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Chapter 3

Analysis

Contextual Analysis

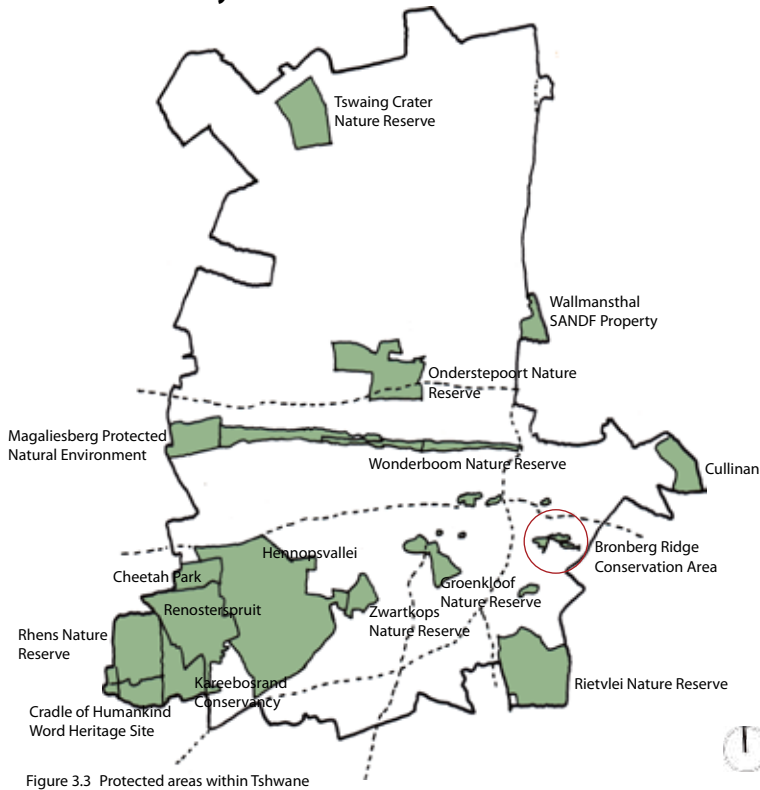


Figure 3.3 Protected areas within Tshwane



Figure 3.4 Bronberg ridge



Figure 3.1 South Africa



Figure 3.2 Gauteng Province

The Faerie Glen Nature Reserve is located in the predominantly residential eastern suburbs of Pretoria within the City of Tshwane. The reserve is a protected area (TOSF 2006:20) and covers an area of 124 hectares. It lies on the western end of the Bronberg Ridge Conservation Area, which is classified as a Class 2 ridge¹.

The reserve owes its origin to Mr H. Struben, the owner of the farm Hartbeespoort 362-JR. Following his death the farm was subdivided and became incorporated into the metropolitan area of Pretoria.

In 1984, the City Council Department of Culture and Recreation decided to utilize the area as an open space.

¹ A ridge of which more than 5%, but less than 35%, of their surface area has been converted to urban development, quarries and/or alien vegetation (GDACE 2006:8).



Figure 3.5 Faerie Glen in its regional context



Figure 3.6 Western boundary - General Louis Botha drive



Figure 3.7 Northern boundary - palisade fence



Figure 3.8 Faerie Glen in its urban context

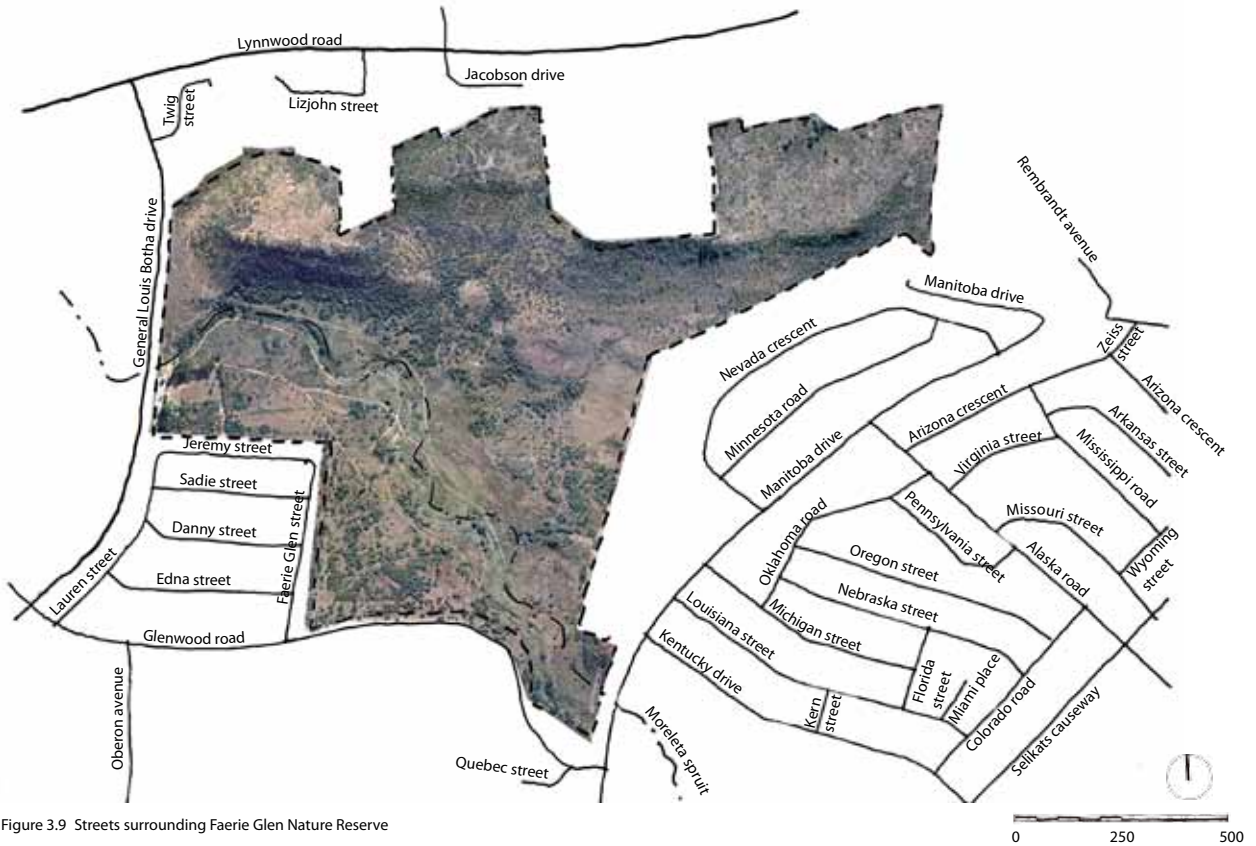


Figure 3.9 Streets surrounding Faerie Glen Nature Reserve

Faerie Glen Nature Reserve lies east of the N1 motorway and south of the N4 motorway. The reserve lies between four main roads: Lynnwood road to the north, Hans Strijdom drive to the east, Atterbury road to the south and General Louis Botha drive bordering it to the west. The only access to the reserve however, is from General Louis Botha drive. Roads immediately bordering the reserve are General Louis Botha drive, Jeremy street, Faerie Glen street, Glenwood road and Manitoba drive.

The Reserve is bordered by the suburbs of Lynwood Ridge, Die Wilgers, Lynwood Glen, Lynwood Park, Menlyn, Faerie Glen and Faerie Glen ext. 1.



Figure 3.10 South-eastern boundary - Glenwood road and Manitoba drive

- Land Parcels

The Faerie Glen Nature Reserve is made up of various farms and erfs. These are:

- Hartebeestpoort 362-JR (Portion 83, 117, 119, 122, 123, 124, 125, 300, R/17, R/39).
- Kodoesnek 341-JR (Portion 3).
- Faerie Glen erf 800.
- Lynnwood Ridge erfs 421 (Portion 2), 422 and 465.

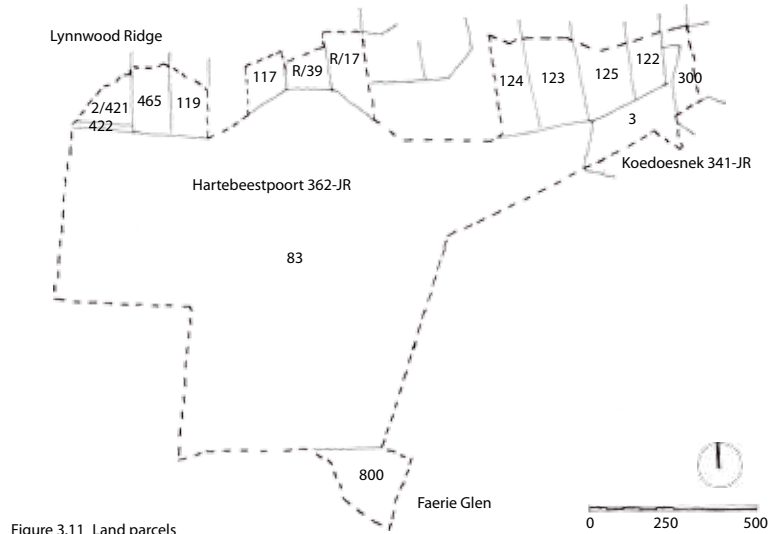


Figure 3.11 Land parcels

- Land Use

Land use zoning around the Faerie Glen Nature Reserve is as follows:

- Special
- Single residential
- Medium density residential
- High density residential
- Agriculture
- Business
- Educational / research
- Government
- Hospital / Clinic
- Municipal
- Office
- Open space / sport



Figure 3.12 Land use surrounding Faerie Glen Nature Reserve

- Servitudes

The following servitudes are present in the reserve:

A 30m servitude for high voltage powerlines runs along the western boundary (figure 3.14). No development may take place below the high voltage power lines.

A 6m servitude for the Petronet pipeline runs diagonally through the site (figure 3.15). No development may take place over the Petronet pipeline. Furthermore, no soil cover may be removed and no more than 3m of soil cover may be added within this servitude.

A 4m servitude for sewerage pipes runs parallel with the Moreleta spruit (figure 3.16).

The Faerie Glen sub-station is located in a fenced off section of the reserve in the south-eastern corner (figure 3.17).

The the Petronet and sewerage servitudes are located mostly in the 50 year flood line. Development may not take place in this zone.

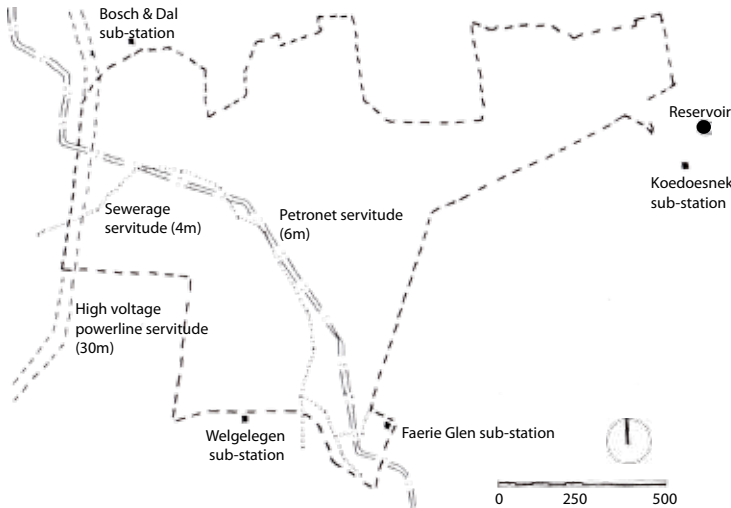


Figure 3.13 Servitudes in Faerie Glen Nature Reserve



Figure 3.14 High voltage powerlines



Figure 3.15 Petronet pipeline



Figure 3.16 Sewerage servitude



Figure 3.17 Faerie Glen sub-station

Site Specific Analysis

- Geology

The geology of the Faerie Glen Nature Reserve forms part of the Pretoria Group of the Transvaal Sequence. The group is estimated to be approximately 2 100 to 2 300 million years old (van der Neut in ECO Assessments 2004:7).

The Daspoort formation gives rise to the Bronberg Ridge which consists mainly of quartzite. The quartzite is underlain with the Strubenkop shale. The shale weathers into a clayey soil, and the other three rock types into a gravely or sandy soil. The area is covered with large quartzite boulders and extensive rock sheets. This results in shallow sandy soils. (ECO Assessments 2004:7)

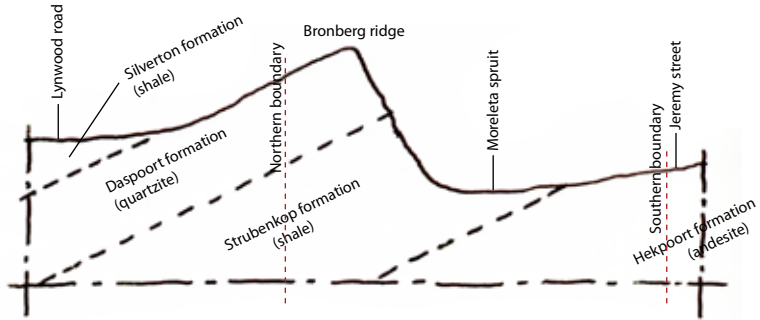


Figure 3.18 Geological section through Faerie Glen Nature Reserve



Figure 3.19 Andesite



Figure 3.20 Quartzite



Figure 3.21 Shale

-Soils

Duplex, red sandy clay loam and rocky soils are present within the Faerie Glen Nature Reserve. On the southern slopes of the Bronberg ridge, rocky soils with little top soil are present. This area, marked 8 in Figure 3.22, is therefore seen and highly sensitive.

Most soil types within the reserve have a intermediate to high sensitivity as they provide specific conditions to vegetation present. However, the areas marked 4 and 5 in Figure 3.22 consist of sandy clay loam soils and are identified as areas where development could take place due to lower ecological sensitivity.

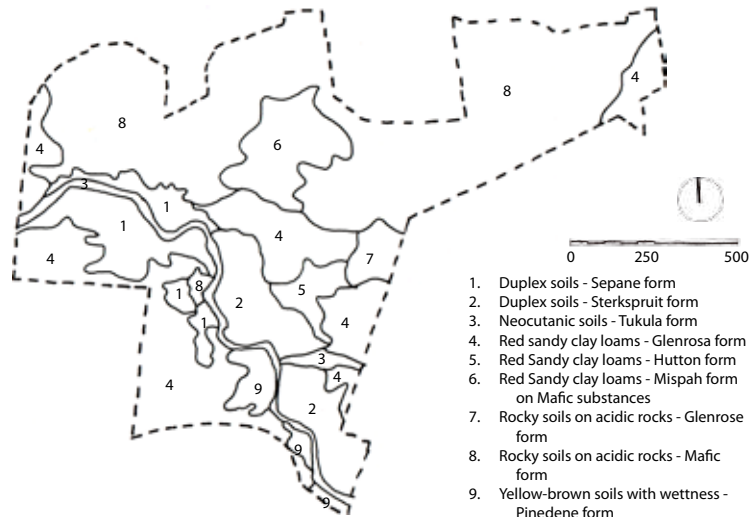


Figure 3.22 Soil types present in the Faerie Glen Nature Reserve

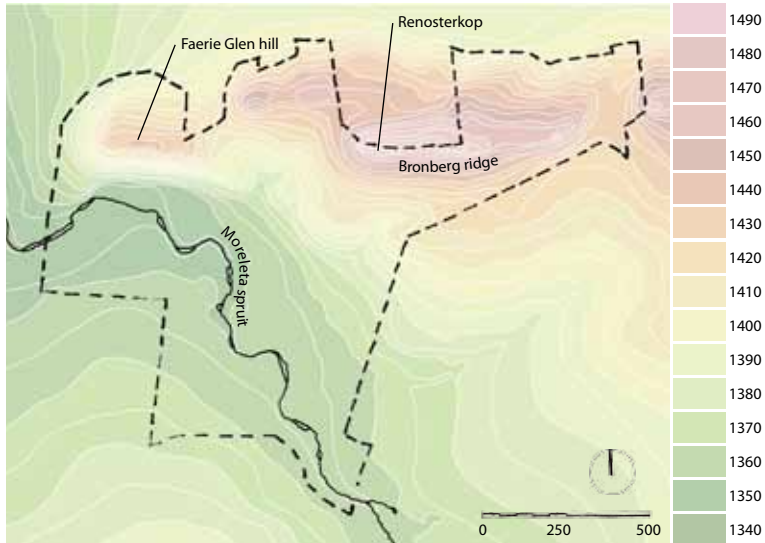


Figure 3.23 Topography of Faerie Glen Nature Reserve (elevation in metres above sea level)

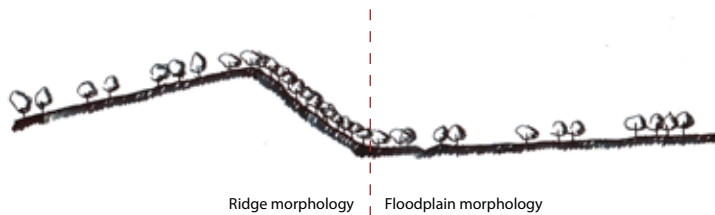


Figure 3.24 Ecological importance of Faerie Glen Nature reserve



Figure 3.25 Bronberg ridge

- Topography

The Faerie Glen Nature Reserve lies within the Bronberg Ridge. The most prominent features of this ridge are the cliffs which occur on the south-western side of the ridge which fall within the reserve.

The highest point in the reserve is Renosterkop (1482masl). The topography within the reserve ranges from gently undulating slopes to very steep.

The lowest point in the reserve (1352masl) is where the Moreleta spruit exits on the western boundary.

Furthermore, the reserve is an important area of Pretoria as it is one of the last remaining eco-systems in Tshwane where both ridge (Bronberg Ridge) and floodplain (Moreleta Spruit) morphology naturally occur together and represents a unique "Middlelevel" vegetation type (ECO Assessments 2004:2) as illustrated in Figure 3.24.

- Climate

Rainfall - The average annual rainfall for Pretoria is 686mm. Thunderstorms occur frequently during the rainy season which is from October to March. The majority of the rain falls during the months of December and January. January (134mm) and July (3.9mm) are the wettest and driest months respectively.

Temperature - The average temperature for Pretoria is 18.1°C. The hottest months are December, January and February which have an average maximum temperature of 24.9°C. The coldest months are June and July which have an average minimum temperature of 11.2°C.

Wind - The prevailing wind direction is from the north-east. The average speed is 1.96m.s⁻¹. The reserve is largely protected from high winds speeds by the Bronberg Ridge. The summit of the ridge however experiences severe winds during the months of August and September which are typical of the Highveld wind patterns.

Humidity - The average rate of evaporation is 2236mm per annum. The relative humidity at 14:00 fluctuates between 33% in July and 48% in February.

Figure 3.26 illustrates the sun angles for Pretoria at 12:00 in summer and 12:00 in winter.

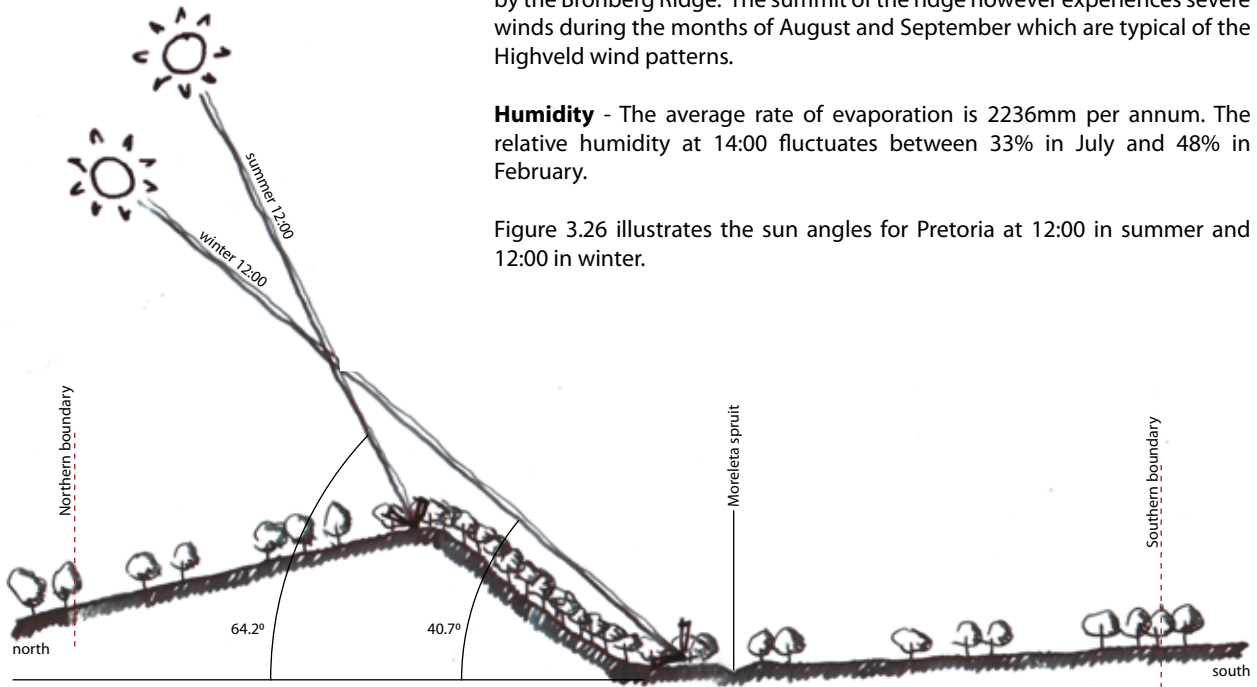


Figure 3.26 Sun angles for Pretoria

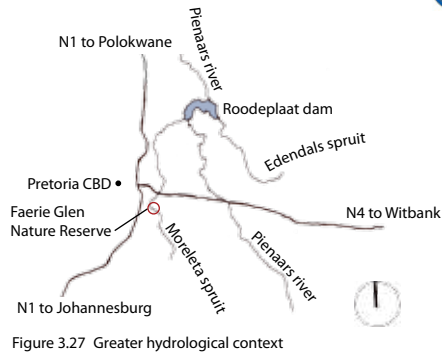


Figure 3.27 Greater hydrological context

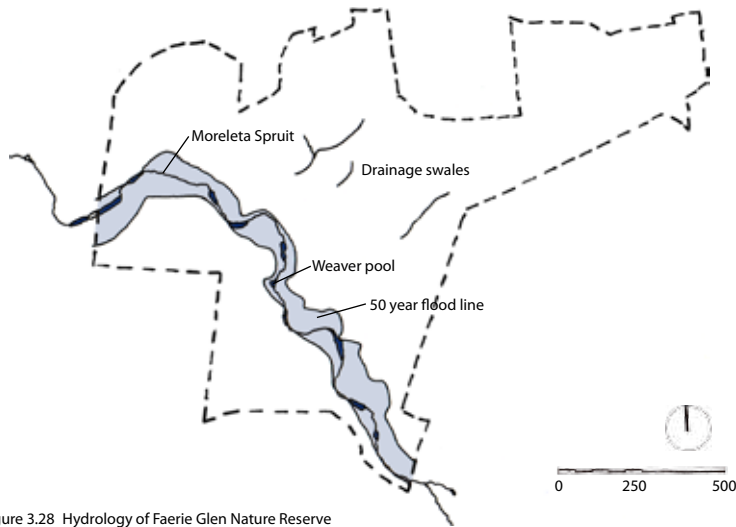


Figure 3.28 Hydrology of Faerie Glen Nature Reserve



Figure 3.29 Weaver pool

- Hydrology

The Faerie Glen Nature Reserve falls within the Crocodile River catchment area. The Moreleta Spruit has its source in Bapsfontein river and is a tributary of the Pienaars river (ECO Assessments 2004:22).

The Moreleta Spruit is a perennial stream which dries and becomes stagnant during drought periods. Increased peak flow caused due to summer thunderstorms results in localised flooding within the reserve.

The Moreleta Spruit provides the only source of water to the reserve. Its elevation drops by approximately 11 metres from where it enters the reserve to where it exits.

A rocky outcrop within the stream near the middle of the reserve provides a natural pool known as Weaver pool (Figure 3.29).

An existing debris trap, which prevents large objects from flowing down the spruit, is located on the eastern boundary where the Moreleta Spruit exits the reserve (Figure 3.30).



Figure 3.30 Debris trap

- Plant Communities

The Faerie Glen Nature Reserve falls within the Rocky Highveld Grassland vegetation type (Low et al 1998:39) and the vegetation is described as the Central Variation of Brakenveld by Acocks (1988:113). In addition, the reserve includes woodland elements that resemble the Waterberg Moist Mountain Bushveld and Mixed Bushveld vegetation types as defined by Low et al (1998:22,26).

Furthermore, 16 vegetation types were identified within the reserve in an strategic assessment carried out by ECO Assessments in 2004 as illustrated in Figure 3.31. A list of plant species present in the reserve is included as Appendix A.

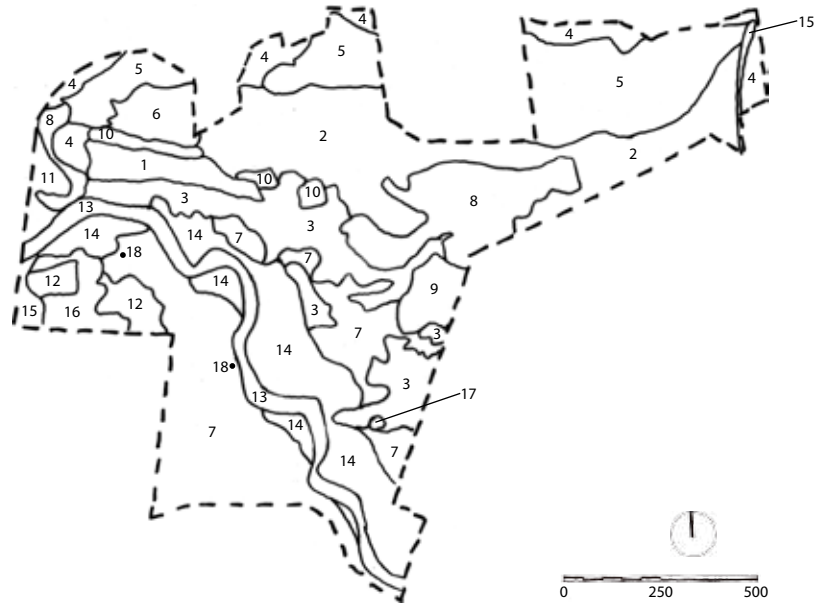


Figure 3.31 Vegetation types of Faerie Glen Nature Reserve

- | | |
|--|---|
| 1. <i>Dombeya rotundifolia</i> – <i>Acacia caffra</i> Closed woodland | 9. <i>Themeda triandra</i> – <i>Melinis repens</i> Disturbed grassland |
| 2. <i>Acacia caffra</i> – <i>Cussonia paniculata</i> Closed woodland | 10. <i>Diheteropogon amplexens</i> Crest vegetation |
| 3. <i>Celtis africana</i> – <i>Rhus pyroides</i> Closed woodland | 11. <i>Cymbopogon plurinodis</i> – <i>Diheteropogon amplexens</i> Grassland |
| 4. <i>Burkea africana</i> – <i>Ochna pulchra</i> Closed woodland | 12. <i>Acacia karoo</i> Altered grassland |
| 5. <i>Burkea africana</i> – <i>Ochna pulchra</i> Shrubland | 13. <i>Combretum erythrophyllum</i> Riverine vegetation |
| 6. <i>Loudetia simplex</i> – <i>Tristachya rehmannii</i> Rocky grassland | 14. <i>Berkheya radula</i> Flood plain |
| 7. <i>Acacia karoo</i> Open woodland | 15. Disturbed areas |
| 8. <i>Protea caffra</i> – <i>Themeda triandra</i> Grassland | 16. <i>Acacia karoo</i> Disturbed woodland |
| | 17. <i>Combretum erythrophyllum</i> (large tree) |
| | 18. Protected plant population |



Figure 3.32 *Dombeya rotundifolia*



Figure 3.33 *Acacia caffra*



Figure 3.34 *Cussonia paniculata*



Figure 3.35 *Celtis africana*



Figure 3.36 *Rhus pyroides*



Figure 3.37 *Burkea africana*



Figure 3.38 *Ochna pulchra*



Figure 3.39 *Loudetia simplex*



Figure 3.40 *Acacia karoo*



Figure 3.41 *Protea caffra*



Figure 3.42 *Themeda triandra*



Figure 3.43 *Melinis repens*



Figure 3.44 *Diheteropogon amplexans*



Figure 3.45 *Cymbopogon plurinodis*



Figure 3.46 *Combretum erythrophyllum*



Figure 3.47 *Berkheya radula*

- Red Data Species

“The ridges of Gauteng provide vital habitat for many threatened or Red List plant species” (GDACE 2006:4)

Various red data species are present in the Faerie Glen Nature reserve. A 200m buffer zone has been marked 1 in Figure 3.48 in accordance with the draft final Gauteng ridges policy (GDACE 2006:11). The reserve also provides potential habitats for various other red data species - these areas are marked 2 and 3 in Figure 3.48. A list of red data species found within the reserve follows:

Plants

Milkweed (Asclepiadaceae) and
Hyacinth (Hyacinthaceae)
Eulophia coddii

Mammals

Atelerix frontalis South African hedgehog
Chrysospalax villosus Rough-haired golden mole

Birds

Alcedo semitorquata Half collared kingfisher
Crex crex Corncrake
*Locustella fluviatilis*² River warbler
Podica senegalensis African finfoot

² Although the *Locustella fluviatilis* is not a red data species it is considered rare and requires protection (Eco Assessments 2004:16).

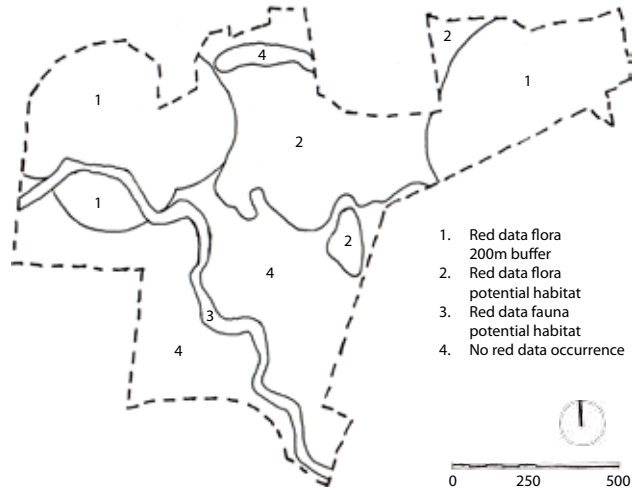


Figure 3.48 Red data occurrence in Faerie Glen Nature Reserve



Figure 3.46 *Atelerix frontalis*



Figure 3.47 *Chrysospalax villosus*



Figure 3.48 *Alcedo semitorquata*



Figure 3.49 *Crex crex*



Figure 3.50 *Locustella fluviatilis*¹



Figure 3.51 *Podica senegalensis*

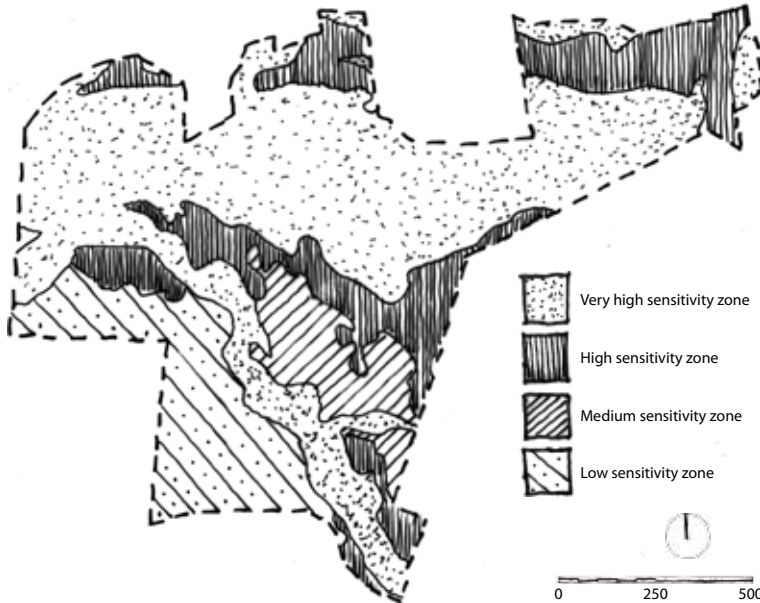


Figure 3.55 Ecological Sensitivity of Faerie Glen Nature Reserve

- Ecological Sensitivity

The ecological sensitivity of Faerie Glen Nature Reserve takes into account the morphology, topography, geology as well as the presence of fauna and flora present in order to draw up sensitivity zones which forms a basis for the landscape development concept. Using GIS mapping, these layers are overlaid and values are given to establish the ecological sensitivity.

In a Strategic Environmental Assessment carried out by ECO Assessments in 2004, the reserve was found to contain 4 zones (Figure 3.55): Very high sensitivity, high sensitivity, medium sensitivity and low sensitivity. This sensitivity index is based on the presence or absence of red data species as well as the presence of ridges, rocky outcrops, wetlands and river systems - unique habitats which are protected because of the high instance of endangered species potentially occurring in such areas.

Very High Sensitivity - This zone includes areas on the southern side of the Bronberg ridge, as well as the banks along the Moreleta spruit. This zone contains protected and endangered or near endangered fauna and flora species and needs protection. Areas along the Moreleta spruit are severely affected by alien vegetation. The alien vegetation is to be manually cleared and rehabilitated in order to restore the riparian vegetation to its pristine state.

High Sensitivity - This zone includes areas on the crest, and along the southern footslope of the Bronberg ridge, as well as areas along the banks of the Moreleta spruit. This zone does not contain any protected or endangered fauna or flora species, but provides potential habitats for them. This zone should be conserved due to its limited distribution and habitat potential.

Medium Sensitivity - This zone is in a generally natural state but does not contain any fauna or flora species that require specific protection. The vegetation types encountered in these Medium sensitivity areas are also relatively wide spread across the Gauteng province.

Low Sensitivity - This zone is in a generally natural state and does not contain any fauna or flora species that require protection. It contains areas of disturbed vegetation and also plays host to a number of alien plant species.

- Conservation and Development Opportunities

According to the Tshwane Open Space Framework (2006:47), development of the Faerie Glen Nature Reserve is restricted to that of educational purposes, appreciation for nature and upliftment of the arts by the City of Tshwane Metropolitan Municipality.

The reserve is divided into 3 conservation and development zones (Figure 3.56) based on its ecological sensitivity mapping.

Zone 1 - This area has been identified as mostly having a very high ecological sensitivity and therefore has a high conservation requirement. The spruit is to be maintained in its natural state and control of alien vegetation through manual clearance and rehabilitation in order to restore the riparian vegetation to its pristine state. No permanent structures may be erected within the 50 year flood line, or within 32m of the centre line of the spruit (TOSF 2006:47) without authorisation from the local authority. Activities allowed within this zone include hiking trails and cycling routes.

Zone 2 - This area has a lower ecological sensitivity and is therefore suitable for ecologically sensitive and low-impact development that serves an educational and recreational function. Activities allowed within this zone include bird hides and walkways.

Zone 3 - This area has a low ecological sensitivity and is suitable for development and the erection of limited structures such as a small restaurant, ablution facilities and exhibition spaces.

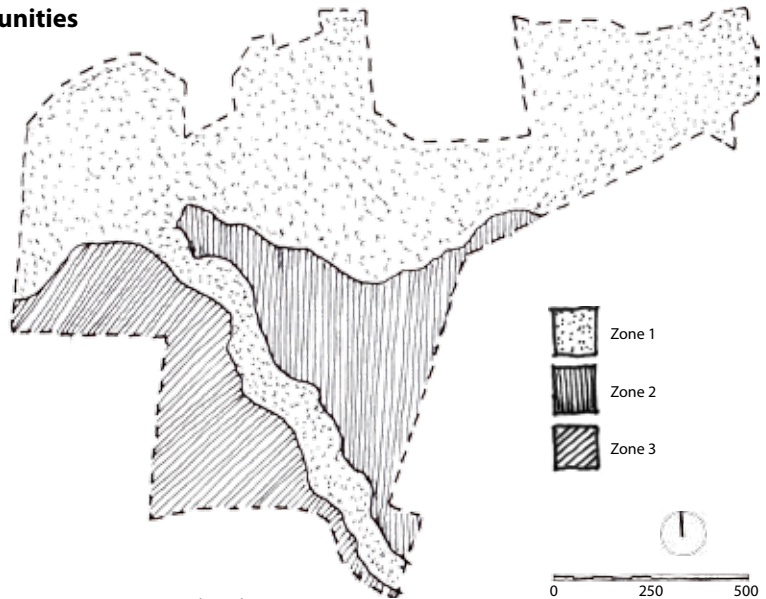


Figure 3.56 Conservation and Development Zones



Figure 3.57 Existing parking and entrance



Figure 3.58 Hadeda trail



Figure 3.59 Arboretum



Figure 3.60 Bird hide

- Access and Activities

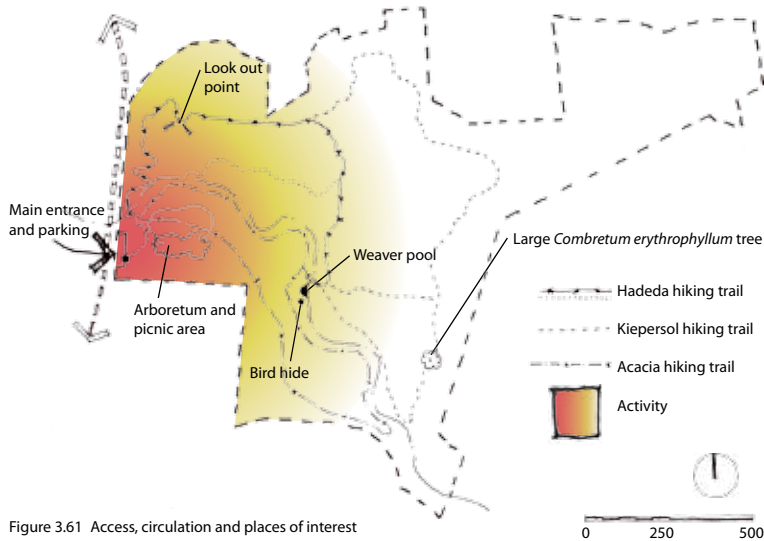


Figure 3.61 Access, circulation and places of interest

The reserve is currently completely fenced off with a palisade fence that runs the length of the perimeter of the reserve. An entrance, with parking (figure 3.57), is located off General Louis Botha drive. An admission fee of R5.00 is charged and a register needs to be signed. Due to the location of the existing entrance, activity in the reserve seems mainly limited to the western edge and central areas of the reserve.

There are 3 established hiking trails in the reserve. The hadeda, Kiepersol and Acacia trails cover a distance of approximately 9 kilometers and provide access to the main lookout points and places of interest in the reserve. The hadeda trail is paved with a concrete strip (figure 5.58) from the river crossing to the look out point at the top of Faerie Glen hill. This has become the main

activity path in the park further adding to the problem of the activity being limited to the western edge of the reserve. There is no river crossing provided in the south-eastern area of the reserve which limits circulation in this area.

Pathways around the reserve are well maintained and signage is clear and provides information to the visitor. The Friends of the Faerie Glen Nature Reserve have established an arboretum (Figure 3.59) near the current entrance along side a mowed grass picnic area. A bird hide has been erected at Weaver pool (Figure 3.60). A large *Combretum erythrophyllum* tree on the eastern side of the reserve provides a beautiful pause area. Activities that currently take place in the reserve include hiking, dog walking, mountain biking, bouldering, bird watching and jogging (Figures 3.62 - 3.65).



Figure 3.62 Mountain biking



Figure 3.63 Dog walking



Figure 3.64 Bouldering



Figure 3.65 Hiking

Visual Analysis



Figure 3.66 View from Lynnwood road.



Figure 3.67 View from General Louis Botha drive.



Figure 3.68 Current entrance building with caretakers cottage to its left



Figure 3.69 Stormwater debris trap with pedestrian bridge behind it



Figure 3.70 View From Glenwood road



Figure 3.71 View from Manitoba drive



Figure 3.72 View from Renosterkop



Figure 3.73 View towards the city



Figure 3.74 View from look out point in summer



Figure 3.75 View from look out point in winter





Figure 3.77 View of the Bronberg Ridge from Glenwood road in winter



Figure 3.76 View of the Bronberg Ridge in summer





Figure 3.78 View from Weaver pool



Figure 3.79 View of the Moroleta spruit floodplain



Figure 3.80 View through the avenue of *Eucalyptus globulus* trees



Figure 3.81 Pathway through the *Celtis africana* - *Rhus pyriodes* closed woodland

Summary

From analysis of the Faerie Glen Nature Reserve, various items have been identified that provide constraints and guidelines for the planning stage of the project.

Contextual analysis

- General Louis Botha drive is a double carriage way and fast traffic makes access to and from the existing entrance of the reserve dangerous for both motor vehicles and pedestrians.
- There is only one entrance to the reserve currently, located on the western side of the reserve, it prevents east access from the surrounding residential areas.
- The reserve, although surrounded by residential areas, does not provides any access directly from these areas.

Site specific analysis

- No development may take place on the Bronberg ridge which is classified as a Class 2 ridge.
- The Moreleta spruit runs diagonally through the site. The 50 year flood line has been identified and no development may take place in this zone or within 32m of the centre line of the spruit.
- The existing parking area lies largely within the 50 year flood line.
- 16 Plant communities are present in the reserve and need to be taken into account in the planting strategy.
- Red data species are present within the reserve and no development may take place in the potential habitats of these species.
- Based on the ecological sensitivity of the reserve, development is limited to specific areas.
- Activity in the reserve is concentrated in the western part due to the location of the existing entrance.
- Existing nature trails, an arboretum and bird hide are present in the reserve.

Visual analysis

- It is clear from the images that the reserve is a beautiful place which provides vistas both to, and from the ridge.