APPENDIX D2: Biodiversity Specialist Report
Biodiversity Assessment

of

ELSBURGSPRUIT CANAL ON PORTION 731 OF THE FARM DRIEFONTEIN 87 IR

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Report Compiled and edited by: Ms. Vanessa Marais of Galago Environmental
Report authors:
Mr. J.C.P. van Wyk (Pri. Sci. Nat: M.Sc),
Mrs. P. Lemmer (Cert. Sci. Nat: B.Sc.)
Mr. R.F. Geyser
Avifauna Report verified by: Dr. Alan C. Kemp (Pri. Sci. Nat.)
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1. **Introduction:**

Galago Environmental was appointed to conduct a vegetation, mammal, avifaunal, reptile and amphibian survey of the Elsburgspruit canal on portion 731 of the farm Driefontein 87-IR, scheduled for construction of canals to separate surface water from acid mine water.

2. **Location of the study site:**

The proposed route runs southward along the Elsburgspruit from the point where the tributary from Witfield dam enters the Spruit. The route then runs between the Driefontein 87-IR opencast mine and the purification plant west of Waverley Care Centre to end at Main Reef Road (Road R29) in the south.

![Figure 1: Locality map of the study area](Image)

3. **Participating Specialists**

This investigation was conducted by the following specialists:

<table>
<thead>
<tr>
<th>Specialists</th>
<th>Aspect Investigated</th>
<th>Qualifications</th>
<th>Prof. Registration</th>
<th>Date of Field Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geyser, R.</td>
<td>Avifauna</td>
<td></td>
<td>Pending</td>
<td>24 August 2013</td>
</tr>
<tr>
<td>Kemp, A.C.</td>
<td>Avifaunal review</td>
<td>Ph.D.</td>
<td>Pr. Nat. Sci.</td>
<td></td>
</tr>
<tr>
<td>Marais, V.</td>
<td>Environmental Impacts and maps</td>
<td>BL Landscape Architecture</td>
<td></td>
<td>24 August 2013</td>
</tr>
</tbody>
</table>
4. **Vegetation assessment:**

Mucina & Rutherford (2006) classified the area as Soweto Highveld Grassland, a gently to moderately undulating landscape on the Highveld plateau supporting short to medium high, dense, tufted grassland dominated almost entirely by *Themeda triandra*, and accompanied by a variety of other grasses such as *Elionurus muticus*, *Eragrostis racemosa*, *Heteropogon contortus* and *Tristachya leucothrix*. It is in places undisturbed, with scattered small wetlands, narrow stream alluvia and pans. Occasional ridges or rocky outcrops interrupt the continuous grassland cover. This vegetation unit comprises shale, sandstone or mudstone, or the intrusive Karoo Suite dolerites which feature prominently. This vegetation unit is considered endangered.

Two vegetation study units were identified:

- Drainage line vegetation; and
- Mixed alien and indigenous vegetation.

The study found that the proposed route runs mostly along the drainage line. The species diversity of the drainage line was very low. Removal of the alien species in and along the drainage line will be of great benefit to the wetland. The species diversity of both study units of the site was very low in comparison with other areas in the 2628AA q.d.s. See Appendix A for the Flora report.

5. **Fauna assessment:**

The mammal study found that the Elsburgspruit, with its wetlands and its buffer zone, should be considered as ecologically sensitive. The study site falls in the Soweto Highveld Grassland vegetation type, which is considered endangered (Mucina and Rutherford, 2006).

The possibility exist that 14 species of mammals with a Red Data status may occur on the study site. Most of these species include bats, which move over huge distance, and all possible shrew species. It is very difficult to confirm whether any of these species is present on any study site, but there is a possibility that some members of these two groups of species occurs on this particular study site.

In optimum conditions the possibility exists that the Southern African hedgehog may occur on the study site.

Ecologically, the study site is currently in a downward spiral. The study site has been ecologically disturbed by diggings, encroaching urbanisation, veld fires, invasive plants, dumping, steep man-made stream banks, water pollution, noise pollution, squatters and illegal mining. These factors have a detrimental effect on mammal numbers and diversity.

It is recommended that during the construction of the water canal on the study site, measures be taken to stop water pollution from dumping, squatters and illegal mining in the Elsburgspruit. Structures to help animals escape from the canal should be included in the construction of the canal and could include gradually sloping ramps or steps (grids) at the sides of the canal at regular intervals. The size of the canal (depth or width)
is not so much a problem as the shape. It is impossible for mammal species to obtain purchase on smooth, curved walls, which will cause them to keep slipping to the bottom of the canal. Using rough concrete rather than smooth will allow the animals to escape from the canal more easily. The removal of exotic trees will increase the water quality and habitat of water-dependent mammals. See Appendix B for the Mammal report.

The avifaunal study found that there is no suitable habitat for any Red Data avifaunal species within the study area and as a result, the construction of the canals will not have a negative effect on any Red Data avifaunal species. The wetland habitat is important to ensure future avifaunal biodiversity within the study area and to act as a natural filter system for water pollutants. In terms of avifauna the wetland can be rated as medium sensitive See Appendix C for the Avifauna report.

The herpetofaunal study found that the study site contains a few temporary pans and wetlands, which are potential breeding places for the giant bullfrog. Ecologically, the study site is currently in a downward spiral. The study site has been ecologically disturbed by diggings, encroaching urbanisation, veld fires, invasive plants, dumping of soil heaps, dumping of building rubble, steep man-made stream banks, water pollution, noise pollution, squatters and illegal mining. These factors have a detrimental effect on herpetofauna numbers and diversity.

It is recommended that during the construction of the water canal on the study site, measures be taken to stop water pollution from dumping, squatters and illegal mining in the Elsburgspruit. Structures to help animals escape from the canal should be included in the construction of the canal and could include gradually sloping ramps or steps (grids) at the sides of the canal at regular intervals. The size of the canal (depth or width) is not so much a problem as the shape. It is impossible for herpetofaunal species to obtain purchase on smooth, curved walls, which will cause them to keep slipping to the bottom of the canal. Using rough concrete rather than smooth will allow the animals to escape from the canal more easily. The removal of exotic trees will increase the water quality and habitat of water-dependent herpetofauna. See Appendix D for the Herpetofaunal report.

6. Mitigation:

- The appropriate agency should implement an ongoing monitoring and eradication program for all invasive and weedy plant species growing within the servitude.
- Rehabilitation of natural vegetation should proceed in accordance with a rehabilitation plan compiled by a specialist registered in terms of the Natural Scientific Professions Act (No. 27 of 2003) in the field of Ecological Science.
- Any post-development re-vegetation or landscaping exercise should use species indigenous to South Africa. Plant species locally indigenous to the area are preferred. As far as possible, indigenous plants naturally growing along the proposed route, but would otherwise be destroyed during construction, should be used for re-vegetation / landscaping purposes.
- Prior to construction, fences should be erected in such a manner to prevent access and damage to any sensitive areas identified in a sensitivity mapping exercise.
- Disturbance to any wetlands during construction should be minimized. A plan for
the immediate rehabilitation of damage caused to wetlands should be compiled by a specialist registered in accordance with the Natural Scientific Professions Act (No. 27 of 2003) in the field of Ecological Science. This rehabilitation plan should form part of the EMP and a record book should be maintained on site to monitor and report on the implementation of the plan.

- Every effort should be made to retain the linear integrity, flow dynamics and water quality of the Elsburgspruit, its wetlands and associated riparian vegetation. Preventing water pollution of the Elsburgspruit must be a priority.

The following mitigation measures are proposed by the fauna specialists.

- Should any mammals (such as hedgehogs) be encountered during the construction phase of the canals, these should be relocated to natural grassland areas in the vicinity.
- If the Giant Bullfrog or any herpetological species are encountered or exposed during the construction phase, they should be removed and relocated to natural areas in the vicinity. This remedial action requires the employment of a herpetologist to oversee the removal of any herpetofauna during the initial ground clearing phase of construction (i.e. initial ground-breaking by earthmoving equipment).
- The contractor must ensure that no faunal species are disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.
- During the construction phase there will be increased surface runoff and a decreased water quality (with increased silt load and pollution). Completing construction during the winter months would mitigate the environmental impact.
- Proper water quality tests should be conducted within the wetland and river systems, and measures should be undertaken to improve the water quality of these systems.

Please see the specialist reports for more mitigation measures.
7. Environmental sensitivity:

Figure 2: Combined environmental sensitivity map

<table>
<thead>
<tr>
<th>BIODIVERSITY ELEMENT</th>
<th>SENSITIVITY MAPPING RULE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flora communities</td>
<td>Sensitive flora communities</td>
</tr>
<tr>
<td>Mammal and herpetofaunal habitat</td>
<td>Sensitive faunal habitat</td>
</tr>
<tr>
<td>Wetland</td>
<td>Wetland area + 30m buffer</td>
</tr>
</tbody>
</table>

8. Conclusion:

From all the biodiversity studies undertaken it is clear that the proposed route runs mostly along the drainage line. The species diversity of the drainage line was very low. Removal of the alien species in and along the drainage line will be of great benefit to the wetland.

All the wetlands and associated 30m buffer areas is considered sensitive, although highly disturbed in certain places. The importance of building the canals for the future preservation of surface water in terms of water quality however makes the need for the project imperative. All mitigation measures proposed by the specialists must be adhered to as far as possible to reduce the impact of the construction activities and to ensure that some wetland habitat is preserved for faunal species.
9. GDARD Biodiversity requirements

With regard to the Elsburgspruit project, specialist biodiversity studies are required to investigate the following aspects:
* Wetlands.