | 474 m  | 11/11/2023 05:31<br>13/11/2023 18:28<br>17/11/2023 09:21 | 01/02/2024 10:09<br>03/02/2024 05:38<br>05/02/2024 18:12                                         | 09/04/2024 17:37<br>11/04/2024 06:27<br>13/04/2024 10:40 |
| WT6 | -26.67419258;<br>28.41021091   | -26.67419258;<br>28.41021091   | 469 m  | 10/11/2023 05:31<br>15/11/2023 15:26<br>17/11/2023 18:16 | 01/02/2024 05:41<br>03/02/2024 18:29<br>05/02/2024 09:39                                         | 09/04/2024 12:33<br>11/04/2024 17:25<br>14/04/2024 10:33 |
| WT7 | -26.700358;<br>28.399118       | -26.69641;<br>28.396716        | 526 m  |                                                          |                                                                                                  | 16/04/2024 16:42                                         |

Uvemvane WEF 1 Scoping Phase  
Final Avifaunal Pre-application Monitoring  
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| WT   | Start Coordinates              | End Coordinates                | Length | Dates Conducted S1                                       | Dates Conducted S2                                       | Dates Conducted S3                                       |
|------|--------------------------------|--------------------------------|--------|----------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|
|      |                                |                                |        |                                                          |                                                          | 17/04/2024 07:37<br>18/04/2024 10:40                     |
| CWT1 | -26.613586613;<br>28.525473304 | -26.608664984;<br>28.526645137 | 538 m  | 09/11/2023 18:23<br>12/11/2023 09:55<br>14/11/2023 05:43 | 29/01/2024 18:29<br>31/01/2024 05:50<br>04/02/2024 09:41 | 10/04/2024 06:45<br>12/04/2024 11:25<br>15/04/2024 17:09 |
| CWT2 | -26.60603403;<br>28.56071586   | -26.60170701;<br>28.55883851   | 518 m  | 09/11/2023 17:57<br>12/11/2023 10:13<br>14/11/2023 05:59 | 29/01/2024 18:02<br>31/01/2024 06:14<br>04/02/2024 10:04 | 10/04/2024 06:25<br>12/04/2024 11:05<br>15/04/2024 17:29 |

| WT  | Start Coordinates              | End Coordinates                | Length | Dates Conducted S4                                       | Dates Conducted S5                                                           | Dates Conducted S6                                                                               |
|-----|--------------------------------|--------------------------------|--------|----------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| WT1 | -26.6095409;<br>28.3933666     | -26.60951052;<br>28.39870119   | 552 m  | 16/06/2024 09:24<br>21/06/2024 06:54<br>22/06/2024 17:00 | 12/08/2024 12:34<br>18/08/2024 17:36<br>21/08/2024 06:43<br>25/08/2024 07:08 | 19/10/2024 05:35<br>21/10/2024 11:33<br>21/10/2024 17:48<br>27/10/2024 10:01<br>27/10/2024 16:22 |
| WT2 | -26.61315158,<br>28.45689130   | -26.609180086;<br>28.458604948 | 499 m  | 17/06/2024 06:57<br>19/06/2024 16:38<br>21/06/2024 16:32 | 12/08/2024 17:02<br>16/08/2024 06:39<br>20/08/2024 08:24<br>25/08/2024 17:01 | 19/10/2024 18:11<br>20/10/2024 17:19<br>25/10/2024 18:08<br>27/10/2024 05:24<br>29/10/2024 09:28 |
| WT3 | -26.644075201;<br>28.424074991 | -26.64356617;<br>28.42874749   | 519 m  | 12/06/2024 17:16<br>20/06/2024 07:02<br>22/06/2024 09:06 | 15/08/2024 06:39<br>19/08/2024 17:30<br>23/08/2024 08:01                     | 18/10/2024 18:01<br>24/10/2024 05:31<br>28/10/2024 10:52                                         |
| WT4 | -26.64290780;<br>28.45718181   | -26.64651367;<br>28.46063649   | 512 m  | 10/06/2024 12:04<br>13/06/2024 16:44<br>19/06/2024 11:34 | 14/08/2024 06:46<br>16/08/2024 11:19<br>20/08/2024 17:13                     | 21/10/2024 05:45<br>25/10/2024 09:21<br>25/10/2024 13:39                                         |
| WT5 | -26.67349909;<br>28.44692342   | -26.66921855;<br>28.44744477   | 474 m  | 11/06/2024 07:02<br>14/06/2024 11:38<br>18/06/2024 16:10 | 13/08/2024 06:39<br>17/08/2024 11:19<br>21/08/2024 17:10                     | 17/10/2024 05:40<br>22/10/2024 18:01<br>26/10/2024 09:11                                         |
| WT6 | -26.67419258;<br>28.41021091   | -26.67419258;<br>28.41021091   | 469 m  | 11/06/2024 16:33                                         | 13/08/2024 11:46                                                             | 17/10/2024 10:10                                                                                 |

| WT   | Start Coordinates              | End Coordinates                | Length | Dates Conducted S4                                       | Dates Conducted S5                                       | Dates Conducted S6                                                                                                                                                               |
|------|--------------------------------|--------------------------------|--------|----------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                |                                |        | 14/06/2024 07:07<br>18/06/2024 07:10                     | 17/08/2024 06:54<br>22/08/2024 17:17                     | 22/10/2024 06:02<br>26/10/2024 17:49                                                                                                                                             |
| WT7  | -26.700358;<br>28.399118       | -26.69641;<br>28.396716        | 526 m  | 12/06/2024 06:52<br>16/06/2024 16:59<br>20/06/2024 14:33 | 15/08/2024 17:22<br>19/08/2024 06:37<br>23/08/2024 11:06 | 17/10/2024 18:25<br>18/10/2024 05:32<br>22/10/2024 10:29<br>24/10/2024 09:15<br>26/10/2024 05:24<br>28/10/2024 06:14<br>28/10/2024 15:04<br>29/10/2024 08:40<br>30/10/2024 05:43 |
| CWT1 | -26.613586613;<br>28.525473304 | -26.608664984;<br>28.526645137 | 538 m  | 10/06/2024 17:20<br>13/06/2024 06:49<br>20/06/2024 15:13 | 14/08/2024 17:27<br>18/08/2024 06:31<br>22/08/2024 08:34 | 16/10/2024 17:58<br>20/10/2024 05:30<br>23/10/2024 08:25                                                                                                                         |
| CWT2 | -26.60603403;<br>28.56071586   | -26.60170701;<br>28.55883851   | 518 m  | 10/06/2024 16:56<br>13/06/2024 07:09<br>20/06/2024 15:31 | 14/08/2024 17:02<br>18/08/2024 06:50<br>22/08/2024 08:52 | 16/10/2024 17:34<br>20/10/2024 05:50<br>23/10/2024 08:44                                                                                                                         |

## APPENDIX C: Driven Transect Survey Details

| DT  | Start Coordinates          | End Coordinates            | Length  | Dates Conducted S1                   | Dates Conducted S2                                       | Dates Conducted S3                   |
|-----|----------------------------|----------------------------|---------|--------------------------------------|----------------------------------------------------------|--------------------------------------|
| DT1 | -26.692557;<br>28.394874   | -26.6736957;<br>28.4469068 | 7.67 km | 09/11/2023 13:05<br>11/11/2023 10:24 | 01/02/2024 15:09<br>03/02/2024 10:21                     | 11/04/2024 11:39<br>12/04/2024 14:20 |
| DT2 | -26.6429000,<br>28.4570878 | -26.6202854;<br>28.5127160 | 7.50 km | 17/11/2023 08:39                     | 06/02/2024 12:18<br>08/02/2024 14:13<br>09/02/2024 15:32 | 10/04/2024 11:55<br>15/04/2024 11:18 |
| CDT | -26.601614;<br>28.558778   | -26.539182;<br>28.581532   | 7.93 km | 12/11/2023 14:36<br>14/11/2023 10:15 | 07/02/2024 10:41<br>07/02/2024 15:42                     | 10/04/2024 11:01<br>12/04/2024 15:42 |

| DT  | Start Coordinates          | End Coordinates            | Length  | Dates Conducted S4                   | Dates Conducted S5                   | Dates Conducted S6                   |
|-----|----------------------------|----------------------------|---------|--------------------------------------|--------------------------------------|--------------------------------------|
| DT1 | -26.692557;<br>28.394874   | -26.6736957;<br>28.4469068 | 7.67 km | 11/06/2024 11:27<br>18/06/2024 11:34 | 13/08/2024 11:00<br>17/08/2024 15:50 | 22/10/2024 13:32<br>26/10/2024 08:42 |
| DT2 | -26.6429000,<br>28.4570878 | -26.6202854;<br>28.5127160 | 7.50 km | 10/06/2024 12:28<br>19/06/2024 11:51 | 14/08/2024 11:13<br>16/08/2024 15:46 | 23/10/2024 13:22<br>25/10/2024 08:58 |
| CDT | -26.601614;<br>28.558778   | -26.539182;<br>28.581532   | 7.93 km | 17/06/2024 16:28<br>22/06/2024 08:00 | 14/08/2024 11:46<br>22/08/2024 09:10 | 20/10/2024 10:11<br>25/10/2024 08:12 |

## APPENDIX D: Focal Site Survey Details

| Focal Site | Coordinates           | Type | Dates Visited S1                     | Dates Visited S2                     | Dates Visited S3                     |
|------------|-----------------------|------|--------------------------------------|--------------------------------------|--------------------------------------|
| FS1        | -26.671982; 28.407392 | Dam  | 10/11/2023 09:50<br>15/11/2023 15:44 | 01/02/2024 09:19<br>03/02/2024 14:46 | 09/04/2024 10:43<br>14/04/2024 10:05 |
| FS2        | -26.668953; 28.448373 | Dam  | 11/11/2023 10:01<br>17/11/2023 09:41 | 01/02/2024 14:35<br>03/02/2024 09:59 | 11/04/2024 11:20<br>13/04/2024 14:01 |
| FS3        | -26.650187; 28.422354 | Dam  | 10/11/2023 10:23<br>15/11/2023 10:55 | 02/02/2024 10:01<br>07/02/2024 12:52 | 17/04/2024 10:08<br>18/04/2024 12:01 |
| FS4        | -26.609303; 28.392192 | Dam  | 13/11/2023 09:18<br>16/11/2023 09:46 | 08/02/2024 09:15<br>10/02/2024 10:20 |                                      |

| Focal Site | Coordinates           | Type | Dates Visited S4                     | Dates Visited S5                     | Dates Visited S6                     |
|------------|-----------------------|------|--------------------------------------|--------------------------------------|--------------------------------------|
| FS1        | -26.671982; 28.407392 | Dam  | 11/06/2024 12:14<br>14/06/2024 09:55 | 17/08/2024 10:01<br>22/08/2024 15:35 | 17/10/2024 10:36<br>22/10/2024 09:43 |
| FS2        | -26.668953; 28.448373 | Dam  | 11/06/2024 11:05<br>18/06/2024 15:13 | 13/08/2024 10:40<br>17/08/2024 15:31 | 17/10/2024 09:35<br>29/10/2024 07:49 |
| FS3        | -26.650187; 28.422354 | Dam  | 12/06/2024 11:10<br>16/06/2024 14:47 | 15/08/2024 15:09<br>23/08/2024 11:48 | 17/10/2024 15:28<br>22/10/2024 11:48 |
| FS4        | -26.609303; 28.392192 | Dam  | 21/06/2024 11:53<br>22/06/2024 12:40 | 18/08/2024 16:09<br>21/08/2024 12:38 | 19/10/2024 11:53                     |

## APPENDIX E: Priority Species Flights recorded during 513h VP watches during six seasonal surveys at the WEF site

| Species                   | Red Data Status | WEF Priority Score | No. of flights <sup>16</sup> S3 |    |    |    |    |     | No. of flights at risk height (RH) |    |    |    |    |     | Total No. of flights | Total No. of flights at risk height (RH) |
|---------------------------|-----------------|--------------------|---------------------------------|----|----|----|----|-----|------------------------------------|----|----|----|----|-----|----------------------|------------------------------------------|
|                           |                 |                    | S1                              | S2 | S3 | S4 | S5 | S6  | S1                                 | S2 | S3 | S4 | S5 | S6  |                      |                                          |
| African Black Swift       | Least Concern   | 0                  | 0                               | 0  | 0  | 0  | 0  | 120 | 0                                  | 0  | 0  | 0  | 0  | 120 | 120                  | 120                                      |
| African Fish Eagle        | Least Concern   | 290                | 0                               | 0  | 3  | 2  | 0  | 1   | 0                                  | 0  | 2  | 2  | 0  | 1   | 6                    | 5                                        |
| African Goshawk           | Least Concern   | 0                  | 0                               | 0  | 0  | 1  | 1  | 0   | 0                                  | 0  | 0  | 1  | 1  | 0   | 2                    | 2                                        |
| African Harrier Hawk      | Least Concern   | 190                | 2                               | 0  | 0  | 1  | 0  | 0   | 0                                  | 0  | 0  | 1  | 0  | 0   | 3                    | 1                                        |
| African Marsh Harrier     | Endangered      | 300                | 0                               | 1  | 0  | 0  | 0  | 0   | 0                                  | 1  | 0  | 0  | 0  | 0   | 1                    | 1                                        |
| Alpine Swift              | Least Concern   | 0                  | 0                               | 0  | 0  | 0  | 0  | 3   | 0                                  | 0  | 0  | 0  | 0  | 3   | 3                    | 3                                        |
| Amur Falcon               | Least Concern   | 210                | 0                               | 2  | 0  | 0  | 0  | 0   | 0                                  | 2  | 0  | 0  | 0  | 0   | 2                    | 2                                        |
| Black-chested Snake Eagle | Least Concern   | 230                | 0                               | 0  | 0  | 0  | 1  | 0   | 0                                  | 0  | 0  | 0  | 1  | 0   | 1                    | 1                                        |
| Black-winged Kite         | Least Concern   | 175                | 15                              | 13 | 14 | 10 | 1  | 1   | 6                                  | 12 | 14 | 9  | 1  | 1   | 54                   | 43                                       |
| Black Sparrowhawk         | Least Concern   | 170                | 4                               | 1  | 2  | 3  | 1  | 1   | 3                                  | 1  | 1  | 3  | 1  | 1   | 12                   | 10                                       |
| Booted Eagle              | Least Concern   | 230                | 1                               | 0  | 0  | 0  | 0  | 0   | 1                                  | 0  | 0  | 0  | 0  | 0   | 1                    | 1                                        |
| Brown Snake Eagle         | Least Concern   | 180                | 0                               | 0  | 0  | 0  | 1  | 1   | 0                                  | 0  | 0  | 0  | 1  | 1   | 2                    | 2                                        |
| Common Buzzard            | Least Concern   | 210                | 9                               | 17 | 1  | 0  | 0  | 1   | 6                                  | 16 | 1  | 0  | 0  | 1   | 28                   | 24                                       |
| European Honey Buzzard    | Least Concern   | 0                  | 1                               | 1  | 0  | 0  | 0  | 1   | 1                                  | 1  | 0  | 0  | 0  | 1   | 3                    | 3                                        |
| Greater Flamingo          | Near Threatened | 290                | 0                               | 0  | 16 | 0  | 0  | 0   | 0                                  | 0  | 13 | 0  | 0  | 0   | 16                   | 13                                       |
| Jackal Buzzard            | Least Concern   | 250                | 0                               | 6  | 0  | 0  | 0  | 0   | 0                                  | 6  | 0  | 0  | 0  | 0   | 6                    | 6                                        |
| Lanner Falcon             | Vulnerable      | 300                | 1                               | 0  | 2  | 2  | 1  | 1   | 0                                  | 0  | 2  | 2  | 1  | 1   | 7                    | 6                                        |
| Little Sparrowhawk        | Least Concern   | 0                  | 0                               | 1  | 1  | 0  | 1  | 0   | 0                                  | 1  | 1  | 0  | 1  | 0   | 3                    | 3                                        |
| Long-crested Eagle        | Least Concern   | 190                | 1                               | 0  | 0  | 0  | 0  | 0   | 1                                  | 0  | 0  | 0  | 0  | 0   | 1                    | 1                                        |

<sup>16</sup> A flight can be by more than one bird (a pair or a flock).

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| Species                | Red Data Status | WEF Priority Score | No. of flights <sup>16</sup> S3 |           |           |           |          |            | No. of flights at risk height (RH) |           |           |           |          |            | Total No. of flights | Total No. of flights at risk height (RH) |
|------------------------|-----------------|--------------------|---------------------------------|-----------|-----------|-----------|----------|------------|------------------------------------|-----------|-----------|-----------|----------|------------|----------------------|------------------------------------------|
|                        |                 |                    | S1                              | S2        | S3        | S4        | S5       | S6         | S1                                 | S2        | S3        | S4        | S5       | S6         |                      |                                          |
| Northern Black Korhaan | Least Concern   | 180                | 0                               | 1         | 0         | 0         | 0        | 0          | 0                                  | 1         | 0         | 0         | 0        | 0          | 1                    | 1                                        |
| Red-footed Falcon      | Near Threatened | 174                | 0                               | 6         | 0         | 0         | 0        | 0          | 0                                  | 6         | 0         | 0         | 0        | 0          | 6                    | 6                                        |
| Secretarybird          | Endangered      | 320                | 0                               | 0         | 1         | 0         | 0        | 0          | 0                                  | 0         | 0         | 0         | 0        | 0          | 1                    | 0                                        |
| Southern Bald Ibis     | Vulnerable      | 330                | 0                               | 0         | 0         | 0         | 0        | 1          | 0                                  | 0         | 0         | 0         | 0        | 1          | 1                    | 1                                        |
| Verreaux's Eagle       | Vulnerable      | 360                | 10                              | 2         | 11        | 4         | 1        | 0          | 9                                  | 2         | 9         | 3         | 1        | 0          | 28                   | 24                                       |
| Yellow-billed Kite     | Least Concern   | 0                  | 0                               | 0         | 0         | 0         | 0        | 3          | 0                                  | 0         | 0         | 0         | 0        | 0          | 3                    | 0                                        |
| <b>Grand Total</b>     | <b>7 SCC</b>    | <b>19 PS</b>       | <b>44</b>                       | <b>51</b> | <b>51</b> | <b>23</b> | <b>8</b> | <b>134</b> | <b>27</b>                          | <b>49</b> | <b>43</b> | <b>21</b> | <b>8</b> | <b>131</b> | <b>311</b>           | <b>279</b>                               |

## APPENDIX F: Priority Species Flights recorded during 72h VP watches during six seasonal surveys at the Control site

| Species              | Red Data Status | WEF Priority Score | No. of flights <sup>17</sup> S3 |           |           |          |          |          | No. of flights at risk height (RH) |           |           |          |          |          | Total No. of flights | Total No. of flights at risk height (RH) |
|----------------------|-----------------|--------------------|---------------------------------|-----------|-----------|----------|----------|----------|------------------------------------|-----------|-----------|----------|----------|----------|----------------------|------------------------------------------|
|                      |                 |                    | S1                              | S2        | S3        | S4       | S5       | S6       | S1                                 | S2        | S3        | S4       | S5       | S6       |                      |                                          |
| African Harrier Hawk | Least Concern   | 190                | 0                               | 0         | 2         | 0        | 0        | 0        | 0                                  | 0         | 2         | 0        | 0        | 0        | 2                    | 2                                        |
| Amur Falcon          | Least Concern   | 210                | 0                               | 7         | 0         | 0        | 0        | 0        | 0                                  | 7         | 0         | 0        | 0        | 0        | 7                    | 7                                        |
| Black-winged Kite    | Least Concern   | 175                | 4                               | 8         | 7         | 3        | 1        | 0        | 3                                  | 8         | 7         | 3        | 1        | 0        | 23                   | 22                                       |
| Black Harrier        | Endangered      | 345                | 0                               | 1         | 0         | 0        | 0        | 0        | 0                                  | 1         | 0         | 0        | 0        | 0        | 1                    | 1                                        |
| Black Sparrowhawk    | Least Concern   | 170                | 0                               | 0         | 0         | 0        | 0        | 1        | 0                                  | 0         | 0         | 0        | 0        | 1        | 1                    | 1                                        |
| Common Buzzard       | Least Concern   | 210                | 0                               | 2         | 0         | 0        | 0        | 0        | 0                                  | 2         | 0         | 0        | 0        | 0        | 2                    | 2                                        |
| Jackal Buzzard       | Least Concern   | 250                | 0                               | 0         | 1         | 0        | 0        | 0        | 0                                  | 0         | 1         | 0        | 0        | 0        | 1                    | 1                                        |
| Secretarybird        | Endangered      | 320                | 0                               | 0         | 0         | 0        | 1        | 0        | 0                                  | 0         | 0         | 0        | 1        | 0        | 1                    | 1                                        |
| Verreaux's Eagle     | Vulnerable      | 360                | 0                               | 3         | 3         | 0        | 0        | 0        | 0                                  | 3         | 3         | 0        | 0        | 0        | 6                    | 6                                        |
| Yellow-billed Stork  | Endangered      | 330                | 0                               | 1         | 0         | 0        | 0        | 0        | 0                                  | 1         | 0         | 0        | 0        | 0        | 1                    | 1                                        |
| <b>Grand Total</b>   | <b>4 SCC</b>    | <b>10 PS</b>       | <b>4</b>                        | <b>22</b> | <b>13</b> | <b>3</b> | <b>2</b> | <b>1</b> | <b>3</b>                           | <b>22</b> | <b>13</b> | <b>3</b> | <b>2</b> | <b>1</b> | <b>45</b>            | <b>44</b>                                |

<sup>17</sup> A flight can be by more than one bird (a pair or a flock).

## **APPENDIX G: Vulpro Data**

## APPENDIX H: Total Number of Birds recorded on Walked Transects (WT)

| Species                     | WT 1 | WT 2 | WT 3 | WT 4 | WT 5 | WT 6 | WT7 | Total WEF | CWT 1 | CWT 2 | Total Control |
|-----------------------------|------|------|------|------|------|------|-----|-----------|-------|-------|---------------|
| Acacia Pied Barbet          | 2    | 2    | 1    | 5    | 10   | 4    | 0   | 24        | 2     | 7     | 9             |
| African Black Duck          | 0    | 0    | 3    | 2    | 0    | 0    | 0   | 5         | 2     | 12    | 14            |
| African Black Swift         | 0    | 0    | 30   | 0    | 2    | 24   | 0   | 56        | 51    | 80    | 131           |
| African Darter              | 0    | 0    | 26   | 1    | 0    | 1    | 0   | 28        | 3     | 10    | 13            |
| African Dusky Flycatcher    | 1    | 0    | 0    | 0    | 0    | 0    | 0   | 1         | 0     | 0     | 0             |
| African Hoopoe              | 0    | 0    | 0    | 0    | 1    | 0    | 0   | 1         | 0     | 0     | 0             |
| African Paradise Flycatcher | 0    | 0    | 0    | 2    | 0    | 0    | 0   | 2         | 1     | 2     | 3             |
| African Pied Wagtail        | 0    | 0    | 0    | 0    | 6    | 0    | 0   | 6         | 0     | 0     | 0             |
| African Pipit               | 0    | 13   | 4    | 3    | 1    | 22   | 65  | 108       | 18    | 17    | 35            |
| African Red-eyed Bulbul     | 31   | 26   | 26   | 12   | 21   | 1    | 0   | 117       | 5     | 0     | 5             |
| African Sacred Ibis         | 0    | 1    | 0    | 0    | 0    | 11   | 0   | 12        | 6     | 8     | 14            |
| African Spoonbill           | 0    | 0    | 0    | 1    | 0    | 0    | 0   | 1         | 0     | 0     | 0             |
| African Stonechat           | 4    | 15   | 10   | 24   | 0    | 29   | 39  | 121       | 26    | 32    | 58            |
| African Wattled Lapwing     | 0    | 0    | 2    | 0    | 0    | 1    | 1   | 4         | 0     | 0     | 0             |
| Amethyst Sunbird            | 2    | 3    | 0    | 1    | 8    | 2    | 0   | 16        | 0     | 0     | 0             |
| Ant-eating Chat             | 12   | 6    | 6    | 5    | 0    | 84   | 3   | 116       | 8     | 52    | 60            |
| Banded Martin               | 0    | 3    | 2    | 0    | 6    | 58   | 0   | 69        | 15    | 6     | 21            |
| Barn Swallow                | 26   | 13   | 8    | 2    | 31   | 7    | 8   | 95        | 36    | 35    | 71            |
| Bar-throated Apalis         | 2    | 0    | 0    | 2    | 6    | 0    | 0   | 10        | 0     | 0     | 0             |
| Black-chested Prinia        | 29   | 13   | 29   | 20   | 18   | 5    | 6   | 120       | 7     | 26    | 33            |
| Black-collared Barbet       | 0    | 8    | 5    | 11   | 9    | 8    | 0   | 41        | 0     | 1     | 1             |
| Black-headed Canary         | 10   | 0    | 0    | 0    | 0    | 0    | 0   | 10        | 0     | 0     | 0             |
| Black-headed Heron          | 3    | 0    | 1    | 5    | 0    | 0    | 19  | 28        | 8     | 6     | 14            |
| Blacksmith Lapwing          | 17   | 2    | 0    | 16   | 14   | 15   | 21  | 85        | 21    | 9     | 30            |
| Black-throated Canary       | 0    | 4    | 26   | 12   | 35   | 12   | 12  | 101       | 0     | 19    | 19            |

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| Species                   | WT 1 | WT 2 | WT 3 | WT 4 | WT 5 | WT 6 | WT7 | Total WEF | CWT 1 | CWT 2 | Total Control |
|---------------------------|------|------|------|------|------|------|-----|-----------|-------|-------|---------------|
| Bokmakerie                | 43   | 36   | 24   | 30   | 42   | 15   | 0   | 190       | 0     | 2     | 2             |
| Bronze Mannikin           | 0    | 0    | 0    | 0    | 3    | 0    | 0   | 3         | 0     | 0     | 0             |
| Brown-crowned Tchagra     | 0    | 2    | 1    | 0    | 0    | 0    | 0   | 3         | 0     | 0     | 0             |
| Brown-throated Martin     | 4    | 1    | 18   | 12   | 39   | 24   | 9   | 107       | 7     | 34    | 41            |
| Buffy Pipit               | 0    | 1    | 0    | 0    | 0    | 2    | 5   | 8         | 0     | 0     | 0             |
| Cape Bulbul               | 0    | 0    | 2    | 2    | 2    | 3    | 0   | 9         | 0     | 0     | 0             |
| Cape Bunting              | 0    | 3    | 8    | 13   | 8    | 11   | 0   | 43        | 0     | 0     | 0             |
| Cape Canary               | 8    | 7    | 7    | 1    | 23   | 0    | 8   | 54        | 10    | 9     | 19            |
| Cape Longclaw             | 47   | 57   | 56   | 43   | 5    | 45   | 12  | 265       | 43    | 62    | 105           |
| Cape Penduline Tit        | 0    | 0    | 4    | 0    | 6    | 0    | 0   | 10        | 0     | 10    | 10            |
| Cape Robin-Chat           | 5    | 16   | 17   | 16   | 24   | 3    | 0   | 81        | 5     | 6     | 11            |
| Cape Sparrow              | 9    | 28   | 60   | 30   | 70   | 4    | 82  | 283       | 98    | 101   | 199           |
| Cape Spurfowl             | 2    | 0    | 0    | 0    | 0    | 0    | 0   | 2         | 0     | 0     | 0             |
| Cape Starling             | 45   | 48   | 17   | 44   | 73   | 9    | 0   | 236       | 9     | 28    | 37            |
| Cape Wagtail              | 11   | 10   | 15   | 7    | 13   | 3    | 25  | 84        | 6     | 30    | 36            |
| Cape Weaver               | 463  | 370  | 481  | 336  | 695  | 117  | 798 | 3260      | 472   | 1019  | 1491          |
| Cape White-eye            | 47   | 27   | 76   | 45   | 131  | 10   | 0   | 336       | 12    | 6     | 18            |
| Capped Wheatear           | 0    | 0    | 0    | 0    | 0    | 0    | 37  | 37        | 1     | 13    | 14            |
| Cardinal Woodpecker       | 0    | 0    | 0    | 0    | 7    | 0    | 0   | 7         | 0     | 0     | 0             |
| Chestnut-vented Warbler   | 7    | 8    | 4    | 5    | 6    | 0    | 0   | 30        | 0     | 0     | 0             |
| Chinspot Batis            | 0    | 2    | 2    | 0    | 0    | 2    | 0   | 6         | 0     | 0     | 0             |
| Cinnamon-breasted Bunting | 1    | 0    | 0    | 0    | 0    | 0    | 0   | 1         | 0     | 0     | 0             |
| Cloud Cisticola           | 0    | 5    | 1    | 7    | 0    | 25   | 2   | 40        | 20    | 9     | 29            |
| Common Buttonquail        | 0    | 0    | 0    | 0    | 3    | 0    | 0   | 3         | 0     | 0     | 0             |
| Common Moorhen            | 0    | 0    | 0    | 1    | 0    | 0    | 0   | 1         | 0     | 7     | 7             |
| Common Myna               | 0    | 0    | 0    | 0    | 5    | 5    | 0   | 10        | 0     | 10    | 10            |
| Common Scimitarbill       | 0    | 0    | 0    | 0    | 12   | 0    | 0   | 12        | 0     | 0     | 0             |

Uvemvane WEF 1 Scoping Phase  
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| Species                         | WT 1 | WT 2 | WT 3 | WT 4 | WT 5 | WT 6 | WT7 | Total WEF | CWT 1 | CWT 2 | Total Control |
|---------------------------------|------|------|------|------|------|------|-----|-----------|-------|-------|---------------|
| Common Starling                 | 0    | 0    | 0    | 0    | 2    | 0    | 0   | 2         | 0     | 0     | 0             |
| Common Waxbill                  | 248  | 0    | 68   | 127  | 0    | 43   | 108 | 594       | 53    | 122   | 175           |
| Crested Barbet                  | 2    | 3    | 1    | 3    | 22   | 7    | 0   | 38        | 0     | 0     | 0             |
| Crowned Lapwing                 | 2    | 85   | 48   | 17   | 8    | 35   | 30  | 225       | 24    | 30    | 54            |
| Dark-capped Bulbul              | 84   | 57   | 34   | 56   | 50   | 20   | 0   | 301       | 4     | 21    | 25            |
| Desert Cisticola                | 12   | 17   | 2    | 7    | 6    | 16   | 2   | 62        | 9     | 6     | 15            |
| Diederik Cuckoo                 | 9    | 8    | 3    | 2    | 6    | 3    | 0   | 31        | 4     | 1     | 5             |
| Eastern Clapper Lark            | 4    | 0    | 6    | 0    | 0    | 52   | 0   | 62        | 10    | 6     | 16            |
| Eastern Long-billed Lark        | 0    | 2    | 0    | 0    | 0    | 2    | 1   | 5         | 0     | 1     | 1             |
| Egyptian Goose                  | 2    | 6    | 44   | 12   | 24   | 14   | 15  | 117       | 38    | 25    | 63            |
| European Bee-eater              | 0    | 9    | 0    | 0    | 7    | 0    | 0   | 16        | 0     | 0     | 0             |
| Familiar Chat                   | 2    | 1    | 4    | 4    | 3    | 6    | 0   | 20        | 0     | 1     | 1             |
| Fan-tailed Widowbird            | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0         | 0     | 1     | 1             |
| Fiscal Flycatcher               | 6    | 14   | 14   | 12   | 15   | 10   | 3   | 74        | 2     | 3     | 5             |
| Giant Kingfisher                | 0    | 0    | 0    | 0    | 1    | 0    | 0   | 1         | 0     | 0     | 0             |
| Glossy Ibis                     | 6    | 0    | 0    | 3    | 1    | 0    | 0   | 10        | 0     | 0     | 0             |
| Goliath Heron                   | 0    | 0    | 0    | 0    | 1    | 0    | 0   | 1         | 0     | 0     | 0             |
| Greater Double-collared Sunbird | 0    | 0    | 0    | 1    | 3    | 0    | 0   | 4         | 0     | 0     | 0             |
| Greater Honeyguide              | 0    | 0    | 0    | 0    | 2    | 1    | 0   | 3         | 1     | 0     | 1             |
| Greater Striped Swallow         | 23   | 26   | 23   | 15   | 39   | 26   | 31  | 183       | 31    | 57    | 88            |
| Green Wood Hoopoe               | 0    | 0    | 0    | 0    | 16   | 0    | 0   | 16        | 0     | 0     | 0             |
| Grey Go-away-bird               | 0    | 4    | 0    | 0    | 0    | 0    | 0   | 4         | 0     | 0     | 0             |
| Grey Heron                      | 0    | 0    | 0    | 2    | 0    | 2    | 0   | 4         | 6     | 1     | 7             |
| Grey-headed Gull                | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0         | 5     | 0     | 5             |
| Hadada Ibis                     | 14   | 5    | 45   | 61   | 26   | 27   | 22  | 200       | 50    | 34    | 84            |
| Hamerkop                        | 2    | 0    | 4    | 0    | 0    | 0    | 0   | 6         | 0     | 0     | 0             |
| Helmeted Guineafowl             | 5    | 30   | 122  | 174  | 144  | 92   | 0   | 567       | 179   | 97    | 276           |

Uvemvane WEF 1 Scoping Phase  
Final Avifaunal Pre-application Monitoring  
and Site Sensitivity Verification Report

| Species                | WT 1 | WT 2 | WT 3 | WT 4 | WT 5 | WT 6 | WT7 | Total WEF | CWT 1 | CWT 2 | Total Control |
|------------------------|------|------|------|------|------|------|-----|-----------|-------|-------|---------------|
| Horus Swift            | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0         | 0     | 7     | 7             |
| House Sparrow          | 0    | 4    | 5    | 0    | 14   | 0    | 19  | 42        | 4     | 14    | 18            |
| Intermediate Egret     | 0    | 0    | 0    | 1    | 0    | 0    | 0   | 1         | 0     | 2     | 2             |
| Kalahari Scrub Robin   | 1    | 1    | 0    | 0    | 0    | 0    | 0   | 2         | 0     | 0     | 0             |
| Karoo Thrush           | 1    | 0    | 1    | 2    | 2    | 0    | 0   | 6         | 0     | 0     | 0             |
| Lark-like Bunting      | 6    | 0    | 0    | 0    | 0    | 0    | 0   | 6         | 0     | 0     | 0             |
| Laughing Dove          | 11   | 24   | 24   | 11   | 12   | 7    | 0   | 89        | 48    | 159   | 207           |
| Lazy Cisticola         | 0    | 0    | 8    | 10   | 6    | 1    | 0   | 25        | 0     | 0     | 0             |
| Lesser Grey Shrike     | 0    | 0    | 0    | 0    | 0    | 2    | 0   | 2         | 0     | 0     | 0             |
| Lesser Swamp Warbler   | 0    | 0    | 31   | 1    | 0    | 0    | 0   | 32        | 1     | 30    | 31            |
| Levaillant's Cisticola | 15   | 0    | 20   | 79   | 23   | 13   | 29  | 179       | 93    | 92    | 185           |
| Little Grebe           | 0    | 0    | 5    | 2    | 0    | 0    | 0   | 7         | 0     | 0     | 0             |
| Little Swift           | 8    | 0    | 50   | 0    | 7    | 20   | 4   | 89        | 60    | 10    | 70            |
| Long-tailed Widowbird  | 45   | 0    | 28   | 49   | 0    | 84   | 43  | 249       | 43    | 245   | 288           |
| Malachite Kingfisher   | 0    | 0    | 0    | 0    | 1    | 0    | 0   | 1         | 0     | 0     | 0             |
| Malachite Sunbird      | 3    | 4    | 6    | 2    | 2    | 0    | 0   | 17        | 0     | 0     | 0             |
| Marico Flycatcher      | 0    | 0    | 0    | 0    | 0    | 2    | 0   | 2         | 0     | 0     | 0             |
| Mountain Wheatear      | 0    | 0    | 0    | 0    | 0    | 1    | 1   | 2         | 0     | 0     | 0             |
| Namaqua Dove           | 0    | 0    | 1    | 0    | 0    | 1    | 4   | 6         | 0     | 11    | 11            |
| Neddicky               | 7    | 3    | 2    | 5    | 9    | 1    | 0   | 27        | 0     | 0     | 0             |
| Nicholson's Pipit      | 1    | 2    | 7    | 1    | 0    | 5    | 0   | 16        | 0     | 1     | 1             |
| Orange River Francolin | 11   | 15   | 1    | 3    | 3    | 2    | 1   | 36        | 34    | 24    | 58            |
| Pearl-breasted Swallow | 0    | 0    | 0    | 0    | 0    | 6    | 0   | 6         | 0     | 0     | 0             |
| Pied Avocet            | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0         | 1     | 0     | 1             |
| Pied Crow              | 0    | 0    | 0    | 1    | 2    | 0    | 0   | 3         | 2     | 0     | 2             |
| Pied Kingfisher        | 0    | 0    | 1    | 0    | 0    | 0    | 0   | 1         | 0     | 0     | 0             |
| Pied Starling          | 0    | 42   | 1    | 0    | 19   | 26   | 1   | 89        | 12    | 71    | 83            |

Uvemvane WEF 1 Scoping Phase  
Final Avifaunal Pre-application Monitoring  
and Site Sensitivity Verification Report

| Species                     | WT 1 | WT 2 | WT 3 | WT 4 | WT 5 | WT 6 | WT7  | Total WEF | CWT 1 | CWT 2 | Total Control |
|-----------------------------|------|------|------|------|------|------|------|-----------|-------|-------|---------------|
| Pink-billed Lark            | 0    | 0    | 0    | 0    | 0    | 15   | 0    | 15        | 0     | 0     | 0             |
| Pin-tailed Whydah           | 7    | 0    | 2    | 13   | 17   | 7    | 90   | 136       | 31    | 37    | 68            |
| Plain-backed Pipit          | 0    | 2    | 2    | 4    | 0    | 1    | 5    | 14        | 0     | 7     | 7             |
| Purple Heron                | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 1         | 0     | 0     | 0             |
| Quailfinch                  | 8    | 3    | 6    | 0    | 0    | 0    | 0    | 17        | 2     | 0     | 2             |
| Red-billed Quelea           | 702  | 283  | 312  | 171  | 700  | 142  | 1058 | 3368      | 114   | 943   | 1057          |
| Red-billed Teal             | 0    | 0    | 2    | 0    | 0    | 0    | 0    | 2         | 0     | 0     | 0             |
| Red-capped Lark             | 0    | 22   | 8    | 0    | 4    | 17   | 179  | 230       | 11    | 58    | 69            |
| Red-chested Cuckoo          | 1    | 1    | 0    | 0    | 0    | 0    | 0    | 2         | 0     | 0     | 0             |
| Red-collared Widowbird      | 2    | 0    | 0    | 6    | 0    | 0    | 0    | 8         | 0     | 2     | 2             |
| Red-eyed Dove               | 1    | 12   | 7    | 17   | 11   | 8    | 2    | 58        | 18    | 8     | 26            |
| Red-faced Mousebird         | 23   | 74   | 6    | 11   | 12   | 30   | 0    | 156       | 0     | 0     | 0             |
| Red-headed Finch            | 0    | 0    | 12   | 0    | 0    | 0    | 0    | 12        | 30    | 0     | 30            |
| Red-knobbed Coot            | 0    | 0    | 6    | 2    | 0    | 0    | 0    | 8         | 5     | 27    | 32            |
| Red-throated Wryneck        | 3    | 1    | 1    | 4    | 13   | 2    | 0    | 24        | 1     | 2     | 3             |
| Red-winged Francolin        | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0         | 0     | 3     | 3             |
| Red-winged Starling         | 6    | 0    | 0    | 0    | 0    | 0    | 0    | 6         | 0     | 0     | 0             |
| Reed Cormorant              | 0    | 0    | 1    | 3    | 0    | 1    | 0    | 5         | 0     | 4     | 4             |
| Ring-necked Dove            | 25   | 68   | 24   | 45   | 33   | 13   | 5    | 213       | 60    | 85    | 145           |
| Rock Kestrel                | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 1         | 0     | 0     | 0             |
| Rock Martin                 | 0    | 0    | 0    | 2    | 0    | 2    | 0    | 4         | 0     | 0     | 0             |
| Rufous-naped Lark           | 25   | 31   | 24   | 6    | 5    | 30   | 0    | 121       | 12    | 16    | 28            |
| Sabota Lark                 | 0    | 0    | 0    | 0    | 0    | 3    | 5    | 8         | 0     | 0     | 0             |
| Scaly-feathered Weaver      | 5    | 0    | 8    | 0    | 8    | 7    | 7    | 35        | 0     | 69    | 69            |
| South African Cliff Swallow | 2    | 11   | 17   | 0    | 6    | 26   | 251  | 313       | 45    | 166   | 211           |
| South African Shelduck      | 0    | 0    | 10   | 0    | 3    | 9    | 0    | 22        | 8     | 0     | 8             |
| Southern Boubou             | 0    | 2    | 0    | 0    | 0    | 0    | 0    | 2         | 0     | 0     | 0             |

Uvemvane WEF 1 Scoping Phase  
Final Avifaunal Pre-application Monitoring  
and Site Sensitivity Verification Report

| Species                      | WT 1 | WT 2 | WT 3 | WT 4 | WT 5 | WT 6 | WT7 | Total WEF | CWT 1 | CWT 2 | Total Control |
|------------------------------|------|------|------|------|------|------|-----|-----------|-------|-------|---------------|
| Southern Fiscal              | 3    | 11   | 4    | 17   | 23   | 4    | 0   | 62        | 18    | 15    | 33            |
| Southern Grey-headed Sparrow | 0    | 12   | 0    | 7    | 30   | 11   | 22  | 82        | 6     | 0     | 6             |
| Southern Masked Weaver       | 113  | 59   | 217  | 80   | 113  | 27   | 225 | 834       | 164   | 298   | 462           |
| Southern Red Bishop          | 64   | 24   | 8    | 276  | 26   | 100  | 160 | 658       | 58    | 939   | 997           |
| Speckled Mousebird           | 15   | 9    | 9    | 16   | 0    | 0    | 0   | 49        | 0     | 30    | 30            |
| Speckled Pigeon              | 43   | 30   | 29   | 106  | 46   | 48   | 394 | 696       | 80    | 53    | 133           |
| Spike-heeled Lark            | 0    | 0    | 0    | 4    | 0    | 0    | 6   | 10        | 11    | 15    | 26            |
| Spotted Thick-knee           | 0    | 5    | 0    | 0    | 0    | 0    | 4   | 9         | 1     | 0     | 1             |
| Spur-winged Goose            | 6    | 1    | 1    | 6    | 5    | 0    | 6   | 25        | 3     | 35    | 38            |
| Streaky-headed Seedeater     | 2    | 29   | 0    | 3    | 9    | 11   | 0   | 54        | 0     | 0     | 0             |
| Striated Heron               | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0         | 0     | 2     | 2             |
| Swainson's Spurfowl          | 9    | 34   | 11   | 23   | 16   | 11   | 8   | 112       | 21    | 43    | 64            |
| Swallow-tailed Bee-eater     | 0    | 8    | 0    | 0    | 0    | 0    | 0   | 8         | 0     | 9     | 9             |
| Tawny-flanked Prinia         | 2    | 0    | 0    | 0    | 0    | 0    | 0   | 2         | 0     | 0     | 0             |
| Three-banded Plover          | 0    | 0    | 0    | 0    | 2    | 0    | 0   | 2         | 0     | 2     | 2             |
| Unidentified                 | 6    | 6    | 6    | 2    | 6    | 6    | 0   | 32        | 6     | 6     | 12            |
| Village Weaver               | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0         | 3     | 0     | 3             |
| Wailing Cisticola            | 55   | 17   | 37   | 31   | 17   | 23   | 0   | 180       | 1     | 13    | 14            |
| Western Cattle Egret         | 22   | 2    | 71   | 0    | 20   | 190  | 23  | 328       | 63    | 28    | 91            |
| White-bellied Sunbird        | 0    | 6    | 1    | 1    | 0    | 0    | 0   | 8         | 0     | 0     | 0             |
| White-breasted Cormorant     | 0    | 0    | 26   | 0    | 0    | 1    | 0   | 27        | 0     | 2     | 2             |
| White-browed Sparrow-Weaver  | 0    | 55   | 6    | 13   | 113  | 34   | 0   | 221       | 25    | 2     | 27            |
| White-fronted Bee-eater      | 0    | 0    | 5    | 6    | 54   | 0    | 0   | 65        | 0     | 0     | 0             |
| White-rumped Swift           | 21   | 42   | 46   | 6    | 23   | 59   | 22  | 219       | 40    | 201   | 241           |
| White-throated Bee-eater     | 0    | 0    | 0    | 0    | 11   | 0    | 0   | 11        | 0     | 0     | 0             |
| White-throated Canary        | 0    | 0    | 0    | 0    | 0    | 0    | 14  | 14        | 2     | 0     | 2             |
| White-throated Swallow       | 3    | 18   | 5    | 1    | 4    | 10   | 1   | 42        | 1     | 1     | 2             |

Uvemvane WEF 1 Scoping Phase  
Final Avifaunal Pre-application Monitoring  
and Site Sensitivity Verification Report

| Species                  | WT 1        | WT 2        | WT 3        | WT 4        | WT 5        | WT 6        | WT7         | Total WEF    | CWT 1       | CWT 2       | Total Control |
|--------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|-------------|---------------|
| White-winged Tern        | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0            | 0           | 9           | 9             |
| White-winged Widowbird   | 0           | 0           | 0           | 0           | 0           | 0           | 0           | 0            | 0           | 4           | 4             |
| Wing-snapping Cisticola  | 0           | 0           | 2           | 0           | 0           | 3           | 0           | 5            | 0           | 0           | 0             |
| Yellow Bishop            | 0           | 9           | 0           | 40          | 0           | 0           | 0           | 49           | 30          | 120         | 150           |
| Yellow Canary            | 16          | 0           | 0           | 0           | 15          | 0           | 0           | 31           | 2           | 4           | 6             |
| Yellow-bellied Eremomela | 0           | 0           | 5           | 5           | 0           | 0           | 1           | 11           | 1           | 0           | 1             |
| Yellow-billed Duck       | 2           | 0           | 10          | 40          | 0           | 7           | 0           | 59           | 16          | 23          | 39            |
| Yellow-crowned Bishop    | 0           | 0           | 0           | 30          | 0           | 0           | 30          | 60           | 20          | 90          | 110           |
| Yellow-fronted Canary    | 22          | 33          | 17          | 9           | 29          | 0           | 6           | 116          | 15          | 6           | 21            |
| Zitting Cisticola        | 8           | 10          | 16          | 10          | 4           | 8           | 7           | 63           | 11          | 19          | 30            |
| <b>Grand Total</b>       | <b>2584</b> | <b>2022</b> | <b>2561</b> | <b>2395</b> | <b>3189</b> | <b>1955</b> | <b>3998</b> | <b>18704</b> | <b>2541</b> | <b>6136</b> | <b>8677</b>   |

## APPENDIX I: List of potential and recorded avian species in the study area

| Common Name                 | Scientific Name          | Red Data Status | Endemism | WEF Priority Score | SABAP2 | WEF Site |    |    |    |    |    | Control Site |    |    |    |    |    |
|-----------------------------|--------------------------|-----------------|----------|--------------------|--------|----------|----|----|----|----|----|--------------|----|----|----|----|----|
|                             |                          |                 |          |                    |        | S1       | S2 | S3 | S4 | S5 | S6 | S1           | S2 | S3 | S4 | S5 | S6 |
| Acacia Pied Barbet          | Tricholaema leucomelas   |                 |          |                    | 12     | X        | X  |    | X  | X  | X  |              |    |    |    | X  | X  |
| African Black Duck          | Anas sparsa              |                 |          |                    | 10.1   |          |    |    | X  | X  |    | X            | X  |    | X  | X  | X  |
| African Black Swift         | Apus barbatus            |                 |          |                    | 0.8    | X        | X  | X  |    | X  |    |              | X  |    |    | X  |    |
| African Darter              | Anhinga rufa             |                 |          |                    | 26.6   | X        | X  | X  |    | X  |    | X            | X  | X  |    | X  | X  |
| African Fish Eagle          | Haliaeetus vocifer       |                 |          | 290                | 4.1    |          |    | X  | X  |    |    |              |    |    |    |    |    |
| African Goshawk             | Accipiter tachiro        |                 |          |                    |        |          |    |    | X  |    |    |              |    |    |    |    |    |
| African Harrier-Hawk        | Polyboroides typus       |                 |          | 190                | 0.4    | X        |    |    |    |    |    |              |    | X  |    |    | X  |
| African Hoopoe              | Upupa africana           |                 |          |                    | 13.9   | X        |    |    |    | X  |    |              |    |    |    |    |    |
| African Jacana              | Actophilornis africanus  |                 |          |                    | 0.4    |          |    |    |    |    |    |              |    |    |    |    |    |
| African Marsh-harrier       | Circus ranivorus         | EN, LC          |          | 300                | 0.4    |          | X  |    |    |    |    |              |    |    |    |    |    |
| African Olive-pigeon        | Columba arquatrix        |                 |          |                    | 0.8    |          |    |    |    |    |    |              |    |    |    |    |    |
| African Palm-swift          | Cypsiurus parvus         |                 |          |                    | 15     |          |    |    |    |    | X  |              |    |    |    |    |    |
| African Paradise Flycatcher | Terpsiphone viridis      |                 |          |                    | 4.1    |          | X  |    |    |    |    |              | X  |    |    |    |    |
| African Pipit               | Anthus cinnamomeus       |                 |          |                    | 56.6   | X        |    |    | X  |    | X  | X            | X  | X  | X  | X  | X  |
| African Quailfinch          | Ortygospiza atricollis   |                 |          |                    | 19.9   |          | X  | X  | X  | X  | X  | X            | X  | X  |    |    |    |
| African Rail                | Rallus caerulescens      |                 |          |                    | 0.8    |          |    |    |    |    |    |              |    |    |    |    |    |
| African Red-eyed Bulbul     | Pycnonotus nigricans     |                 |          |                    | 30.7   | X        | X  | X  | X  | X  | X  |              |    |    |    |    |    |
| African Rock Pipit          | Anthus crenatus          | NT, LC          | SLS      | 200                | 1.5    |          |    |    |    |    |    |              |    |    |    |    |    |
| African Sacred Ibis         | Threskiornis aethiopicus |                 |          |                    | 31.1   |          | X  | X  |    | X  | X  | X            | X  |    | X  |    |    |
| African Snipe               | Gallinago nigripennis    |                 |          |                    | 15.4   |          |    |    |    | X  |    |              |    |    |    |    |    |
| African Spoonbill           | Platalea alba            |                 |          |                    | 13.1   | X        | X  | X  | X  | X  |    |              |    | X  | X  |    | X  |
| African Stonechat           | Saxicola torquatus       |                 |          |                    | 88     | X        |    | X  | X  | X  |    | X            | X  | X  | X  | X  | X  |
| African Wattled Lapwing     | Vanellus senegallus      |                 |          |                    | 18.4   |          |    | X  |    | X  |    | X            | X  |    |    |    |    |
| Alpine Swift                | Tachymarptis melba       |                 |          |                    | 0.8    |          |    |    |    |    |    |              |    |    |    |    |    |
| Amethyst Sunbird            | Chalcomitra amethystina  |                 |          |                    | 4.1    | X        |    | X  |    | X  |    |              |    |    |    |    |    |

Uvemvane WEF Pre-application Bird Monitoring  
Final Monitoring Report

| Common Name               | Scientific Name           | Red Data Status | Endemism | WEF Priority Score | SABAP2 | WEF Site |    |    |    |    |    | Control Site |    |    |    |    |    |
|---------------------------|---------------------------|-----------------|----------|--------------------|--------|----------|----|----|----|----|----|--------------|----|----|----|----|----|
|                           |                           |                 |          |                    |        | S1       | S2 | S3 | S4 | S5 | S6 | S1           | S2 | S3 | S4 | S5 | S6 |
| Amur Falcon               | Falco amurensis           |                 |          | 210                | 19.1   |          | X  |    |    |    |    |              | X  |    |    |    |    |
| Ant-eating Chat           | Myrmecocichla formicivora |                 |          |                    | 52.4   | X        | X  | X  | X  | X  | X  | X            |    | X  | X  | X  | X  |
| Arrow-marked Babbler      | Turdoides jardineii       |                 |          |                    | 0.4    |          |    |    |    |    |    |              |    |    |    |    |    |
| Ashy Tit                  | Melaniparus cinerascens   |                 |          |                    | 0.8    |          |    |    |    |    |    |              |    |    |    |    |    |
| Banded Martin             | Riparia cincta            |                 |          |                    | 13.1   | X        | X  | X  |    |    | X  |              |    | X  |    |    |    |
| Barn Owl                  | Tyto alba                 |                 |          |                    |        |          |    |    |    |    | X  |              |    |    |    |    |    |
| Barn Swallow              | Hirundo rustica           |                 |          |                    | 42     | X        | X  |    |    |    | X  | X            | X  |    |    |    | X  |
| Bar-throated Apalis       | Apalis thoracica          |                 |          |                    | 9.4    |          | X  | X  | X  |    | X  |              |    |    |    |    |    |
| Black Crane               | Zapornia flavirostra      |                 |          |                    | 3.8    |          |    |    |    |    |    |              |    |    |    |    |    |
| Black Cuckooshrike        | Campephaga flava          |                 |          |                    | 0.4    |          |    |    |    |    |    |              |    |    |    |    |    |
| Black Harrier             | Circus maurus             | EN, EN          | NE       | 345                |        |          |    |    |    |    |    |              | X  |    |    |    |    |
| Black Heron               | Egretta ardesiaca         |                 |          |                    | 1.1    |          |    |    |    |    |    |              |    |    |    |    |    |
| Black Kite                | Milvus migrans            |                 |          | 220                | 0.4    |          |    |    |    |    |    |              |    |    |    |    |    |
| Black Sparrowhawk         | Accipiter melanoleucus    |                 |          | 170                | 2.6    |          | X  |    | X  | X  |    |              |    |    |    |    | X  |
| Black Stork               | Ciconia nigra             | VU, LC          |          | 330                |        |          |    |    |    | X  |    |              |    |    |    |    |    |
| Black-chested Prinia      | Prinia flavicans          |                 |          |                    | 53.6   | X        | X  | X  | X  | X  | X  | X            | X  | X  | X  | X  | X  |
| Black-chested Snake Eagle | Circaetus pectoralis      |                 |          | 230                | 0.8    |          |    |    |    | X  |    |              |    |    |    |    |    |
| Black-collared Barbet     | Lybius torquatus          |                 |          |                    | 34.8   | X        | X  | X  | X  | X  | X  |              |    |    |    |    |    |
| Black-crowned Night Heron | Nycticorax nycticorax     |                 |          |                    | 1.9    |          |    |    |    |    |    |              |    |    |    |    |    |
| Black-crowned Tchagra     | Tchagra senegalus         |                 |          |                    |        |          |    |    |    |    | X  |              |    |    |    |    |    |
| Black-eared Sparrow-Lark  | Eremopterix australis     |                 | NE       |                    |        | X        |    |    |    |    |    |              |    |    |    |    |    |
| Black-faced Waxbill       | Brunhilda erythronotos    |                 |          |                    | 0.4    |          |    |    |    |    |    |              |    |    |    |    |    |
| Black-headed Canary       | Serinus alario            |                 | NE       |                    |        |          |    |    |    | X  |    |              |    |    |    |    |    |
| Black-headed Heron        | Ardea melanocephala       |                 |          |                    | 64     | X        | X  | X  |    | X  | X  | X            | X  |    | X  | X  | X  |
| Black-headed Oriole       | Oriolus larvatus          |                 |          |                    | 1.1    |          |    |    |    |    |    |              |    |    |    |    |    |
| Black-shouldered Kite     | Elanus caeruleus          |                 |          | 175                | 75.3   | X        | X  | X  | X  | X  | X  | X            | X  |    | X  | X  |    |
| Blacksmith Lapwing        | Vanellus armatus          |                 |          |                    | 88.4   | X        | X  | X  |    | X  | X  |              | X  | X  | X  | X  | X  |

# Uvemvane WEF Pre-application Bird Monitoring Final Monitoring Report

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| Common Name                     | Scientific Name               | Red Data Status | Endemism | WEF Priority Score | SABAP2 | WEF Site |    |    |    |    |    | Control Site |    |    |    |    |    |
|---------------------------------|-------------------------------|-----------------|----------|--------------------|--------|----------|----|----|----|----|----|--------------|----|----|----|----|----|
|                                 |                               |                 |          |                    |        | S1       | S2 | S3 | S4 | S5 | S6 | S1           | S2 | S3 | S4 | S5 | S6 |
| Goliath Heron                   | Ardea goliath                 |                 |          |                    | 4.1    |          |    |    |    |    |    |              |    |    |    |    |    |
| Great Crested Grebe             | Podiceps cristatus            |                 |          |                    | 2.3    |          |    |    |    |    |    |              |    |    |    |    |    |
| Great Egret                     | Ardea alba                    |                 |          |                    | 4.9    | X        | X  |    |    |    |    |              |    |    |    |    |    |
| Greater Double-collared Sunbird | Cinnyris afer                 |                 | SLS      |                    | 1.1    | X        | X  |    | X  |    |    |              |    |    |    |    |    |
| Greater Flamingo                | Phoenicopterus roseus         | NT, LC          |          | 290                | 3.4    |          |    | X  |    |    |    |              |    |    |    |    |    |
| Greater Honeyguide              | Indicator indicator           |                 |          |                    | 2.3    |          |    |    |    | X  |    |              |    |    |    |    | X  |
| Greater Kestrel                 | Falco rupicoloides            |                 |          | 174                | 0.8    |          |    |    |    |    |    |              |    |    |    |    |    |
| Greater Striped Swallow         | Cecropis cucullata            |                 |          |                    | 57.3   | X        | X  | X  |    |    | X  |              | X  | X  |    |    |    |
| Green Wood-hoopoe               | Phoeniculus purpureus         |                 |          |                    | 13.5   |          |    |    | X  |    | X  |              |    |    |    |    |    |
| Green-backed (Striated) Heron   | Butorides striata             |                 |          |                    | 1.1    |          |    |    |    |    |    |              | X  |    |    |    |    |
| Green-winged Pytilia            | Pytilia melba                 |                 |          |                    | 1.5    |          |    |    |    |    |    |              |    |    |    |    |    |
| Grey Go-away-bird               | Crinifer concolor             |                 |          |                    | 1.5    | X        |    |    | X  |    |    |              |    |    |    |    |    |
| Grey Heron                      | Ardea cinerea                 |                 |          |                    | 24.7   | X        | X  | X  |    | X  |    | X            | X  | X  | X  | X  | X  |
| Grey-backed Sparrow-lark        | Eremopterix verticalis        |                 |          |                    | 0.4    |          |    |    |    |    |    |              |    |    |    |    |    |
| Grey-headed Gull                | Chroicocephalus cirrocephalus |                 |          |                    | 5.2    |          |    | X  |    |    |    |              | X  |    | X  |    |    |
| Grey-winged Francolin           | Scleroptila afra              |                 | SLS      | 190                |        |          |    | X  |    |    |    | X            |    |    |    | X  |    |
| Hadedda Ibis                    | Bostrychia hagedash           |                 |          |                    | 82.8   | X        | X  | X  |    | X  | X  | X            | X  | X  | X  | X  |    |
| Hamerkop                        | Scopus umbretta               |                 |          |                    | 9.4    | X        |    |    | X  | X  |    |              |    |    |    |    |    |
| Helmeted Guineafowl             | Numida meleagris              |                 |          |                    | 69.7   | X        |    | X  | X  | X  | X  | X            | X  | X  |    | X  | X  |
| Horus Swift                     | Apus horus                    |                 |          |                    | 2.6    |          |    | X  |    |    |    | X            |    |    |    |    |    |
| House Sparrow                   | Passer domesticus             |                 |          |                    | 48.3   | X        | X  | X  | X  | X  |    |              |    |    |    |    | X  |
| Jackal Buzzard                  | Buteo rufofuscus              |                 | NE       | 250                | 4.1    |          | X  | X  |    |    |    |              |    |    |    |    |    |
| Jacobin Cuckoo                  | Clamator jacobinus            |                 |          |                    | 0.4    |          |    |    |    |    |    |              |    |    |    |    |    |
| Jameson's Firefinch             | Lagonosticta rhodopareia      |                 |          |                    | 0.4    |          |    |    |    |    |    |              |    |    |    |    |    |
| Kalahari Scrub Robin            | Cercotrichas paena            |                 |          |                    |        |          |    | X  | X  |    |    |              |    |    |    |    |    |
| Karoo Thrush                    | Turdus smithi                 |                 | NE       |                    | 20.6   | X        | X  |    |    | X  |    |              |    |    |    |    |    |
| Kittlitz's Plover               | Charadrius pecuarius          |                 |          |                    | 0.8    |          |    |    |    |    | X  |              |    |    |    |    |    |

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|------------------------|-----------------------------|-----------------|----------|--------------------|--------|----------|----|----|----|----|----|--------------|----|----|----|----|----|
|                        |                             |                 |          |                    |        | S1       | S2 | S3 | S4 | S5 | S6 | S1           | S2 | S3 | S4 | S5 | S6 |
| Knob-billed Duck       | Sarkidiornis melanotos      |                 |          |                    | 1.5    |          |    |    |    |    |    |              |    |    |    |    |    |
| Kurrichane Thrush      | Turdus libonyana            |                 |          |                    | 1.5    |          |    |    |    |    |    |              |    |    |    |    |    |
| Lanner Falcon          | Falco biarmicus             | VU, LC          |          | 300                | 1.5    | X        |    | X  | X  | X  | X  |              |    | X  |    |    |    |
| Laughing Dove          | Spilopelia senegalensis     |                 |          |                    | 97     | X        | X  | X  |    | X  | X  | X            |    | X  | X  | X  | X  |
| Lazy Cisticola         | Cisticola aberrans          |                 |          |                    | 2.3    | X        | X  |    | X  |    |    |              |    |    |    |    |    |
| Lesser Flamingo        | Phoeniconaias minor         | NT, NT          |          | 290                |        |          |    |    |    |    |    |              |    |    |    |    | X  |
| Lesser Grey Shrike     | Lanius minor                |                 |          |                    | 0.8    |          |    | X  |    |    |    |              |    |    |    |    |    |
| Lesser Honeyguide      | Indicator minor             |                 |          |                    | 1.9    |          |    |    |    |    |    |              |    |    |    |    |    |
| Lesser Kestrel         | Falco naumanni              |                 |          | 214                | 0.4    |          |    |    |    |    |    |              |    |    |    |    |    |
| Lesser Striped Swallow | Cecropis abyssinica         |                 |          |                    | 1.1    |          |    |    |    |    |    |              |    |    |    |    | X  |
| Lesser Swamp-warbler   | Acrocephalus gracilirostris |                 |          |                    | 21.7   |          |    |    |    | X  | X  |              |    | X  | X  | X  | X  |
| Levaillant's Cisticola | Cisticola tinniens          |                 |          |                    | 77.5   | X        |    | X  |    | X  | X  | X            | X  | X  | X  | X  | X  |
| Lilac-breasted Roller  | Coracias caudatus           |                 |          |                    | 0.4    |          |    |    |    |    |    |              |    |    |    |    |    |
| Little Bittern         | Ixobrychus minutus          |                 |          |                    | 0.8    |          |    |    |    |    |    |              |    |    |    |    |    |
| Little Egret           | Egretta garzetta            |                 |          |                    | 10.5   | X        |    |    |    |    |    |              |    |    |    |    |    |
| Little Grebe           | Tachybaptus ruficollis      |                 |          |                    | 47.2   | X        | X  |    |    |    | X  | X            | X  | X  |    | X  | X  |
| Little Rush-warbler    | Bradypterus baboecala       |                 |          |                    | 1.5    |          |    |    |    |    |    |              |    |    |    |    |    |
| Little Sparrowhawk     | Accipiter minullus          |                 |          |                    |        | X        | X  | X  | X  | X  |    |              |    |    |    |    |    |
| Little Stint           | Calidris minuta             |                 |          |                    | 3.8    |          |    |    |    |    |    |              |    |    |    |    |    |
| Little Swift           | Apus affinis                |                 |          |                    | 30.3   | X        |    |    |    |    |    |              |    | X  |    |    | X  |
| Long-billed crombec    | Sylvietta rufescens         |                 |          |                    |        |          |    |    |    | X  |    |              |    |    |    |    |    |
| Long-billed Pipit      | Anthus nicholsoni           |                 |          |                    | 4.9    | X        |    |    | X  | X  |    |              |    |    | X  |    |    |
| Long-crested Eagle     | Lophaetus occipitalis       |                 |          | 190                | 0.8    | X        |    |    |    |    |    |              |    |    |    |    |    |
| Long-tailed Widowbird  | Euplectes progne            |                 |          |                    | 80.2   |          | X  | X  |    | X  |    | X            | X  |    | X  | X  |    |
| Maccoa Duck            | Oxyura maccoa               | NT, VU          |          |                    | 0      |          |    |    |    |    |    |              |    |    |    |    |    |
| Malachite Kingfisher   | Corythornis cristatus       |                 |          |                    | 10.1   |          |    |    |    |    |    |              |    |    |    |    |    |
| Malachite Sunbird      | Nectarinia famosa           |                 |          |                    | 12     | X        | X  | X  | X  | X  | X  |              |    |    |    |    |    |

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|-------------------------|------------------------------|-----------------|----------|--------------------|--------|----------|----|----|----|----|----|--------------|----|----|----|----|----|
|                         |                              |                 |          |                    |        | S1       | S2 | S3 | S4 | S5 | S6 | S1           | S2 | S3 | S4 | S5 | S6 |
| Mallard Duck            | Anas platyrhynchos           |                 |          |                    | 0.4    |          |    |    |    |    |    |              |    |    |    |    |    |
| Marsh Owl               | Asio capensis                |                 |          | 190                | 4.5    |          |    |    |    |    |    |              |    |    |    | X  |    |
| Marsh Sandpiper         | Tringa stagnatilis           |                 |          |                    | 0.8    |          |    |    |    |    |    |              |    |    |    |    |    |
| Melodious Lark          | Mirafraga cheniana           |                 | NE       | 180                | 0.4    | X        |    |    |    |    |    |              |    |    |    |    |    |
| Mocking Cliff Chat      | Thamnolaea cinnamomeiventris |                 |          |                    | 14.6   | X        | X  |    | X  | X  |    |              |    |    |    |    |    |
| Mountain Wheatear       | Myrmecocichla monticola      |                 |          |                    | 15.4   |          | X  |    |    | X  | X  |              |    |    |    |    |    |
| Namaqua Dove            | Oena capensis                |                 |          |                    | 13.9   | X        | X  | X  | X  | X  | X  | X            |    |    | X  |    |    |
| Natal Spurfowl          | Pternistis natalensis        |                 |          |                    | 0.8    |          |    |    |    |    |    |              |    |    |    |    |    |
| Neddicky                | Cisticola fulvicapilla       |                 |          |                    | 27.7   | X        | X  | X  | X  |    | X  |              |    |    | X  |    |    |
| Northern Black Korhaan  | Afrotis afraoides            |                 |          | 180                | 20.6   | X        | X  |    |    |    | X  |              |    |    |    |    |    |
| Orange River Francolin  | Scleroptila gutturalis       |                 |          |                    | 12     | X        | X  |    |    | X  | X  | X            | X  | X  | X  | X  |    |
| Orange River White-eye  | Zosterops pallidus           |                 |          |                    | 0.4    |          |    |    |    |    |    |              |    |    |    |    |    |
| Orange-breasted Waxbill | Amandava subflava            |                 |          |                    | 6.7    |          |    |    |    |    |    |              |    |    |    |    |    |
| Ovambo Sparrowhawk      | Accipiter ovampensis         |                 |          |                    | 0      |          |    |    |    |    |    |              |    |    |    |    |    |
| Pearl-breasted Swallow  | Hirundo dimidiata            |                 |          |                    | 1.1    |          |    | X  |    |    |    |              |    | X  |    |    |    |
| Pied Avocet             | Recurvirostra avosetta       |                 |          |                    | 0.8    |          |    |    |    |    |    |              |    |    |    |    |    |
| Pied Crow               | Corvus albus                 |                 |          |                    | 3.4    |          | X  | X  | X  | X  | X  |              | X  |    |    |    |    |
| Pied Kingfisher         | Ceryle rudis                 |                 |          |                    | 10.5   |          |    |    |    | X  |    |              |    |    |    |    |    |
| Pied Starling           | Lamprotornis bicolor         |                 | SLS      |                    | 28.8   | X        | X  | X  | X  | X  | X  |              | X  | X  |    | X  |    |
| Pink-billed Lark        | Spizocorys conirostris       |                 |          |                    | 0.4    |          |    | X  | X  | X  | X  |              |    |    |    |    |    |
| Pin-tailed Whydah       | Vidua macroura               |                 |          |                    | 49.1   | X        |    | X  | X  | X  | X  | X            | X  | X  | X  |    | X  |
| Plain-backed Pipit      | Anthus leucophrys            |                 |          |                    | 1.1    | X        |    |    | X  | X  |    |              | X  |    |    |    |    |
| Purple Heron            | Ardea purpurea               |                 |          |                    | 4.5    |          |    |    | X  |    | X  |              |    |    |    |    |    |
| Red-backed Shrike       | Lanius collurio              |                 |          |                    | 3.4    |          |    |    |    |    |    |              |    |    |    |    |    |
| Red-billed Firefinch    | Lagonosticta senegala        |                 |          |                    | 0.8    |          |    |    |    |    |    |              |    |    |    |    |    |
| Red-billed Quelea       | Quelea quelea                |                 |          |                    | 60.3   |          |    | X  |    | X  |    |              | X  | X  |    | X  | X  |
| Red-billed Teal         | Anas erythrorhynchos         |                 |          |                    | 26.6   | X        |    |    |    |    | X  |              | X  |    |    |    | X  |

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|                                |                           |                 |          |                    |        | S1       | S2 | S3 | S4 | S5 | S6 | S1           | S2 | S3 | S4 | S5 | S6 |
| Red-breasted Swallow           | Cecropis semirufa         |                 |          |                    |        |          |    | X  |    |    |    |              |    |    |    |    |    |
| Red-capped Lark                | Calandrella cinerea       |                 |          |                    | 35.2   | X        | X  |    | X  | X  | X  | X            | X  | X  | X  | X  | X  |
| Red-chested Cuckoo             | Cuculus solitarius        |                 |          |                    | 6.4    | X        |    |    |    |    | X  |              |    |    |    |    |    |
| Red-chested Flufftail          | Sarothrura rufa           |                 |          |                    | 0.8    |          |    |    |    |    |    |              |    |    |    |    |    |
| Red-collared Widowbird         | Euplectes ardens          |                 |          |                    | 23.2   | X        | X  | X  |    | X  |    |              | X  |    |    |    |    |
| Red-eyed Dove                  | Streptopelia semitorquata |                 |          |                    | 71.9   | X        | X  | X  |    | X  | X  | X            |    | X  | X  | X  | X  |
| Red-faced Mousebird            | Urocolius indicus         |                 |          |                    | 25.5   | X        | X  | X  | X  | X  | X  |              |    |    |    |    |    |
| Red-footed Falcon              | Falco vespertinus         | NT, NT          |          | 174                | 1.5    |          | X  |    |    |    |    |              |    |    |    |    |    |
| Red-headed Finch               | Amadina erythrocephala    |                 |          |                    | 7.1    |          |    |    |    | X  |    | X            |    |    |    |    |    |
| Red-knobbed coot               | Fulica cristata           |                 |          |                    | 70.8   | X        | X  |    |    | X  |    | X            | X  | X  | X  | X  | X  |
| Red-throated Wryneck           | Jynx ruficollis           |                 |          |                    | 22.1   | X        | X  | X  | X  | X  | X  |              |    | X  |    |    |    |
| Red-winged Francolin           | Scleroptila levallantii   |                 |          |                    | 1.1    |          |    |    |    | X  |    |              |    |    |    | X  |    |
| Red-winged Starling            | Onychognathus morio       |                 |          |                    | 3.4    | X        |    |    | X  |    |    | X            |    |    |    |    |    |
| Reed Cormorant                 | Microcarbo africanus      |                 |          |                    | 55.4   |          |    | X  |    |    |    | X            | X  |    |    |    |    |
| Rock Dove                      | Columba livia             |                 |          |                    | 18.4   |          |    |    |    |    |    |              |    |    |    |    |    |
| Rock Kestrel                   | Falco rupicolus           |                 |          |                    | 3      |          |    |    | X  |    |    |              |    |    | X  | X  |    |
| Rock Martin                    | Ptyonoprogne fuligula     |                 |          |                    | 13.9   | X        |    | X  | X  | X  | X  |              |    |    |    | X  |    |
| Ruff                           | Calidris pugnax           |                 |          |                    | 4.9    |          |    |    |    |    |    |              |    |    |    |    |    |
| Rufous-chested Sparrowhawk     | Accipiter rufiventris     |                 |          | 170                |        |          |    |    | X  |    |    |              |    |    |    |    |    |
| Rufous-naped Lark              | Mirafra africana          |                 |          |                    | 44.9   | X        |    | X  | X  | X  | X  | X            | X  |    | X  | X  | X  |
| Sabota Lark                    | Calendulauda sabota       |                 |          |                    |        |          |    |    |    | X  | X  |              |    |    |    | X  |    |
| Scaly-feathered Finch (Weaver) | Sporopipes squamifrons    |                 |          |                    |        |          | X  |    | X  | X  | X  |              | X  |    |    |    | X  |
| Secretarybird                  | Sagittarius serpentarius  | VU, EN          |          | 320                | 2.3    |          |    | X  |    | X  |    |              |    |    |    | X  |    |
| Shelley's Francolin            | Scleroptila shelleyi      |                 |          |                    |        |          |    |    |    |    | X  |              |    |    |    |    |    |
| Sickle-winged Chat             | Emarginata sinuata        |                 | NE       |                    | 0.4    |          |    |    |    |    |    |              |    |    |    |    |    |
| South African Cliff Swallow    | Petrochelidon spilodera   |                 | BNE      |                    | 31.5   |          | X  | X  |    | X  | X  | X            | X  | X  |    |    | X  |
| South African Shelduck         | Tadorna cana              |                 |          |                    | 4.1    | X        |    | X  | X  |    |    | X            | X  |    | X  | X  | X  |

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|-----------------------------|--------------------------|-----------------|----------|--------------------|--------|----------|----|----|----|----|----|--------------|----|----|----|----|----|
|                             |                          |                 |          |                    |        | S1       | S2 | S3 | S4 | S5 | S6 | S1           | S2 | S3 | S4 | S5 | S6 |
| Wailing Cisticola           | Cisticola lais           |                 |          |                    | 24.3   |          | X  | X  | X  | X  | X  |              | X  |    | X  | X  |    |
| Water Thick-knee            | Burhinus vermiculatus    |                 |          |                    | 0.4    |          |    |    |    |    |    |              |    |    |    |    |    |
| Wattled Starling            | Creatophora cinerea      |                 |          |                    | 16.5   | X        |    |    |    |    |    |              |    |    |    |    |    |
| Whiskered Tern              | Chlidonias hybrida       |                 |          |                    | 18     |          |    |    |    |    |    |              | X  |    |    |    |    |
| White Stork                 | Ciconia ciconia          |                 |          | 220                | 4.1    |          |    |    |    |    |    |              |    |    |    |    |    |
| White-backed Duck           | Thalassornis leuconotus  |                 |          |                    | 2.6    |          | X  |    |    |    |    |              | X  |    |    |    |    |
| White-bellied Sunbird       | Cinnyris talatala        |                 |          |                    | 10.5   | X        | X  | X  | X  | X  | X  |              |    |    |    |    |    |
| White-breasted Cormorant    | Phalacrocorax lucidus    |                 |          |                    | 12     |          | X  | X  |    | X  |    |              |    |    |    | X  |    |
| White-browed Sparrow-Weaver | Plocepasser mahali       |                 |          |                    | 79.8   | X        | X  | X  | X  | X  | X  |              |    | X  |    |    |    |
| White-faced Duck            | Dendrocygna viduata      |                 |          |                    | 10.1   | X        |    |    |    |    |    | X            | X  |    |    |    |    |
| White-fronted Bee-eater     | Merops bullockoides      |                 |          |                    | 13.1   | X        | X  | X  | X  |    | X  |              |    |    |    |    |    |
| White-rumped Swift          | Apus caffer              |                 |          |                    | 42     | X        | X  | X  |    |    | X  |              | X  | X  |    |    | X  |
| White-throated Bee-eater    | Merops albicollis        |                 |          |                    |        |          |    |    |    | X  |    |              |    |    |    |    |    |
| White-throated Canary       | Crithagra albogularis    |                 |          |                    |        |          |    |    |    |    |    |              |    |    |    |    | X  |
| White-throated Swallow      | Hirundo albigularis      |                 |          |                    | 38.6   | X        | X  | X  | X  |    | X  | X            | X  |    |    |    | X  |
| White-winged Tern           | Chlidonias leucopterus   |                 |          |                    | 4.1    |          |    |    |    |    | X  |              | X  |    |    |    |    |
| White-winged Widowbird      | Euplectes albonotatus    |                 |          |                    | 18.4   |          |    |    |    |    |    |              | X  |    |    |    |    |
| Willow Warbler              | Phylloscopus trochilus   |                 |          |                    | 5.2    |          |    |    |    |    |    |              |    |    |    |    |    |
| Wing-snapping Cisticola     | Cisticola ayresii        |                 |          |                    | 11.2   |          | X  |    |    | X  |    |              |    |    |    |    |    |
| Wood Sandpiper              | Tringa glareola          |                 |          |                    | 4.5    |          |    |    |    |    |    |              |    |    |    |    |    |
| Yellow Bishop               | Euplectes capensis       |                 |          |                    | 1.1    | X        | X  |    |    |    | X  |              |    |    |    |    |    |
| Yellow Canary               | Crithagra flaviventris   |                 |          |                    | 27.7   | X        | X  |    |    | X  |    | X            |    |    |    |    |    |
| Yellow-bellied Eremomela    | Eremomela icteropygialis |                 |          |                    |        |          |    | X  |    |    |    |              |    |    |    |    |    |
| Yellow-billed Duck          | Anas undulata            |                 |          |                    | 61.1   |          | X  |    |    | X  | X  | X            | X  | X  | X  | X  | X  |
| Yellow-billed Egret         | Ardea intermedia         |                 |          |                    | 9.4    | X        | X  | X  |    |    |    |              |    |    |    |    | X  |
| Yellow-billed Kite          | Milvus aegyptius         |                 |          |                    | 0.4    |          |    |    |    |    | X  |              |    |    |    |    | X  |
| Yellow-billed Stork         | Mycteria ibis            | EN, LC          |          | 330                | 0.4    |          |    |    |    |    | X  |              | X  |    |    |    |    |

Uvemvane WEF Pre-application Bird Monitoring  
Final Monitoring Report

| Common Name              | Scientific Name        | Red Data Status | Endemism | WEF Priority Score | SABAP2 | WEF Site |    |    |    |    |    | Control Site |    |    |    |    |    |
|--------------------------|------------------------|-----------------|----------|--------------------|--------|----------|----|----|----|----|----|--------------|----|----|----|----|----|
|                          |                        |                 |          |                    |        | S1       | S2 | S3 | S4 | S5 | S6 | S1           | S2 | S3 | S4 | S5 | S6 |
| Yellow-crowned Bishop    | Euplectes afer         |                 |          |                    | 30     | X        |    |    |    |    |    |              | X  |    |    |    | X  |
| Yellow-fronted Canary    | Crithagra mozambica    |                 |          |                    | 10.9   | X        | X  |    | X  | X  | X  |              |    |    |    | X  |    |
| Yellow-throated Petronia | Gymnoris superciliaris |                 |          |                    | 0.8    |          |    |    |    |    |    |              |    |    |    |    |    |
| Zitting Cisticola        | Cisticola juncidis     |                 |          |                    | 37.5   | X        | X  | X  |    | X  |    |              | X  |    | X  | X  | X  |

## **APPENDIX J: Specialist CV and Qualifications**

## **APPENDIX K: Impact Assessment Methodology**

# Appendix C.6

**BATS SSVR**



## Bat Site Sensitivity Verification Report for the proposed ABO Uvemvane Wind Energy Facility 1 in Mpumalanga and Gauteng, South Africa

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