

**ENVIRONMENTAL IMPACT ASSESSMENT FOR THE
PROPOSED MATIMBA-WITKOP NO. 2 400 kV
TRANSMISSION LINE, LIMPOPO PROVINCE**

SPECIALIST STUDY – FLORA

APPENDIX K

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1. APPROACH

A desktop study was supplemented with a survey of the main habitats within the demarcated study area. The terrain was visited during January 2002. The proposed corridors were systematically surveyed at representative survey sites of the main habitats, with the aim to record all the identifiable plant species. All recorded species are listed in Annexure A.

2. VEGETATION TYPES

According to Low & Rebelo (1996), four vegetation types are intersected by the proposed alignments within the study area. The dominant vegetation type along the proposed corridors will be the Mixed Bushveld (Vegetation Type 18, Low & Rebelo 1996), while Sweet Bushveld (Vegetation Type 17, Low & Rebelo 1996) and Waterberg Moist Mountain Bushveld (Vegetation Type 12, Low & Rebelo 1996), will also be affected, although to a much lesser degree. A narrow strip of Clay Thorn Bushveld (Vegetation Type 14, Low & Rebelo 1996) is also included in the study area.

Depending on the alternative alignment: 75% to 82% of the study area can be regarded as Mixed Bushveld; 9% is Sweet Bushveld; 0% (northern alignment) to 8% is Waterberg Moist Mountain Bushveld; and approximately 1% is Clay Thorn Bushveld.

Large areas of the Mixed Bushveld to the east of the Waterberg Biosphere Reserve, as well as most of the Clay Thorn Bushveld are cultivated (approximately 40%). The rural areas utilised for grazing display various degrees of degradation, depending on the stocking rates and level of farm management. Serious degradation due to overgrazing and the absence of proper grazing management programs in these rural areas were recorded. Another feature of the rural agricultural areas within this part of the study area, is the almost total eradication of trees and shrubs. The landscape is literally stripped of any tree or shrub that could provide useful quantities of fuel-wood. The only trees that are left intact, include scattered individuals of *Boscia albitrunca*, *Sclerocarya birrea*, *Mimusops zeyheri*, *Ficus ingens* and *Ficus thonningii*.

To the west of, and within the Waterberg Biosphere Reserve most of the area is utilised for grazing (livestock, game or mixed systems), especially along the southern alignment which bisect an area known for its rugged terrain. The bush here is also very dense at certain areas, while the tree canopy layer may become quite tall (15-20 m). Along the Northern alignment, the tree layer is shorter, the soils are generally deeper and crop production may even be the main agricultural activity on some farms. Various instances of bush encroachment were also

recorded along both alignments with *Dichrostachys cinerea* and *Acacia tortilis* the main encroacher species.

- *Mixed Bushveld (18 - Low & Rebelo 1996) (Figures 1-3; Annexure 2):*
This veldtype is very variable and is represented through many different plant communities and habitat types. It occurs mainly on the undulating to flat plains of the Limpopo and North West Provinces. The soil is mostly shallow, sandy, sometimes coarse and gravelly, overlying granite, quartzite, sandstone or shale. Rainfall is erratic and may fluctuate between 350 to 650 mm p/a. Temperature varies between -8°C in winter and 40°C in summer.

The vegetation is highly variable, depending mostly on the soil type and soil depth, while aspect may also influence the vegetation type. Within the proposed study area the vegetation varies from short, dense, sometimes shrubby bushveld to tall, open tree savanna. On the shallow, heavier, sometimes gravel soils, the tree layer may be totally dominated by *Combretum apiculatum*. Associated trees and shrubs include *Grewia flava*, *G. monticola*, *Dichrostachys cinerea*, *Lannea discolor* and *Sclerocarya birrea*. In general the grass layer is rather sweet with species such as *Schmidtia pappophoroides*, *Digitaria eriantha*, *Eragrostis lehmaniana*, *Antheophora pubescens* and *Stipagrostis uniplumis*. Areas with deeper sandy soils are often dominated by *Terminalia sericea* while other trees and shrubs such as *Peltophorum africanum*, *Combretum zeyheri*, *Ochna pulchra*, *Sclerocarya birrea*, *Faurea saligna* and *Burkea africana* can be found as co-dominants. The grass layer can be fairly coarse and sour with species like *Eragrostis pallens*, *Pogonarthria squarrosa*, *Cymbopogon excavatus* and *Trachypogon spicatus* dominating.

This veld type is fairly well conserved (3,05%) over its distribution range in various nature reserves, private game farms and conservation areas including Ben Alberts, Mabula, Vaalkop Dam, Thaba Tholo, Rust de Winter, Shelanti, Roodeplaat Dam, Nylsvley, Percy Fyfe, Ben Lavin etc. (Low and Rebelo, 1996).

- *Sweet Bushveld (17 - Low & Rebelo 1996) (Figures 4-6; Annexure 2):*
This vegetation type occurs in the wide low-lying (800 m to 950 m) Limpopo River valley, and the associated valleys of tributary rivers (specifically the Mogalakwena and Lapalala rivers within the study area).
The climate is hot and dry with temperatures varying between -5°C and 40°C, and an average of 21°C. The rainfall (350 mm to 500 mm per year) is rather erratic, mostly occurring as thunderstorms during the summer months.

The soil varies from deep, greyish sand to shallow, reddish soils with a clay content up to 35%, overlying granite, quartzite or sandstone.

The vegetation can be described as a low open to closed woodland, often forming large areas of thicket, especially on the heavier soils. In sandy areas the tree canopy layer tends to be higher and is dominated by trees and shrubs, including *Terminalia sericea*, *Combretum apiculatum*, *Acacia nigrescens*, *Acacia tortilis*, *Boscia albitrunca*, *Rhigozum brevispinosum*, *Grewia flava* and *Acacia tortilis*. Here the herbaceous layer is often coarse, dominated by grasses such as *Eragrostis pallens*, *Schmidtia pappophoroides*, *Eragrostis Eragrostis rigidior*, *Eragrostis trichophora*, *Brachiaria nigropedata*, *Loudetia simplex*, *Aristida congesta* subsp. *congesta* and other *Aristida* species.

On shallow, heavier and drier soils, *Combretum apiculatum*, *Commiphora pyracanthoides*, *Euclea undulata*, *Grewia flava*, *Boscia foetida* subsp. *foetida*, *Boscia albitrunca* are often dominant. Due to a combination of various factors (overgrazing, absence of fire, climatic conditions) dense, nearly impenetrable, thickets of *Acacia erubescens*, *A. senegal* var. *rostrata*, *A. mellifera*, *Dichrostachys cinerea* are formed over extended areas. The dominant grasses of this variation includes *Panicum maximum*, *P. coloratum*, *Anthepera pubescens*, *Urochloa mosambicensis*, *Cenchrus ciliaris*, *Enneapogon scoparius*, are sweeter and may be grazed right through the year.

According to Low & Rebelo (1996) this vegetation type are poorly conserved on a formal level, though a representative example are conserved in the Langjan Nature. In general, large areas are informally conserved on many private game farms.

- *Waterberg Moist Mountain Bushveld* (12 - Low & Rebelo 1996) (Figures 7-9; Annexure 2):

The annual rainfall varies between 650 mm to 950 mm and the temperature between -6°C and 39°C. The soils are acidic, sandy, loamy to gravelly (Low and Rebelo, 1996).

The vegetation may vary considerably according to local soil conditions, while aspect and rockiness may also play a mayor role in species composition. Common tree species include *Burkea africana*, *Peltophorum africanum*, *Faurea saligna*, *Diplorynchus condylocarpon*, *Pseudolacnostylis maprouneifolia*, *Combretum apiculatum*, *Combretum zeyheri*, *Combretum molle*, *Ficus ingens*, *F. abutilifolia*, *Mimusops zeyheri*, *Kirkia accuminata*, *Croton gratissimus*, *Rhus leptodictya*, *Englerophytum magalismsontanum* and *Albizia tanganyicensis*. The shrub layer is well developed and includes, amongst others, *Ochna pulchra*, *Ochna pretoriensis*, *Euclea crispa*, *Grewia flavescens*, *Diospyros lycioides* subsp. *guerki*, *Vangueria infausta*, *Pouzolzia mixta* and *Rothmannia capensis*. Although the grass layer is floristically rich,

it is not as valuable for grazing purposes as the lower lying areas. Principal species include *Themeda triandra*, *Diheteropogon contortus*, *Tristachya leucothrix*, *Loudetia simplex*, *Trachypogon spicatus*, *Aristida transvaalensis*, *Panicum natalense*, *P. maximum*, *Melinis nerviglume* and *Bewsia biflora*.

This vegetation type is fairly well conserved ($\pm 8,5\%$) in various provincial and private nature reserves as well as private game farms in the Waterberg: Lapala Wilderness, Touch Stone, Mabalingwe Nature Reserve, Hans Strijdom Dam Nature Reserve, etc. (Low & Rebelo, 1996).

- *Clay Thorn Bushveld/Other Turf Thornveld (14 - Low & Rebelo 1996) (Figures 10 – 11; Annexure 2):*

Occurring on the black vertic clay soils of the flat plains of the North-West and Limpopo Provinces. The temperature varies between -6°C in winter and 40°C in summer. Rainfall is highly variable and may vary between 450 mm and 750 mm per year.

Acacia tortilis, *Acacia karroo* and *Acacia nilotica* dominate the tree layer. Other common trees and shrubs include *Acacia nigrescens*, *Ziziphus mucronata*, *Dichrostachys cinerea*, *Rhus pyroides* and *Rhus lancea*. The dominant grasses include *Ischaemum afrum*, *Panicum coloratum*, *Bothriochloa insculpta* (degraded areas), *Eragrostis curvula* and *Setaria incrassata*. Typical forb species include *Crabbea angustifolia*, *Chamaecrista comosa*, *Hibiscus trionum*, *Helichrysum rugulosum*, *Tephrosia capensis* and *Vernonia oligocephala*.

According to Low and Rebelo (1996), an estimated 60% of this veld type is transformed while it is rather poorly conserved (0,93%) in parts of the Nylsvley, Mosdene, Potgietersrus and Warmbaths Nature Reserves.

3. RARE AND ENDANGERED PLANT SPECIES

None of the plant species recorded and listed in Annexure A are found in the "Red Data List of southern African plants" (Craig Hilton-Taylor, 1996) or on the updated PRECIS database of the NBI, Pretoria. There is, however, a distinct possibility that several Red Data species may occur in the study area.

If the diversity in potential microhabitats specifically within the rugged, mountainous terrain of the Waterberg Biosphere Reserve is taken into account though, several Red Data plant species and/or protected plant species may occur along this alignment. A list of Red data species (Table 1) was compiled according to the PRECIS databank of the NBI, Pretoria. According to this list the following breakdown of red data species occurrence can be made:

- *Endangered Species* (taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating): At least one species that is categorised as Endangered (*Euphorbia groenewaldii*, dwarf succulent) may occur in the study area, with a high likelihood of occurring in the Waterberg Moist Mountain Bushveld along the southern corridor.
- *Vulnerable Species* (taxa believed likely to move into the Endangered category in the near future if the factors causing decline continue operating): three Vulnerable species i.e. *Euphorbia clivicola* (dwarf succulent), *Euphorbia waterbergensis* (succl. shrub) & *Warburgia salutaris* (tree) also have a high likelihood of occurrence in the same area.
- *Rare Species* (taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline): Thirteen Rare species may possibly occur within the study area, of which six may in all likelihood occur along the southern corridor in the Waterberg Moist Mountain Bushveld (Table 1).
- Another thirteen species which is insufficiently Known may also occur within the study area (Table 1).

Table 1: Red Data species that may occur within the study area

Species	Status *	Likelihood of occurrence according to main habitat preferences			
		Clay Thorn Bushveld	Waterberg Moist Mountain Bushveld	Sweet Bushveld	Mixed Bushveld
<i>Euphorbia groenewaldii</i> (dwarf succulent)	E	Highly unlikely	Highly likely	Highly unlikely	Possible
<i>Euphorbia clivicola</i> (dwarf succulent)	V	Highly unlikely	Highly likely	Highly unlikely	Possible
<i>Euphorbia waterbergensis</i> (succl. shrub)	V	Highly unlikely	Highly likely	Highly unlikely	Possible
<i>Warburgia salutaris</i> (tree)	V	Highly unlikely	Highly likely	Unlikely	Possible
<i>Asclepias fallax</i> (herb)	R	Unlikely	Possible	Unlikely	Possible
<i>Asclepias eminens</i> (herb)	R	Unlikely	Possible	Unlikely	Possible
<i>Aloe vryheidensis</i> (succulent shrub)	R	Highly unlikely	Possible	Highly unlikely	Unlikely
<i>Anacampseros rhodesica</i> (dwarf succl.)	R	Highly unlikely	Highly likely	Highly unlikely	Possible
<i>Boscia foetida</i> subsp. <i>minima</i> (shrub)	R	Unlikely	Likely	Possible	Possible

Species	Status *	Likelihood of occurrence according to main habitat preferences			
		Clay Thorn Bushveld	Waterberg Moist Mountain Bushveld	Sweet Bushveld	Mixed Bushveld
<i>Brachystelma minor</i> (herb)	R	Unlikely	Highly likely	Unlikely	Likely
<i>Bulbine brunsvigiaefolia</i> (herb)	R	Highly unlikely	Possible	Unlikely	Likely
<i>Combretum petrophilum</i> (shrub/tree)	R	Highly unlikely	Highly likely	Highly unlikely	Possible
<i>Euphorbia restricta</i> (succulent shrublet)	R	Highly unlikely	Possible	Highly unlikely	Unlikely
<i>Gladiolus dolomiticus</i> (herb)	R	Highly unlikely	Highly likely	Highly unlikely	Possible
<i>Otholobium polyphyllum</i> (shrub)	R	Highly unlikely	Possible	Unlikely	Likely
<i>Sartidia jucunda</i> (grass)	R	Highly unlikely	Likely	Highly unlikely	Unlikely
<i>Tetradenia barberae</i> (shrub)	R	Highly unlikely	Highly likely	Unlikely	Likely
<i>Barleria rehmannii</i> (herb)	K	Possible	Likely	Possible	Possible
<i>Barleria bolusii</i> (herb)	K	Highly unlikely	Unlikely	Possible	Likely
<i>Bowiea volubilis</i> (herb)	K	Highly unlikely	Highly likely	Unlikely	Possible
<i>Euphorbia louwii</i> (succulent shrub)	K	Highly unlikely	Highly likely	Highly unlikely	Possible
<i>Lophacme digitata</i> (grass)	K	Highly unlikely	Likely	Unlikely	Possible
<i>Loudetia pedicellata</i> (grass)	K	Highly unlikely	Possible	Unlikely	Likely
<i>Melhania integra</i> (herb)	K	Highly unlikely	Possible	Unlikely	Likely
<i>Mosdenia leptostachyus</i> (grass)	K	Highly unlikely	Possible	possible	Likely
<i>Ozoroa albicans</i> (shrub)	K	Highly unlikely	Likely	Unlikely	Possible
<i>Parapodium costatum</i> (herb)	K	Unlikely	Likely	Possible	Likely
<i>Rhynchosia nitens</i> (shrub)	K	Possible	Likely	Possible	Highly likely
<i>Salvia dolomitica</i> (shrub)	K	Highly unlikely	Likely	Unlikely	Likely
<i>Tristachya biseriata</i> (grass)	K	Highly unlikely	Likely	Unlikely	Possible

R – Rare; V – Vulnerable; K – Insufficiently known

Apart from the Red Data species, several species occurring in the study area are listed in the Transvaal Nature Conservation Ordinance, No. 12 of 1983, Chapter VII, Indigenous Plants, Protected plants and specially protected plants (Schedule 11, Section 86 (1) & 87 (1)). These species include:

- *Scadoxys multiflora*
- *Huernia hystrix*
- *Amocharis coranica*
- *Aloe* – several species
- *Cussonia* - several species
- *Protea* - several species

3.1. Hot spot or sensitive areas with a possible concentration of endangered, rare and/or protected species

Proposed corridor 1 will follow the existing Transmission line for most of the distance. South-east of Marken, the line is proposed to pass through the Waterberg Biosphere Reserve for approximately 20 km. Most of this area falls within the Waterberg Moist Mountain Bushveld. Considerable variation in habitat caused by a complex of environmental parameters (soils, aspect, drainage, exposure, etc.), over time gave rise to ecological systems of rich bio-diversity in terms of fauna and flora within this vegetation type. According to Table 1, twenty-nine of the thirty red data species listed may occur in this area, of which eleven have a high likelihood of occurrence. Several protected plant species also occur here.

This area can thus be classified as very sensitive in terms of red data plant species. Special mitigation measures should be in place to protect the habitat and plant species if the total southern alignment is chosen.

4. POTENTIAL IMPACT ON THE NATURAL VEGETATION

The potential impact of the line should firstly be considered on a vegetation/plant community scale:

- *Transformed vegetation*: The proposed alignments cover a very large study area, characterised by a variety of vegetation types and a myriad of micro-habitats. To complicate the matter further, historic and current land use practices had a considerable influence on the vegetation composition and veld condition within the different vegetation types. Over large distances, the vegetation was almost completely transformed to a semi-natural state through agriculture (cultivation, overgrazing, bush encroachment etc.) and various other human activities (rural communities, roads etc.). The impact on the natural vegetation within these areas is, therefore, anticipated to be low and insignificant.

- *Natural vegetation used for grazing:* All areas unsuitable for cultivation were mainly used for livestock production during the 20th century. Several different management practices were applied during this time, e.g. different camp systems, wagon wheel systems, withholding or use of fire, different approaches to game and livestock ratios etc. Depending on the degree of utilisation and the specific succession and duration of management practices applied through the years, the natural vegetation was also transformed to various degrees of species composition and veld condition. It can therefore be stated with confidence, that the term "pristine" veld (in the strict sense) can not be applied to any significantly large area of bushveld within the study area.

Certain areas though, were utilised to a lesser degree due to the generally low production potential (highly leached, shallow and gravelly soils) and difficult, sometimes inaccessible, mountainous terrain. These areas (e.g. Waterberg Moist Mountain Bushveld - along the eastern section of corridor 1) are often in a much better conserved state than the lower lying areas on more fertile and deeper sand/loam and clay soils).

Construction of a Transmission line through these areas will therefore have a much higher impact on the vegetation than anywhere else within the study area. As indicated previously, the possibility for several Red Data and Protected plant species to occur within these areas are highly likely and the potential impact of the proposed line can therefore be regarded as high. If the Transmission line is constructed within these areas after all, meticulous attention to the placement of the towers, as well as the general management practices during construction and operation, will be essential.

4.1. Specific Areas or Types of Impact

All along the proposed alignments, there are specific instances where activities related to the construction and maintenance of the proposed line could have a significant impact on an individual plant, group of plants or sensitive habitat. One or several of the following impacts on the vegetation could be expected along the power line:

- Partial or even total destruction of the vegetation at the tower sites during the construction phase. Considerable damage may occur within the specific areas e.g. the digging of the foundations, footprints and/or compaction by heavy machinery, trampling by construction personnel, vehicles, etc.
- Formation of exposed soil patches through decreased vegetation cover over the long-term (compaction of the topsoil, etc.) which in turn increases the risk of soil erosion, especially on steep slopes. The same is true for the construction of access roads and construction camps.

- Poorly planned access roads can alter the water drainage patterns and lead to a total change in species composition of the effected vegetation.
- Disturbance of the roots and surrounding soil conditions of *Dichrostachys cinerea* (sekelbos) plants may cause prolific sprouting/re-sprouting, eventually leading to a bush encroachment problem.
- Non-selective clearing of the servitude may also lead to mayor changes in species composition and the eventual dominance of a few species in the surrounding area. This could lead to a decrease in local species diversity.
- Indiscriminant use of chemicals to control invasive species during servitude clearing operations may negatively impact on the surrounding vegetation. The risk of a chemical spill, causing extensive damage to the vegetation is also very real.
- Red Data and Protected plant species: Disturbance of these species or species populations should be avoided as far as possible. Relocation of plants is often unsuccessful, while long-term impacts on the local species interaction of the new site, are difficult to predict.
- Gates, access roads and servitudes increase the risk of illegal access to rare or endangered plant species by illegal plant collectors for horticultural and medicinal purposes.
- Outstanding specimens of rare or characteristic bushveld trees or shrubs, e.g. *Ficus abutilifolia* (large-leaved rock fig), *Adenia spinosa*, *Berchemia zeyheri* (red ivory), *Combretum imberbe* (hardekool), *Maerua angolensis* (bead bean) *Spirostachys africana* (tamboti) or *Sesamothamnus lugardii*, occur along all of the proposed alignments. Although these species may not be regarded as Rare and Endangered, individual specimens or groups of plants may display unique size, age or other characteristics that warrant special mitigation measures.
- Certain trees and shrubs are highly regarded for either their browsing value (e.g. *Acacia erioloba*, *Boscia albitrunca*, and *B. foetida*) or their medicinal and/or food value (*Sclerocarya birrea*, *Mimusops zeyheri* etc.) and are consequently jealously guarded by the landowners. Special care during construction and operation of the line is required to ensure the long-term conservation of these species.
- On several occasions, the proposed alignments cross non-perennial streams or rivers (e.g. Mogolakwena river, east of Ellisras). A river system can be seen as a longitudinal ecosystem, not only reflecting the condition of the terrestrial veld in the catchment, but also the condition and status of the river upstream. River systems make it possible for exotic, invader and weed species to disperse their seed over long distances because the ideal conditions that often exists along the stream-banks, render the system particularly vulnerable to opportunistic colonisation by exotic weeds and invader plants. Vegetation associated with streams and/or rivers channels (riparian vegetation) can, therefore, be regarded as highly sensitive to any development and should rather be avoided.

- Due to the highly destructive force of floodwaters, extreme care should be taken during the erection of any structure within the riparian zone. Preferably, this vegetation zone should be avoided as far as possible. Proper stabilisation and rehabilitation of the disturbed areas are regarded as critical to prevent stream-bank degradation and eventual spread of alien weeds and invader plants.
- Wetlands do occur in several localities within the study area (e.g. Uitkomst farm along the western section of the Southern alignment, Goedgedacht farm west of Marken etc.). Due to the sensitive nature of wetland habitats and the important role they play in the functioning of the broader ecological system as well as water quality, wetlands should be avoided as far as possible.
 - Any physical disturbance of the soil gives rise to conditions favourable to the invasion of pioneer plant species, which in many cases are exotics with invasive qualities. Disturbed areas invaded by such plants can serve as seeding sources for the further distribution of these species to agricultural land, especially if such areas occur on or near stream and/or riverbanks. The management and control of declared weeds and invader plants are regulated by the Conservation of Agricultural Resources Act, No 43 of 1983 (Sections 1, 2, 5 and 6).
 - Various human activities during construction and operation or lightning activity will increase the risk of veld fires emanating and spreading from within the servitude. The ecological impact of veld fires can be devastating to the grazing/browsing capacity of the vegetation over large areas in the short term. Although the long-term impact of fire could be positive (control of bush encroachment etc.), accidental fires rarely occur during the correct time and/or season of the year to effect a positive impact on the vegetation. The impact of an uncontrolled and unplanned fire during the wrong time of the growing season can therefore be very negative on the vegetation in general and can even cause total destruction of certain vulnerable species or species populations.

5. RECOMMENDATIONS

- Considering the high probability of occurrence of Rare and Endangered plant species, the Waterberg Moist Mountain Bushveld along the southern alignment (next to the existing Matimba-Witkop No. 1 400 kV Transmission line) can thus be classified as very sensitive in terms of red data plant species. Special mitigation measures should be in place to protect the habitat and plant species if the southern alignment is chosen:
 - * a detailed vegetation study will be required along the final alignment through the Waterberg Biosphere Reserve

- * The necessary permits for the removal or relocation of Red Data species must be secured from the relevant provincial department before construction starts.
- * Special attention should be given to the exact placement of the pylons in order to avoid sensitive habitats and/or individual plants or groups of plants as indicated by the specialist vegetation survey of the final alignment
- * Lengthening of the towers by approximately four meters within this area, will prevent the need for removal of most of the larger trees and shrubs and therefore minimise the potential impact on the vegetation considerably
- * Clearing of trees and shrubs within the servitude between the towers should be done at minimum level and very selectively within these sensitive areas.
- * Rare/endangered/protected species which are found along the route may be relocated (to a similar location/habitat not more than 300 metres from original location) before construction proceeds. An experienced person/institution must assist the contractor to ensure that the best options are followed.
- * The prescribed mitigation measures, including pre-arranged agreements with specialist institutions/persons to deal with any threatened species found during construction, should be included in the EMP.
- Rehabilitation of disturbed areas should receive high priority and must be included in the EMP. Recommendations regarding the specific plant species used during rehabilitation should be site specific and according to the surrounding vegetation composition.
- To assist contractors in the event of identification of rare, endangered or protected species during the construction phase, the following generic mitigation measures are proposed:
 - * A baseline data set (list of probable rare, endangered or threatened – outcome of the detailed specialist study) that could be encountered by the construction team should be drawn up.
 - * Special environmental provisions should be included in construction agreements. This should include:
 - Penalties for removal and/or destruction of threatened species for any reason (firewood, medicinal use, collectors value etc) should be agreed upon beforehand.
 - A protocol describing the actions to be followed if a threatened species is found should be in place.
- Declared weeds and plant invaders should be controlled and managed according to the regulations of the Conservation of Agricultural Resources Act, No 43 of 1983 (Sections 1, 2, 5 and 6). All necessary actions prescribed by this act must be included in the EMP.

- Eskom and all relevant landowners, during negotiations regarding the servitudes for the final alignment, should take full cognisance of the implications of the National Veld and Forest Fire Act, No 101 of 1998.
 - * All necessary actions regarding the prevention and control of veld fires as stipulated by the act should be included in the EMP.
 - * Legal obligations, risks and liabilities regarding the same should also be brought to the attention of contractors responsible for the maintenance of the line and clearing of the servitudes. These aspects should also be included in their contracts.

5.1. Preferred Alignment

In terms of potential impact on the natural vegetation (not cultivated) as well as specific sensitive habitats and endangered plant species:

- Corridor 2, with minor alterations to avoid sensitive areas, is the preferred route.
- The proposal to follow the existing Matimba-Witkop No. 1 400 kV Transmission line through the Waterberg Biosphere Reserve can only be considered if specific mitigation measures are implemented (see above).
- The proposed linkage between corridors 1 and 2 (near Overysel) is not supported due to its potential impact in an area without similar disturbances.

**ANNEXURE A:
PLANT SPECIES RECORDED AT REPRESENTATIVE
SITES WITHIN THE STUDY AREA**

PLANT SPECIES RECORDED AT REPRESENTATIVE SITES WITHIN THE STUDY AREA

Plant species recorded at representative sites within the study area are indicated in Table A1 overleaf. Functional growth forms were allocated to each species using the following classes:

- **Grasses and grass-like species** - all representatives of the Poaceae, Restionaceae and Cyperaceae
- **Herbaceous plants** - Non-woody, annuals and perennials, climbers & creepers, geophytes & ferns
- **Woody plants:**
 - * **Dwarf shrubs** - woody, single or multi stemmed, shorter than 1 m.
 - * **Shrubs** - woody, single or multi stemmed, taller than 1 m and shorter than 2 m.
 - * **Trees** - woody, single stemmed, taller than 2 m or multi-stemmed and taller than 5m.

The plant species recorded on representative sites for the Matimba-Witkop powerline are indicated as follows:

- exotic species - **(e)**,
- declared weeds - **(w)**,
- species with invasive qualities - **(i)**,
- protected species - **(p)**, and
- endangered species - **(#)**.

Table 1: Plant species recorded at the representative sites within the study area

Grasses and grass-like species		Status	Mixed Bushveld	Sweet Bushveld	Waterberg Moist Mountain Bushveld	Clay Thorn Bushveld
<i>Andropogon schirensis</i>	Stab grass/Tweevingergras		X		X	
<i>Aristida adscensionis</i>	Annual Three-awn grass/Eenjarige Steekgras		X		X	
<i>Aristida congesta</i> subsp. <i>barbicollis</i>	Spreading Three-awn/Los Steekgras		X	X	X	X
<i>Aristida congesta</i> subsp. <i>congesta</i>	Tassle Three-awn/Katstertsteekgras		X	X		X
<i>Aristida diffusa</i>	Iron grass/Ystergras		X	X		
<i>Aristida stipitata</i>	Long-awned grass/Langnaaldsteekgras		X	X		
<i>Aristida transvaalensis</i>	-		X		X	
<i>Bewsia biflora</i>	False love grass/Vals eragrostis		X	X		X
<i>Bothriochloa insculpta</i>	Pinhole grass/Stippelgras		X		X	X
<i>Brachiaria nigropedata</i>	Black-footed grass/Swartvoetjiegras		X	X		
<i>Brachiaria serrata</i>	Velvet grass/Fluweelgras		X		X	
<i>Bulbostylis burchellii</i>	-		X	X	X	
<i>Cenchrus ciliaris</i>	Blue Buffalo grass/Bloubuffelsgras			X		
<i>Cymbopogon excavatus</i>	Broad-leaved turpentine grass/Breëblaarterpentyngras		X		X	
<i>Cymbopogon plurinodis</i>	Narrow-leaved Turpentine grass/Smalblaarterpentyngras			X		X
<i>Cynodon dactylon</i>	Couch grass/Kweek		X	X		X
<i>Cyperus rupestris</i>	-				X	
<i>Digitaria eriantha</i>	Finger grass/Vingergras		X	X	X	X
<i>Diheteropogon amplexans</i>	Broad-leaved bluestem		X		X	

		Status	Mixed Bushveld	Sweet Bushveld	Waterberg Moist Mountain	Clay Thorn Bushveld
<i>Elionurus muticus</i>	Wire grass/Koperdraad		X		X	
<i>Enneapogon cenchroides</i>	Nine-awned grass/Negenaaldgras		X	X	X	
<i>Enneapogon scoparius</i>	Bottlebrush grass/Kalkgras		X		X	
<i>Enteropogon macrostachyus</i>	Mopane grass/Mopaniegras				X	
<i>Eragrostis capensis</i>	Heart-seed Love grass/Hartjiegras		X			
<i>Eragrostis chloromelas</i>	Curly leaf/Krulblaar		X			X
<i>Eragrostis curvula</i>	Weeping love grass/Oulandsgras		X		X	
<i>Eragrostis gummiflua</i>	Gum grass/Kleefgras		X			
<i>Eragrostis lehmanniana</i>	Lehman's Love grass/Knietjiesgras		X	X		
<i>Eragrostis racemosa</i>	Narrow Heart Love grass/Smalhartjiegras		X			
<i>Eragrostis rigidior</i>	Broad-leaved Curly Leaf/Breekkrulblaar		X	X		
<i>Eragrostis superba</i>	Saw-tooth Love grass/Weeluisgras		X		X	
<i>Fingerhuthia africana</i>	Thimble grass/Vingerhoedgras		X		X	X
<i>Heteropogon contortus</i>	Spear grass/Assegaaigras		X		X	
<i>Hyparrhenia filipendula</i>	Fine Thatching grass/Fyntamboekiegras		X	X		
<i>Hyparrhenia hirta</i>	Thatch grass/Dekgras		X		X	
<i>Hyparrhenia tamba</i>	Blue thatching grass/Bloutamboekiegras		X		X	X
<i>Ischaemum afrum</i>	Turf grass/turfgras					X
<i>Loudetia simplex</i>	Common russet grass/Stingelgras		X		X	
<i>Melinis nerviglumis</i>	Bristle-leaved Red Top/Steekblaar-rooipluim		X		X	

		Status	Mixed Bushveld	Sweet Bushveld	Waterberg Moist Mountain	Clay Thorn Bushveld
<i>Melinis repens</i>	Natal red top/Natalse rooipluim		X	X	X	
<i>Panicum coloratum</i>	White Buffalo grass/Witbuffelsgras		X	X	X	
<i>Panicum maximum</i>	Guinea grass/Gewone buffelsgras		X	X	X	
<i>Perotis patens</i>	Cat's Tail/Katstertgras		X		X	
<i>Pogonarthria squarrosa</i>	Herringbone grass/Sekelgras		X			
<i>Setaria incrassata</i>	Canary millet		X		X	X
<i>Setaria pallide-fusca</i>	Garden Bristle grass/Tuinmannagras		X			
<i>Setaria sphacelata var. sericea</i>	Golden Bristle grass/Goue-mannagras			X		X
<i>Setaria sphacelata var. sphacelata</i>	Common bristle grass/Mannagras		X		X	
<i>Sporobolus stapfianus</i>	Fibrous dropseed/Veselfynsaadgras		X		X	
<i>Stipa dregeana var. elongata</i>	-		X			
<i>Themeda triandra</i>	Red grass/Rooigras		X		X	
<i>Trachypogon spicatus</i>	Giant spear grass/Bokbaardgras		X		X	
<i>Tragus berteronianus</i>	Common Carrot Seed grass/Gewone Wortelsaadgras		X	X	X	
<i>Trichoneura grandiglumis</i>	Small rolling gras/Klein rolgras		X		X	
<i>Tristachya leucothrix</i>	Hairy Trident grass/Harige Driebloemgras				X	
<i>Urochloa mosambicensis</i>	Common Signal grass/Bosveldbeesgras		X	X		

		Status	Mixed Bushveld	Sweet Bushveld	Waterberg Moist Mountain	Clay Thorn Bushveld
Herbaceous plants						
<i>Achyranthes aspera</i>	Chaff flower/Langklits		X	X	X	
<i>Amaranthus hybridus</i>	Pigweed/Misbredie		X	X		
<i>Ammocharis coranica</i>	Tumbleweed/Seeroogblom	p			X	
<i>Becium angustifolium</i>	-		X			
<i>Bidens pilosa</i>	Black Jack/Knapsekerel		X	X	X	X
<i>Chamaecrista comosa</i>	-		X	X		
<i>Clematis brachiata</i>	Traveler's Joy/Klimop		X	X	X	
<i>Cleome maculata</i>			X		X	
<i>Commelina africana</i>	-		X	X	X	
<i>Commelina erecta</i>	-		X		X	
<i>Conyza bonariensis</i>	Flax-leaf Fleabane/Kleinskraalhans		X		X	
<i>Corchorus asplenifolius</i>	-		X			
<i>Cucumis hirsitus</i>	Wild Cucumber/Wildekomkommer		X		X	
<i>Cucumis zeyheri</i>	-		X	X		
<i>Disa woodii</i>	-	P	X		X	
<i>Felicia muricata</i>	-		X			
<i>Gazania krebsiana</i>	Botterblom		X			
<i>Gladiolus sp.</i>	-	p	X			

		Status	Mixed Bushveld	Sweet Bushveld	Waterberg Moist Mountain	Clay Thorn Bushveld
<i>Heliotropium steudneri</i>	-		X			
<i>Hibiscus engleri</i>	-		X			
<i>Hibiscus trionum</i>	Bladderweed/Terblansbossie		X			
<i>Indigofera daleoides</i>	-		X			
<i>Indigofera filipes</i>	-			X		
<i>Ipomoea bathycolpos</i>	Veldsambreeltjies		X			
<i>Jatropha sp.</i>	-			X		
<i>Melhania prostrata</i>	-		X			
<i>Pavonia burchellii</i>	-		X	X	X	
<i>Pellaea calomelanos</i>	Rock fern	p	X		X	
<i>Ruellia patula</i>	-		X			
<i>Sansevieria pearsonii</i>	-		X			
<i>Scadoxus multiflorus</i>	-	p	X		X	
<i>Schkuhria pinnata</i>	-		X			
<i>Senecio venosus</i>	-		X		X	X
<i>Sida cordifolia</i>	-		X			
<i>Sida dregei</i>	-		X			
<i>Solanum kwebense</i>	-	I	X			
<i>Solanum panduriforme</i>	Poison apple/Gifappel		X	X	X	X
<i>Sphenostylis angustifolius</i>	Wild Sweetpea/Wilde-ertjie		X			

		Status	Mixed Bushveld	Sweet Bushveld	Waterberg Moist Mountain	Clay Thorn Bushveld
<i>Tagetes minuta</i>	Khaki weed/Kakiebos	e,i	X		X	
<i>Tephrosia capensis</i>	-		X		X	
<i>Tragia rupestris</i>	-		X			
<i>Triumfetta sonderii</i>	Maagbossie		X			
<i>Walafrida densiflora</i>	-		X			
<i>Waltheria indica</i>	Meidebossie		X			
<i>Xanthium strumarium</i>	Boetebossie	e,i, w	X			
<i>Zinnia peruviana</i>	Wilde-Jakobregop	e	X		X	
<i>Zornea milneana</i>	-			X		
Woody plants: dwarf shrubs, shrubs& trees						
<i>Acacia burkei</i>	Black Monkey-thorn/Swartapiesdoring		X			
<i>Acacia caffra</i>	Common hook-thorn/Gewone haakd.		X			
<i>Acacia erioloba</i>			X	X		
<i>Acacia erubescens</i>	Blue Thorn/Blouhaak, Geelhaak		X	X		
<i>Acacia karroo</i>	Sweet thorn/Soetdoring		X			
<i>Acacia mellifera</i>	Swarthaak	i		X		
<i>Acacia ngrescens</i>	Knob-thorn/Knoppiedoring		X	X		
<i>Acacia robusta</i> subsp. <i>robusta</i>	Enkeldoring		X	X	X	

		Status	Mixed Bushveld	Sweet Bushveld	Waterberg Moist Mountain	Clay Thorn Bushveld
<i>Acacia senegal var. rostrata</i>	Three-thorned Acacia/Driehaakdoring			X		
<i>Acacia tortilis</i>	Umbrella thorn/Haak-en-steek		X	X	X	X
<i>Adansonia digitata</i>	Baobab/Kremetart		X			
<i>Adenia glauca</i>	-		X			
<i>Agave sp.</i>		e	X			
<i>Albizia tanganyicensis</i>	Paperbark Albizia/Papierbasvalsdoring		X		X	
<i>Aloe greatheadii var. davyana</i>	-		X	X		
<i>Aloe marlothii</i>	Mountain aloe/Bergaalwyn		X			
<i>Ancylobotrys capensis</i>	Wild Apricot/Wilde-appelkoos		X		X	
<i>Asparagus suaveolens</i>	Wild asparagus/Katdoring		X	X		
<i>Asparagus laricinus</i>	Wild Asparagus/Katbos		X		X	
<i>Berchemia zeyheri</i>	Red Ivory/Rooi-ivoor				X	
<i>Boscia albitrunca</i>	Sheperd's tree/Witgat		X	X		
<i>Boscia foetida subsp. foetida</i>	Smelly Sheperd's tree/Stinkwitgat		X	X		
<i>Brachylaena rotundata</i>	Mountain Silver Oak/Bergvaalbos				X	
<i>Bridelia mollis</i>	Velvet sweetberry/Fluweelsoetbessie		X		X	
<i>Burkea africana</i>	Wild Seringa/Wildesering		X		X	
<i>Canthium gilfillanii</i>	Velvet rock alder/Fluweelklipels		X		X	
<i>Carissa bispinosa</i>	Forest num-num/Bosnoemnoem		X		X	
<i>Cassine aethiopica</i>	Kooboo-berry/Koeboebessie				X	

		Status	Mixed Bushveld	Sweet Bushveld	Waterberg Moist Mountain	Clay Thorn Bushveld
<i>Clerodendrum glabrum</i>	White Cat's Whiskers/Harpuisblaar		X		X	
<i>Colophospermum mopane</i>	Mopane/Mopanie		X			
<i>Combretum apiculatum</i>	Red Bushwillow/Rooibos		X	X	X	
<i>Combretum engleri</i>	Sand Bushwillow/Sandboswilg				X	
<i>Combretum erythrophyllum</i>	River Bushwillow/Riviervaderlandswilg		X		X	
<i>Combretum hereroense</i>	Russet Bushwillow/Kierieklapper		X		X	
<i>Combretum imberbe</i>	Leadwood/Hardekool		X	X		
<i>Combretum molle</i>	Velvet Bushwillow/Basterrooibos		X		X	
<i>Combretum zeyheri</i>	Large-fruited Bushwillow/Raasblaar		X		X	
<i>Commiphora angolensis</i>	Sand Cmmiphora/Sandkanniedood		X			
<i>Commiphora marlothii</i>	Paperbark Commiphora/Papierbaskanniedood				X	
<i>Commiphora mollis</i>	Velvet Commiphora/Fluweelkanniedood		X		X	
<i>Commiphora pyracanthoides</i>	Common Corkwood/Gewone Kanniedood		X			
<i>Croton gratissimus</i>	Lavender Fever-berry/Laventelkoorsbessie				X	
<i>Cussonia paniculata</i>	Mountain Cabbage tree/Bergkiepersol	p	X		X	
<i>Cyphostemma simulans</i>	Wild Grape/Wilde-druif		X			
<i>Dichrostachys cinerea</i>	Sickle bush/Sekelbos		X	X	X	X
<i>Diplorhynchus condylocarpon</i>	Horn-pod tree/Horingpeultjieboom		X			
<i>Diospyros lyciodes</i> subsp. <i>guerkei</i>	Bloubos		X		X	
<i>Dombeya rotundifolia</i>	Common Wild Pear/Gewone Drolpeer		X		X	

		Status	Mixed Bushveld	Sweet Bushveld	Waterberg Moist Mountain	Clay Thorn Bushveld
<i>Ehretia rigida</i>	Puzzle bush/Deurmekaarbos		X	X	X	X
<i>Elephanthorrhiza elephantina</i>	Elephant's root/Olifantswortel		X			
<i>Elephanthorrhiza burkei</i>	Sumach-bean/Basboontjie		X		X	
<i>Englerophytum magalismontanum</i>	Transvaal milkplum/Stamvrug		X		X	
<i>Eucalyptus</i> sp.	Bluegum/Bloekom		X			
<i>Euclea crispa</i>	Blue Guarri/Bloughwarrie		X			
<i>Euclea natalensis</i>	Large-leaved Guarri/Natalghwarrie				X	
<i>Euclea undulata</i>	Common Guarri/Gewone ghwarrie		X			
<i>Euphorbia cooperii</i>	Transvaal Candelabra tree/Tvl kandelaarnaboom				X	
<i>Euphorbia ingens</i>	Tree Euphorbia/Naboom		X		X	
<i>Faurea saligna</i>	Beechwood/Boekenhout		X			
<i>Ficus abutilifolia</i>	Large-leaved Rock Fig/Grootblaarrotsvy				X	
<i>Ficus glumosa</i>	Mountain Fig/Bergvy				X	
<i>Ficus ingens</i>	Red-leaved Fig/Rooiblaarvy				X	
<i>Ficus thonningii</i>	Common Wild Fig/Gewone Wildevy		X		X	
<i>Gardenia volkensii</i>	Transvaal Gardenia/Transvaalkatjeepering		X		X	
<i>Grewia flava</i>	Brandy bush/Wilderrosyntjie		X	X		
<i>Grewia flavescens</i> var. <i>flavescens</i>	/Sandpaper Raisin/Skurwerosyntjie		X	X	X	
<i>Grewia monticola</i>	Silver Raisin/Vaalrosyntjie		X	X	X	
<i>Heteromorpha arborescens</i>	Parsley tree/Wildepietersieliebos				X	

		Status	Mixed Bushveld	Sweet Bushveld	Waterberg Moist Mountain	Clay Thorn Bushveld
<i>Kirkia acuminata</i>	White Syringa/Witsering		X		X	
<i>Lannea discolor</i>	Live-long/Dikbas		X			
<i>Lantana rugosa</i>	Bird's brandy		X	X		
<i>Lippia javanica</i>	Fever tea/Beukesbossie		X			
<i>Maytenus heterophylla</i>	Spike Thorn/Pendoring		X	X	X	
<i>Maytenus senegalensis</i>	Confetti tree/Bloupendoring				X	
<i>Maytenus tenuispina</i>	-		X	X	X	
<i>Maytenus undata</i>	Koko tree/Kokoboom				X	
<i>Melia azederach</i>	Maksering	e,i,w	X			
<i>Mimusops zeyheri</i>	Transvaal Red Milkwood/Moepel				X	
<i>Mundulea sericea</i>	Cork bush/Visgif		X		X	
<i>Myrsine africana</i>	Cape Myrtle/Mirting				X	X
<i>Ochna inermis</i>	Lowveld Plane/Laeveldrooihout		X			
<i>Ochna pulchra</i>	Peeling plane/Lekkerbreek		X		X	
<i>Olea europaea</i> subsp. <i>africana</i>	Wild Olive/Olienhout		X		X	
<i>Opuntia ficus-indica</i>	Prickly pear/Turksvy	e,i,w	X			
<i>Ozoroa paniculosa</i>	Common Resin tree/Gewone harpuisboom					
<i>Pappea capensis</i>	Doppruim		X		X	

		Status	Mixed Bushveld	Sweet Bushveld	Waterberg Moist Mountain	Clay Thorn Bushveld
<i>Pavetta zeyheri</i>	Small-leaved Bride's Bush/Fynblaarbruidsbos		X		X	
<i>Peltophorum africanum</i>	Weeping wattle/Huilboom		X		X	
<i>Populus x canescens</i>	Grey poplar/Gryspopulier	e,i,w	X			
<i>Pouzolzia mixta</i>	Soapbush/Seepbos		X		X	
<i>Protea caffra</i>	Sugarbush/Suikerbos	p			X	
<i>Pseudolachnostylis maprouneifolia</i>	Kudu-berry/Koedoebessie		X		X	
<i>Pterocarpus rotundifolia</i>	Round-leaved Kiaat/Dopperkiaat		X	X	X	
<i>Rhoicissus tridentata</i>	Bushman's Grape/Boesmansdruif				X	
<i>Rhus leptodictya</i>	Mountain karee/Bergkaree		X			
<i>Rhus pyroides</i>	Common Wild Currant/Taaibos		X			
<i>Sarcostemma viminale</i>	Melktou		X	X		
<i>Schotia brachypetala</i>	Weeping Boer-bean/Huilboerboon		X		X	
<i>Sclerocarya birrea</i> subsp. <i>africana</i>	Marula/Maroela		X		X	
<i>Secamone parvifolia</i>	-				X	
<i>Securinega virosa</i>	White-berry Bush/Witbessiebos				X	
<i>Spirostachys africana</i>	Tamboti/Tambotie		X	X	X	
<i>Solanum mauritianum</i>	Luisboom		X			
<i>Sterculia rogersii</i>	Common Star-chestnut/Gewone Sterkastaing		X			
<i>Stoebe vulgaris</i>		i	X			

		Status	Mixed Bushveld	Sweet Bushveld	Waterberg Moist Mountain	Clay Thorn Bushveld
<i>Strychnos madagascariensis</i>	Black Monkey Orange/Swartklapper		X			
<i>Tarchonanthus camphoratus</i>	Wild Camphor bush/Wildekanferbos		X			X
<i>Terminalia prunoides</i>	Purple-pod Terminalia/Sterkbos		X	X		
<i>Terminalia sericea</i>	Silver Terminalia/Vaalboom, Sandgeelhout		X	X	X	
<i>Tetradenia sp.</i>	-	?			X	
<i>Vangueria infausta</i>	Wild medlar/Mispel		X		X	
<i>Xerophyta retinervis</i>	Monkey's tail/Bobbejaanstert		X		X	
<i>Ximenia americana</i>	Small Sourplum/Kleinsuurpruim		X	X		
<i>Ximenia caffra var. caffra</i>	Sourplum/Suupruim		X	X	X	
<i>Ziziphus mucronata</i>	Buffalo thorn/Blinkblaarwag-'n-bietjie		X	X	X	

**ANNEXURE B:
PHOTOGRAPHIC RECORD OF THE VEGETATION
ALONG THE PROPOSED MATIMBA-WITKOP
TRANSMISSION LINE**



Photograph 1: Mixed Bushveld near Marken along the Overysssel road. Species present include *Kirkia acuminata*, *Aloe marlothii*, *Combretum apiculatum* and *Dombeya rotundifolia*



Photograph 2: Mixed Bushveld on the farm George along the Vaalwater road. Species present include *Combretum apiculatum*, *Grewia flava* & *Pterocarpus rotundifolia*



Photograph 3: Mixed Bushveld on sandy soils north of Ellisras with *Combretum apiculatum*, *Terminalia sericea* and *Eragrostis pallens*.



Photograph 4: Sweet Bushveld on the farm Durban with *Acacia erubescens*, *Acacia tortilis*, *Boscia albitrunca*, *Terminalia prunoides* and *Eragrostis rigidior*.



Photograph 5: Sweet Bushveld on the farm Goodhope along the Marken/Ellisras road. Dominant species include *Acacia tortilis*, *A. erubescens*, *Boscia albitrunca* and *Dichrostachys cinerea*. Note the low vegetation cover and large, bare soil patches



Photograph 6: A patch of Mopane veld within the Mixed bushveld on the farm Caledon. *Colophospermum mopane* is almost totally dominant while the grass cover is almost non-existent



Photograph 7: Waterberg Moist Mountain Bushveld on the farm Klipbank with typical sandstone/conglomerate rock formations and tall, dense vegetation. Typical species include *Cussonia paniculata*, *Pappea capensis*, *Kirkia acuminata*, *Commiphora marlothii*, *Acacia caffra*, *Ficus thonningii* etc.



Photograph 8: Waterberg Moist Mountain Bushveld on the farm Klipbank - A dense stand of tall (15 m) *Commiphora marlothii* trees amongst sandstone boulders



Photograph 9: Waterberg Moist Mountain Bushveld on the farm Uitspanning - very shallow, gravel soils amongst sandstone/conglomerate boulders. The vegetation is fairly open and short. Species include *Kirkia acuminata*, *Combretum apiculatum*, *C. molle*, *C. zeyheri*, *Pseudolachnostylis maprouneifolia*, *Diplorhynchus condylocarpon*, *Adenia glauca* etc.



Photograph 10: Clay Thorn Bushveld with *Acacia karroo*, *A.tortilis* and *Dichrostachys cinerea* dominating. Note the low grass cover and bare soil patches



Photograph 11: Clay Thorn Bushveld on black turf soil. *Acacia karroo*, *A.tortilis* and *Dichrostachys cinerea* are the dominant trees. Agave (sisal) plants and old tyres used to rehabilitate a small erosion gulley



Photograph 12: Very rare tree form (+6 meters high) of the scrambling succulent *Sarcostemma viminale*, recorded just outside the existing 400kV servitude on the farm Uitkomst. Similar specimens of 4 meters high were recorded along the northern slopes of the Magaliesberg.



Photograph 13: Beautiful *Ficus abutilifolia* specimen next to the 400 kV servitude on the farm Lilie Fontein. This specimen, already trimmed to clear the servitude will fall within the new servitude and may have to be removed or severely trimmed due to its exceptional size.



Photograph 14: Stem base of the same specimen showing the scars of previous trimming operations



Photograph 15: The Mogalakwena river showing the riparian vegetation



Photograph 16: Wetland area right next to servitude of the existing 400kV line. Severe access restrictions to this specific site will lead to the inevitable and serious disturbance of the wetland during the construction and operational phases