**Personal observations**

Table 4 below shows the results of the point counts conducted in the study area during the site visit. Three (3) Observation Points (OP) were randomly chosen, all in the near vicinity of the proposed project. A 30-min point count was conducted at each OP, recording all species seen or heard, as well as the numbers thereof. The location of these point counts can be seen in Figure 2 above. Data from this table needs to be used with caution, as observations over such a short period, in one season, and in fairly similar weather conditions cannot be taken as a true indication of the presence of bird species in the area. In particular, the target species for this study are threatened, rare species, so the likelihood of seeing one during a point count is limited. This study has therefore attached far more weight to the secondary data sources such as the bird atlas projects (SABAP1 and SABAP2) which collected data over a far longer period, and more diverse conditions. It must be noted that many "non Red Data" bird species also occur in the study area and could be impacted on. Although this impact assessment focuses on Red Data species, the impact on non Red Data species is also assessed, albeit in less detail. Furthermore, much of the mitigation recommended for Red Data species will also protect non Red Data species in the study area.

Table 4: Results of the Point Count exercise, as well as species observed incidentally on site during the site visit.

| *Observation Point* | **OP 1** | **OP 2** | **OP 3** | **Incidental** |
|---|---|---|---|---|
| *Predominant habitat* | *Grassland and drainage line* | *Cultivate lands and dam.* | *Dam* | |
| **Specie observed:** | | | | |
| Cape Turtle Dove | 2 | H | | X |
| Red-eyed Dove | | H | | |
| Cape Crow | 2 | | | |
| Helmeted Guinaefowl | | | 7 | X |
| Village Weaver | 8 | | | |
| African Stonechat | 3 | 1 | | |
| Redcollared Widowbird | 4 | | | |
| Egyptian Goose | 4 | | 5 | |
| Blacksmith Lapwing | 2 | | | X |
| Common Fiscal | 1 | 1 | | X |
| Cape Sparrow | | 4 | | X |
| African Fish Eagle | | 1 | | |
| Blackthroated Canary | | 2 | | |
| Levaillant's Cisticola | | | 2 | X |
| Grey Heron | | 1 | | |
| Reed Cormorant | | | 1 | |
| White-breasted Cormorant | | | 4 | |
| Redknobbed Coot | | | 3 | X |
| South African Shelduck | | | 2 | |
| Greater Flamingo | | | 17 | |
| Lesser Flamingo | | | 8 | |
| Hadeda Ibis | | | | X |
| African Sacred Ibis | | | | X |
| Black-winged Stilt | | | | X |
| Black-shouldered Kite | | | | X |
| Greater Kestrel | | | | X |
| Tawny-flanked Prinia | | | | X |
| Swainson's Spurfowl | | | | X |
| Long-tailed Widowbird | | | | X |
| Red-capped Lark | | | | X |
| Black-headed Heron | | | | X |
| Laughing Dove | | | | X |
| Crowned Lapwing | | | | X |
| Rock Kestrel | | | | X |

*The figures in the table refer to the number of individuals of that particular species recorded during the point count H = Heard and therefore number unknown. X = species recorded in study area, outside of point count time frames, but numbers not recorded.*

**Focal Species List**

The focal species for this study, i.e. the most important species to be considered, will be updated following more detailed site investigations during the EIA phase of the project. At this stage, after examining all the above data sources, the resultant list of 'focal species' is as follows: **Blue Korhaan, Blue Crane, Southern Bald Ibis, Greater Flamingo, Lesser Flamingo, Secretary Bird, White Stork, Pallid Harrier, Lesser Kestrel, Caspian Tern**

**and Botha's Lark.** In some cases, these species serve as surrogates for other similar species (as mitigation will be effective for both), examples being White Stork for Yellow-billed Stork and Lesser Kestrel for Lanner Falcon. Assorted more common species will also be relevant to this study, but it is believed that the above focal species will to a large extent serve as surrogates for these in terms of impact assessment and management.

## ASSESSMENT OF IMPACTS

### Predicted Impacts of Ash Disposal Facilities

The greatest predicted impacts of ash disposal facilities on avifauna are the destruction of habitat and disturbance of birds during construction and operation. However, both of these impacts can be minimized and mitigated to some extent by avoiding more sensitive areas where possible. Similarly, the above mentioned construction and maintenance activities impact on birds through disturbance, particularly during bird breeding activities. Disturbance of birds is anticipated to be of lower significance than habitat destruction. Leachate from fly ash disposal facilities can contain heavy metals (Theism and Marley, 1979) which could result in contamination of surrounding water sources, used by water birds in the study area. Correct placing of the new disposal facility, away from wetlands, dams and water bodies, will help to mitigate this impact.

In addition to the continuous disposal of ash at the of the ash disposal facility, the project may also include the expansion of the relevant infrastructure associated with the ashing system, such as pipelines, storm water trenches, seepage water collection systems, pump stations, seepage dams, roads, etc. The impacts of such associated infrastructure on avifauna are predicted to be minimal, so long as the infrastructure is within the proposed ash disposal facility footprint. Infrastructure outside of the proposed footprint will be assessed in the EIA phase of the project. If any additional linear infrastructure, especially power lines, is to be constructed, the EWT will assess the impact thereof, once the routings have been made known. Below follows a brief description of impacts that may be associated with powerlines (should these be required as part of the proposed project):

### General description of impacts of power lines on birds

Because of its size and prominence, electrical infrastructure constitutes an important interface between wildlife and man. Negative interactions between wildlife and electricity structures take many forms, but two common problems in southern Africa are electrocution of birds (and other animals) and birds colliding with power lines (Ledger 1983; Verdoorn

1996; Kruger 1999; Van Rooyen 2000). Other problems are electrical faults caused by bird excreta when roosting or breeding on electricity infrastructure, (Van Rooyen & Taylor 1999) and disturbance and habitat destruction during construction and maintenance activities.

*Electrocutions*

Electrocution of birds on overhead lines is an important cause of unnatural mortality of raptors and storks. It has attracted plenty of attention in Europe, USA and South Africa (APLIC 1994). Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (van Rooyen 2004). Electrocution is possible on 132kV lines or lower, depending on the exact pole structure used.

*Collisions*

Collisions are the biggest single threat posed by transmission lines to birds in southern Africa (van Rooyen 2004). Most heavily impacted upon are bustards, storks, cranes and various species of water birds. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines (van Rooyen 2004, Anderson 2001). Unfortunately, many of the collision sensitive species are considered threatened in southern Africa. The Red Data species vulnerable to power line collisions are generally long living, slow reproducing species under natural conditions. Some require very specific conditions for breeding, resulting in very few successful breeding attempts, or breeding might be restricted to very small areas. These species have not evolved to cope with high adult mortality, with the results that consistent high adult mortality over an extensive period could have a serious effect on a population's ability to sustain itself in the medium term or even in the long term. Many of the anthropogenic threats to these species are non-discriminatory as far as age is concerned (e.g. habitat destruction, disturbance and power lines) and therefore contribute to adult mortality, and it is not known what the cumulative effect of these impacts could be over the long term.

*Habitat destruction*

During the construction phase and maintenance of substations and power lines some habitat destruction and alteration inevitably takes place. This happens with the construction of access roads, and the clearing of servitudes, as well as clearing vegetation at the substation site. Servitudes have to be cleared of excess vegetation at regular intervals in order to allow access to the line for maintenance, to prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the conductors and to minimize

the risk of fire under the line which can result in electrical flashovers. These activities have an impact on birds breeding, foraging and roosting in or in close proximity of the servitude through modification of habitat.

*Disturbance*

Similarly, the above mentioned construction and maintenance activities impact on bird through disturbance, particularly during bird breeding activities.

**Identification of sensitive areas.**

In general the site is moderate to highly sensitive in terms of avifauna, based on the occurrence of a number of listed species in the study area, as well as the various micro-habitats available to avifauna. The sensitive zones are mapped and described below.

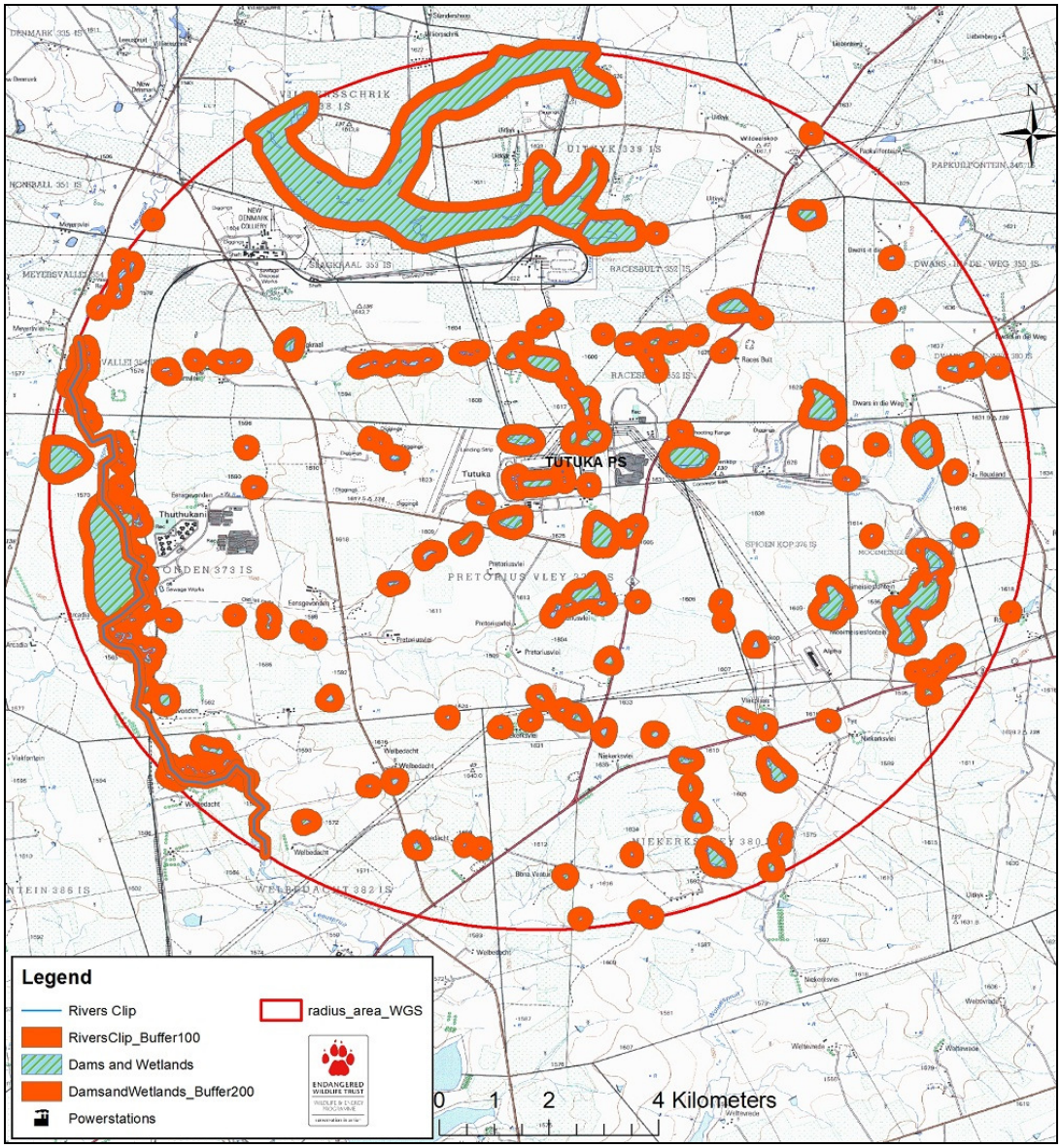


Figure 13: Preliminary avifaunal sensitivity map of the study area.

The above map (Figure 13) shows two features that have been buffered. These are the Rivers, and Wetland/dam areas. The rivers have been buffered by 100m using GIS, while the dams and wetlands have been buffered by 200m. The importance of these micro-habitats to avifauna has been discussed in earlier sections of this report. **All of these buffered zones are regarded as *Medium-High Sensitivity areas* and if possible should be avoided for construction activities. The remaining areas outside of these buffer zones are designated as *Low – Medium sensitivity*, although this is subject to change following the EIA phase site visit.**

*Note that this sensitivity analysis is subject to change, following the site visit in the EIA phase, especially as some of the GIS layers may be outdated, and may not reflect the actual situation on the ground. Also note that certain natural grassland areas, as well as other drainage lines or wetland areas may also be designated as sensitive areas, should they be identified and mapped in the EIA phase.*

**CONCLUSION & EIA PLAN OF STUDY**

In conclusion, the proposed project can continue to the EIA phase, and no fatal flaws have been identified in terms of avifauna. In general, the site has moderate to high sensitivity.
The greatest impact of the proposed project is likely to be that of habitat destruction, while leachate from fly ash, into water systems used by avifauna is also of concern. Possible impacts of associated infrastructure (e.g. roads, power lines, pollution control dams, conveyors, pipelines and pump stations) will be assessed upon completion of the scoping phase, however collisions are expected to be the largest impact of associated power lines this project (assuming that "bird-friendly" pylon structures are used which prevent the impact of electrocution) and some line marking may be a suitable mitigation method for this. The presence of both Greater and Lesser Flamingos in New Denmark Dam is of concern, as both of these species are sensitive to collision. Sensitive areas have been mapped, within which the abovementioned collision mitigation must be implemented.

**The following is recommended for the EIA phase of this avifaunal study:**

- A detailed site visit will be conducted, and the actual affected farm portions will be traversed.
- The table showing SABAP2 data will be updated.
- All identified impacts will be rated according to a pre-determined set of criteria, as supplied by Lidwala Consulting Engineers.
- The sensitivity map will be "fine tuned" and revised if necessary.

- Details of associated infrastructure will be obtained, in order to thoroughly asses the possible impacts thereof.
- New or additional information, deemed relevant by the avifaunal specialist, will be added to the report.
- A final avifaunal EIA report will be compiled.

**REFERENCES**


Avian Power Line Interaction Committee (APLIC). 1994. *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994*. Edison Electric Institute. Washington D.C.

Anderson, M.D. 2001. *The effectiveness of two different marking devices to reduce large terrestrial bird collisions with overhead electricity cables in the eastern Karoo, South Africa*. Draft report to Eskom Resources and Strategy Division. Johannesburg. South Africa.

Barnes, K.N. (ed). 1998. *The Important Bird Areas of Southern Africa*. Birdlife South Africa, Johannesburg.

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

Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J., Parker, V & Brown, C.J. (eds). 1997. *The atlas of southern African birds*. Vol. 1&2. BirdLife South Africa: Johannesburg.

Kruger, R. 1999. *Towards solving raptor electrocutions on Eskom Distribution Structures in South Africa*. M. Phil. Mini-thesis. University of the Orange Free State. Bloemfontein. South Africa.

Ledger, J. 1983. *Guidelines for Dealing with Bird Problems of Transmission Lines and Towers*. Eskom Test and Research Division Technical Note TRR/N83/005.

Mucina & Rutherford. 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

Taylor, P.B., Navarro, R.A., Wren-Sargent, M., Harrison, J.A. & Kieswetter, S.L. 1999. *Coordinated waterbird Counts in South Africa, 1992-1997*. Avian Demography Unit, Cape Town.

Theis, T. L. and Marley, J.J. (1979). *Environmental Consideration for Fly Ash*. Journal of the Energy Division 105 (1).

Van Rooyen, C.S. 2000. "An overview of Vulture Electrocutions in South Africa." *Vulture News,* 43, pp 5-22. Vulture Study Group: Johannesburg, South Africa.

Van Rooyen, C.S. 2004a. The Management of Wildlife Interactions with overhead lines. In The fundamentals and practice of Overhead Line Maintenance (132kV and above), pp217-245. Eskom Technology, Services International, Johannesburg.

Van Rooyen, C.S. 2004b. Investigations into vulture electrocutions on the Edwardsdam-Mareetsane 88kV feeder, unpublished report, Endangered Wildlife Trust, Johannesburg.

Van Rooyen, C.S. & Taylor, P.V. 1999. *Bird Streamers as probable cause of electrocutions in South Africa*. (EPRI Workshop on Avian Interactions with Utility Structures 2-3 December 1999. Charleston, South Carolina)

Verdoorn, G.H. 1996. *Mortality of Cape Griffons Gyps coprotheres and African Whitebacked Vultures Pseudogyps africanus on 88kV and 132kV power lines in Western Transvaal, South Africa, and mitigation measures to prevent future problems*. (2nd International Conference on Raptors: 2-5 October 1996. Urbino, Italy.)