

The background of the cover is a composite image. The top half features a bokeh effect of circular light spots in shades of green and yellow. The bottom half shows a close-up of green grass blades with several clear dew droplets resting on them.

# Limnology

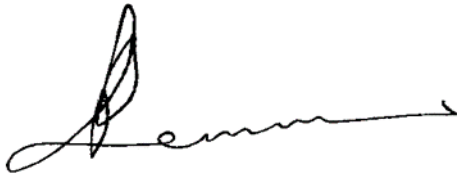
## Tshilindzini Hospital Flora assessment April 2020

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## DECLARATION OF INDEPENDENCE

I, Petro Lemmer (440129 0025 085) declare that I:

- am committed to biodiversity conservation but concomitantly recognize the need for economic development. Whereas I appreciate the opportunity to also learn through the processes of constructive criticism and debate, I reserve the right to form and hold my own opinions and therefore will not willingly submit to the interests of other parties or change my statements to appease them
- abide by the Code of Ethics of the S.A. Council for Natural Scientific Professions
- act as an independent specialist consultant in the field of botany
- am subcontracted as specialist consultant by Limnology for the proposed rehabilitation project of the Tshilidzini Hospital terrain described in this report
- have no financial interest in the proposed development other than remuneration for work performed
- have or will not have any vested or conflicting interests in the proposed development
- undertake to disclose to Limnology and its client as well as the competent authority any material information that have or may have the potential to influence the decision of the competent authority required in terms of the Environmental Impact Assessment Regulations, 2017.



Petro Lemmer - Pr.Sci.Nat. (400567/15)

# 1. INTRODUCTION

Limnology was appointed to assess the vegetation of the terrain of the Tshilidzini Hospital (Limpopo, South Africa) on the scheduled for redevelopment. The objective was to determine which species occur on the site. Special attention had to be given to possible habitats of all the threatened species, the species of conservation concern and the protected species that may occur in the area.

## 2. OBJECTIVES OF THE STUDY

- To assess the current status of the habitat component and current general conservation status of the area;
- To list the perceptible flora of the site and to recommend steps to be taken should threatened plant species, plant species of conservation concern and protected plant species be found;
- To highlight potential impacts of the development on the flora of the proposed site; and
- To provide management recommendations to mitigate negative and enhance positive impacts should the proposed development be approved.

## 3. SCOPE OF STUDY

This report:

- Pertains to the study site as described in subsection 4.2 and is not meant as a report of the general vegetation of the area (subsection 4.1).
- Lists the more noticeable trees, shrubs, herbs, geophytes and grasses observed during the study and offers recommendations about the preservation of the protected species on the site;
- Indicates medicinal plants recorded and lists alien species;
- Evaluates the conservation importance and significance of the site with special emphasis on the current status of resident threatened species; and
- Offers recommendations to reduce or minimise impacts, should the proposed rehabilitation project be approved

## 4. STUDY AREA

### 4.1 Regional vegetation

The study site lies in the quarter degree square 2230CD (Thohoyandou). Mucina & Rutherford (2006) classified the area as Granite Lowveld, a tall shrubland with few trees to moderately dense low woodland on the deep sandy uplands with *Terminalia sericea*, *Combretum zeyheri* and *C. apiculatum* and ground layer including various grasses. Dense thicket to open savannah in the bottomlands with *Acacia nigrescens*, *Dichrostachys cinerea* and *Grewia bicolor* in the woody layer.

Archaean granite and gneiss weather into sandy soils in the uplands and clayey soils with high sodium content in the lowlands. This vegetation unit has summer-rainfall and dry winters. MAP from 450 on the eastern flats to about 900 mm near the escarpment in the west. It is generally a frost free region.

The Granite Lowveld vegetation unit is considered vulnerable. Its conservation target is 19%. Some 17% of this vegetation unit is statutorily conserved in the Kruger national Park. About the same conserved in private reserves, mainly the Selati, Klaserie, Timbavati, Mala Mala, Sabi Sand and Manyeleti Reserves. More than 20% of the unit is already transformed mainly by cultivation and settlement development.

## 4.2 The study site

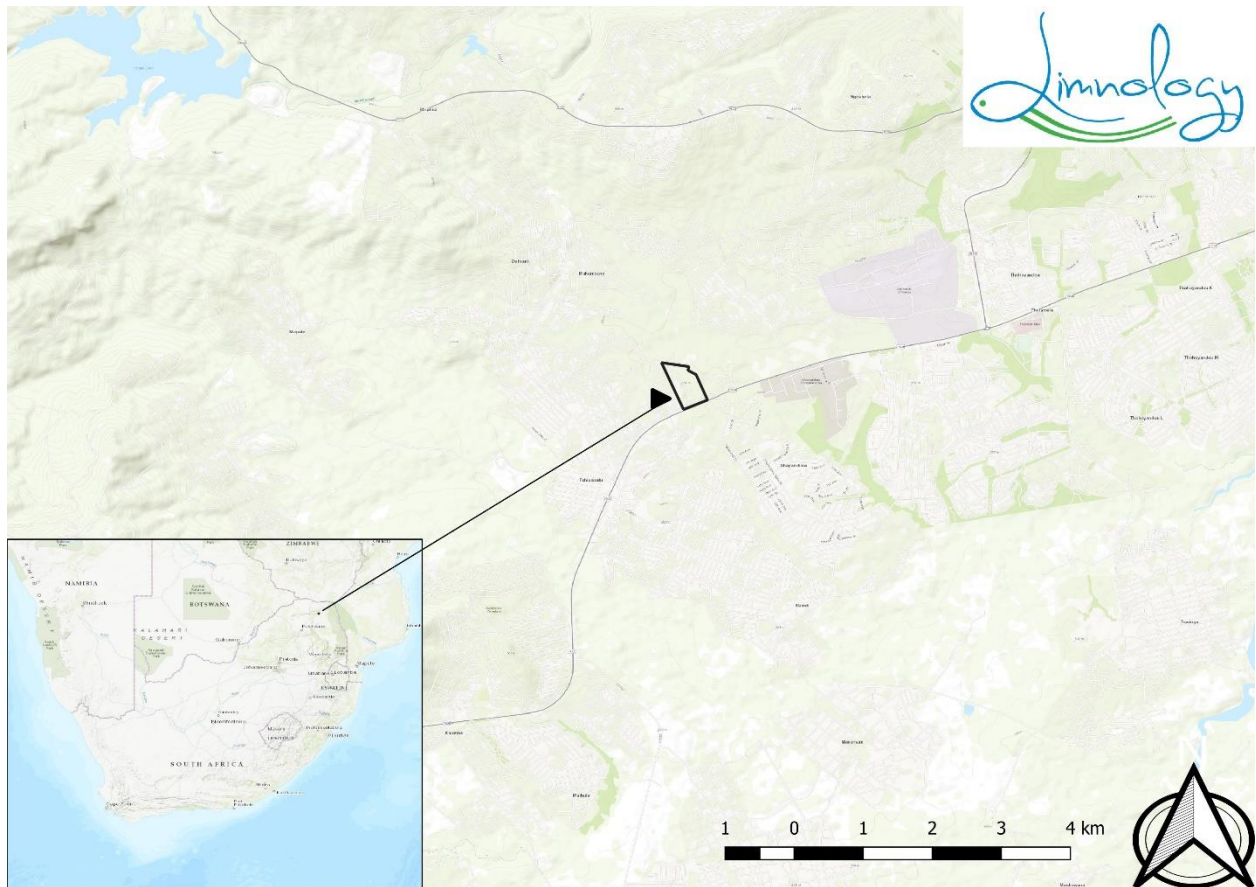


Figure 1: Locality map of the study area

## 5 METHOD

A desktop study of the habitats of the species that are considered threatened and those that are considered not threatened but of conservation concern that are known to occur in the area was done before the site visit. Various Acts and Ordinances were consulted about the protected plant species and species of special concern that might occur on the site. The various publications (Section 10) were consulted about the habitat preferences of the species concerned and to verify identification of some plant species.

The plants recorded in the 2230CD quarter degree square was obtained from the BRAHMS online website and consulted to verify the record of occurrence of the plant species seen on the site. Important taxa listed by Mucina and Rutherford (2006) were also considered. Locality maps were obtained from Planet GIS.

The study site was visited on 19 March 2020 to determine whether suitable habitat for the species that are considered threatened and those that are considered not threatened but of conservation concern in the area existed and to survey the flora present on the site.

The entire site was surveyed in a random crisscross fashion and the plants recorded. The entire site was examined for the presence of protected tree species and other protected species.

## 6 RESULTS

## 6.1 Compositional aspects of vegetation

The site comprises mixed alien and indigenous vegetation. Many of the large trees on the site appear to have been planted along the roads and in the now derelict gardens. Several invasive perennial herbaceous climbers have infested the old gardens and three of them have attached themselves onto the trunks of most of the trees and also grow as ground-covering species on most of the site. They are *Aristolochia elegans* (Dutchman's pipe), *Dolichandra ungui-cati* (Cat's claw creeper) and *Syngodium podophyllum* (Arrowhead plant).

Forty six plant species were recorded on the site. Of these 27 are indigenous species. The following number of species in each growth form was noted:

GROWTH FORM	NUMBER OF SPECIES
Herbaceous species & climbers	13
Tree species	26
Shrubs and dwarf shrubs	2
Grasses	4
Geophytes	1
Total number of species	46

## 6.2 Medicinal plants

The names of known medicinal plants are marked with numbers in Table 1 and the numbers appear as footnotes at the end of the table. Of the 44 plant species recorded on the site, 10 species with medicinal properties were found.

## 6.3 Alien plants

Alien plants are not listed separately but are included in the lists as they form part of each particular study unit. Their names are marked with an asterisk in Table 1. Nineteen alien plant species, of which 8 species are Category 1b invasive species, one is a Category 2 Invasive species and two are Category 3 invasive species, were recorded on the site.

Invasive species are controlled by the National Environmental Management: Biodiversity Act, 2004 (Act no. 10 of 2004) – Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014.

Category 1b: Invasive species which must be controlled and wherever possible, removed and destroyed. Any form of trade or planting is strictly prohibited.

Category 2: Invasive species, or species deemed to be potentially invasive, in that a permit is required to carry out a restricted activity. Category 2 species include commercially important species such as pine, wattle and gum trees. Plants in riparian areas become Category 1b invasive species.

Category 3: Invasive species which may remain in prescribed areas or provinces. Further planting, propagation or trade, is prohibited. Plants in riparian areas become Category 1b invasive species.



**Figure 2: Dutchman's pipe and Cat's claw creeper covering the trunk of a tree**



**Figure 3: Dense invasive species cover the soil between trees**



**Figure 4: Dense stands of Sword fern (Cat 1b) between the trees**

#### **6.4 Species on the study site that are considered threatened**

(Species listed in the Red List of South African plants (2009) as Critically endangered, Endangered and Vulnerable are considered threatened species.)

Four plant species that are considered threatened species are known to occur in the 2230CD quarter degree square. The site does not have suitable habitat for any of these species (Table A.1).

#### **6.5 Species on the study site that are considered not threatened but of conservation concern**

(Species listed in the Red List of South African plants (2009) as Near Threatened, Declining, Rare and Data Deficient are considered not threatened but of conservation concern.)

Twenty-three plant species that are considered not threatened but of conservation concern are known to occur in the 2430CD quarter degree square. The site does not have suitable habitat for any of these species (Table A.2).

#### **6.6 Protected trees and other protected species**

Thirteen Protected trees listed in terms of the National Forests Act, 1998 (Act No. 84 of 1998) are known to occur in the 2230CD quarter degree square. Three of these species were found on the site (Annexure B). One protected plant listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) is known to occur in the 2230CD quarter degree square, but the site does not have suitable habitat for this species.

A license to cut, disturb, damage or destroy any protected tree or to possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree must be obtained from the Minister of Agriculture, Forestry and Fisheries.

#### **Table 1: Plants recorded on the site**

SCIENTIFIC NAME	INV CAT	COMMON NAMES
<i>Adansonia digitata</i> <sup>1,2</sup>		Boobab / Kremetart
<i>Afrocarpus falcatus</i>		Outeniqua yellow wood / Outenikwageelhout
<i>Anthocleista grandiflora</i>		Forest Big leaf
<i>Aristolochia elegans</i> *	1b	Dutchman's pipe / Oupa-se-pyp
<i>Arundo donax</i> *	1b	Spanish reed / Spaansriet
<i>Asystasia gangetica</i> subsp. <i>micrantha</i>		
<i>Brachiaria deflexa</i>		False signal grass / Bastersinjaalgras
cf <i>Brachychiton acerifolius</i>		Illawarra Flame Tree
<i>Bridelia micrantha</i> <sup>3</sup>		Mitzeeri
<i>Commelina benghalensis</i> *		Wandering jew / Wandelende jood
<i>Delonix regia</i> *		Flamboyant / Flambojant
<i>Dolichandra ungui-cati</i> *	1b	Cat's claw creeper
<i>Erythrina lysistemon</i> <sup>1,2</sup>		Common coral tree / Gewone koraalboom
<i>Eucalyptus grandis</i> *	2	Saligna gum / Saligna bloekom
<i>Euphorbia heterophylla</i> *		Wild poinsettia / Wilde poinsettia
<i>Faidherbia albida</i>		Ana tree / Anaboom
<i>Ficus burkei</i>		Common wild fig / Gewone wildevy
<i>Ficus petersii</i>		Peter's fig
<i>Ficus sur</i> <sup>3</sup>		Broom cluster fig / Besem-trosvy
<i>Freesia grandiflora</i> subsp. <i>grandiflora</i>		
<i>Jacaranda mimosifolia</i> *		Jacaranda
<i>Kirkia acuminata</i>		White seringa / Witsering
<i>Lantana camara</i> *	1b	Lantana
<i>Maranta leuconeura</i> *		
<i>Melia azedarach</i> *	3	Syringa / Sering
<i>Nephrolepis exaltata</i> *	1b	Sword fern / Swaardvaring
<i>Oplismenus hirtellus</i>		Basket grass / Bosgras
<i>Parinari curatellifolia</i>		
<i>Peltophorum africanum</i>		African wattle / Huilboom
<i>Pennisetum clandestinum</i> *		Kikuyu lawn grass
<i>Plumeria rubra</i> *		Frangipani
<i>Priva flabelliformis</i>		Blaasklits
<i>Pterocarpus rotundifolius</i> subsp. <i>rotundifolius</i>		Round-leaved bloodwood / Dopperkiaat
<i>Rauvolfia caffra</i> <sup>1,2</sup>		Quinine tree / Kinaboom
<i>Rhoicissus tridentata</i> subsp. <i>cuneifolia</i> <sup>1</sup>		Northern bushman's grape
<i>Rhynchosia hirta</i>		
<i>Sclerocarya birrea</i> subsp. <i>caffra</i> <sup>1,2</sup>		Marula / Maroela
<i>Solanum mauritianum</i> *	1b	Bugweed / Luisboom
<i>Spathodea campanulata</i> *	3	African flame tree / Fakkelboom
<i>Sphagneticola triloba</i> *	1b	Singapore daisy
<i>Syngodium podophyllum</i> *	1b	Arrowhead plant
<i>Terminalia sericea</i> <sup>1,2,3</sup>		Silver cluster leaf / Vaalboom
<i>Thunbergia alata</i>		Black-eyed Susan
<i>Tradescantia pallida</i> *		Wandering jew
<i>Trichilia dregeana</i> <sup>1,2</sup>		Forest mahogany / Bos-rooinessenhout
<i>Vachellia karroo</i> <sup>1,2</sup>		Sweet thorn / Soetdoring

INV CAT=Invasive species category

<sup>1)</sup> Van Wyk, B-E., Van Oudtshoorn, B. & Gericke, N. 2002.

<sup>2)</sup> Watt, J.M. & Breyer-Brandwijk, M.G. 1962.

<sup>3)</sup> Van Wyk, B. & Van Wyk P. 1997.

## 7. FINDINGS AND POTENTIAL IMPLICATIONS

Most of the site comprises derelict gardens with large trees along the roadways and in the gardens. Several invasive perennial herbaceous climbers have infested the old gardens and three of them have attached themselves onto the trunks of most of the trees and also grow as ground-covering species on



most of the site. Other invasive species grow densely in the derelict gardens. All AIS must be removed to preclude their spreading into the surrounding township and further afield.

## 8. RECOMMENDED MITIGATION MEASURES

The following mitigation measures are proposed by the specialist:

- Where possible, trees naturally growing on the site should be retained as part of the landscaping. Measures to ensure that these trees survive the physical disturbance from the development should be implemented. A tree surgeon should be consulted in this regard.
- Outside lighting should be designed to minimize impacts on important pollinators. All outside lighting should be directed away from sensitive areas. Fluorescent and mercury vapour lighting should be avoided and sodium vapour (yellow) lights should be used wherever possible.
- An Alien Invasive Species (AIS) Eradication Plan should be compiled for the study site;

The following mitigation measures were developed by GDARD 2014 (Department of Agriculture and Rural Development, Biodiversity Management Directorate) and the mitigating measures recommended for Tshilidzini Hospital are based on these measures.

- An appropriate management authority that must be contractually bound to implement the Environmental Management Plan (EMP and Record of Decision (ROD) during the operational phase should be identified and informed of their responsibilities in terms of the EMP and ROD.
- Only indigenous plant species, preferably species that are indigenous to the natural vegetation of the area, should be used for landscaping in communal areas. As far as possible, plants naturally growing on the development site, but would otherwise be destroyed during clearing for development purposes, should be incorporated into landscaped areas. Forage and host plants required by pollinators should also be planted in landscaped areas.
- In order to minimize artificially generated surface stormwater runoff, total sealing of paved areas such as parking lots, driveways, pavements and walkways should be avoided. Permeable material should rather be utilized for these purposes.

## 9. CONCLUSION

Where possible, large specimens of the trees, both indigenous and exotic, along the roads should be preserved *in situ*. All Alien invasive species (AIS) must be eradicated. A license to cut, disturb, damage or destroy any protected tree or to possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree must be obtained from the Minister of Agriculture, Forestry and Fisheries.

## 10. LITERATURE SOURCES

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## ANNEXURE A: THREATENED SPECIES AND SPECIES OF CONSERVATION CONCERN

**Table A.1 Species of the 2230CD q.d.s. that are considered threatened in terms of the 2009 Red List**

Species	Conserv status	Presence on site
<i>Dioscorea sylvatica</i>	VU	Habitat not suitable
<i>Diplolophium swynnertonii</i>	VU	Habitat not suitable
<i>Ocotea kenyanensis</i>	VU	Habitat not suitable
<i>Prunus africana</i>	VU	Habitat not suitable

**Table A.2 Species of the 2230CD q.d.s. that are considered not threatened but of conservation concern in terms of the 2009 Red List**

Species	Conserv status	Presence on site
<i>Acridocarpus natalitius</i> var. <i>natalitius</i>	Decl	Habitat not suitable
<i>Adenia gummifera</i> var. <i>gummifera</i>	Decl	Habitat not suitable
<i>Alepidea peduncularis</i>	DDT	Habitat not suitable
<i>Aloe hahnii</i>	NT	Habitat not suitable
<i>Aloe petrophila</i>	Rare	Habitat not suitable
<i>Aloe vossii</i>	DDT	Habitat not suitable
<i>Alsophila capensis</i>	Decl	Habitat not suitable
<i>Anemone transvaalensis</i> var. <i>transvaalensis</i>	DDT	Habitat not suitable
<i>Boophone disticha</i>	Decl	Habitat not suitable
<i>Cassipourea malosana</i>	Decl	Habitat not suitable
<i>Cineraria alchemilloides</i> subsp. <i>alchemilloides</i>	Rare	Habitat not suitable
<i>Clivia caulescens</i>	NT	Habitat not suitable
<i>Crinum macowanii</i>	Decl	Habitat not suitable
<i>Cryptocarya transvaalensis</i>	Decl	Habitat not suitable
<i>Curtisia dentata</i>	NT	Habitat not suitable
<i>Dioscorea buchananii</i> subsp. <i>undatiloba</i>	DDD	Habitat not suitable
<i>Disa extinctoria</i>	NT	Habitat not suitable
<i>Elaeodendron croceum</i>	Decl	Habitat not suitable
<i>Hypoxis hemerocallidea</i>	Decl	Habitat not suitable
<i>Ilex mitis</i> var. <i>mitis</i>	Decl	Habitat not suitable
<i>Mystacidium brayboniae</i>	NT	Habitat not suitable
<i>Pterocelastrus rostratus</i>	Decl	Habitat not suitable
<i>Rapanea melanophloeos</i>	Decl	Habitat not suitable

## ANNEXURE B: PROTECTED TREES

**Trees of the 2230CD q.d.s. that are protected trees in terms of section 15(1) of the National Forests Act, 1998**

Species	Presence on site
<i>Adansonia digitata</i>	FOUND
<i>Afrocarpus falcatus</i>	FOUND
<i>Azelia quanzensis</i>	Not on site
<i>Breonadia salicina</i>	Not on site
<i>Catha edulis</i>	Not on site
<i>Curtisia dentata</i>	Not on site
<i>Philenoptera violacea</i>	Not on site
<i>Pittosporum viridiflorum</i>	Not on site

<i>Podocarpus latifolius</i>	Not on site
<i>Prunus africana</i>	Not on site
<i>Pterocarpus angolensis</i>	Not on site
<i>Sclerocarya birrea</i> subsp. <i>caffra</i>	FOUND
<i>Securidaca longependunculata</i>	Not on site

## ANNEXURE C: OTHER PROTECTED SPECIES

Species of the 2230CD q.d.s. that are Protected\* species in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).

Species	Presence on site
<i>Encephalartos transvenosus</i>	Habitat not suitable