Northern Zululand Misbelt Grassland

The Northern Zululand Misbelt Grassland is, as the name suggests, located in KwaZulu-Natal specifically on the crests and slopes of the Ngome Mountain range and the Ngoje Mountain surrounding Louwsburg as well as some smaller mountainous areas of Langkrans, KwaCeze, KwaNtimbankulu and Nhazatshe. Located on gentle to steep upper slopes of mountains formed by hard dolerite dykes dominated by relatively forb-rich, tall sour *Themeda triandra* grasslands.

This vegetation unit is seen as vulnerable with a 23% conservation target. Only about 3% is statutorily conserved in the Ithala Nature Reserve and in the Ntendeka Wilderness Area of the Ngome State Forest. Some 22% has been transformed for plantations or cultivated land. Threats to the remaining grasslands are heavy selective grazing by livestock and extensive annual burning. Spread of alien *Acacia mearnsii* and Eucalypts species is a serious concern.
Income Sandy Grassland

The Income Sandy Grassland is located in the KwaZulu-Natal province in a large triangle between Newcastle, Vryheid and Dundee and a larger polygon in the Wasbank area in northern KwaZulu-Natal. The vegetation unit occurs in very flat extensive areas with generally shallow, poorly drained, sandy soils supporting low, tussock-dominated sourveld forming a mosaic with wooded grasslands (with *Acacia sieberiena* var. *woodii*) and on well-drained sites with the trees *A. Karroo, A. Nilotica, A. Caffra* and *Diospyros lyciodes*. On disturbed sites *A. Sieberiana* var. *woodii* can form sparse woodlands. *Aristida congesta, Cynodon dactylon* and *Microchloa caffra* are common on shallow soils.
The vegetation unit is considered vulnerable with a conservation target of 23%. None of this vegetation unit is currently in statutory conservation areas. Approximately 27% has been transformed for cultivation, plantations and by urban sprawl. A small portion of the area has been lost due to the building of dams (Klipfontein and Mvunyane). No serious invasions of aliens have been observed (probably due to the low nutrient status of the soils).

Northern KwaZulu-Natal Shrubland

The Northern KwaZulu-Natal Shrubland is located in the KwaZulu-Natal province with a widely scattered group of patches. The unit is embedded within sub-escarpment grassland units of Northern KwaZulu-Natal Moist Grassland, KwaZulu-Natal Highland Thornveld, and Income Sandy Grassland units, from Ladysmith in the west to Vryheid in the northeast. Large portions of this unit are found in the surrounds of Newcastle.
The landscape comprises of small dolerite koppies and steeper slopes of ridges with sparse grass cover and typical occurrence of scattered shrubland pockets (and locally also thickets). *Acacia caffra, A. natalitia, Clerodendrum glabrum, Diospyros lycioides, Rhus pyroides, R. pentheri, Scutia myrtina* etc are the most prominent shrubs and small trees.

This vegetation unit is classified as least threatened with a conservation target of 23%. Currently less than 1% is statutorily conserved in the Spioenkop Nature Reserve and about 3% is transformed by cultivation.

**Ithala Quartzite Sourveld**

The Ithala Quartzite Sourveld occurs in the Mpumalanga and KwaZulu-Natal provinces. The unit is confined to large quartzite patches that occur from Amsterdam, southwards east of Piet Retief and through Mahamba, to the Paris dam and Ithala Game Reserve, with isolated outcrops near Magudu. This unit is located in low mountain ranges and undulating hills with rocky lowlands. The general pattern is a mosaic of woody shrubs and small trees in rocky areas, interspersed in the grass layer. The vegetation structure varies according to altitude and rockiness, but the basal density of the grass sward is relatively low. This unit occurs in the zone between Grassland and Savanna where the dominant grassland gives way to woodland as elevation decreases. The grasslands are species rich covering a variety of altitudes but sharing common species unique to the dystrophic quartzite geology.

This vegetation unit is considered least threatened and the 27% conservation target has not been reached. A total of 10% of this unit is protected within the Ithala Game Reserve. Land use pressures on this unit are low, probably because of its low nutrient status and rocky nature. Approximately 5% is under plantations and a further 5% has been transformed into cultivated land.

**Savanna Biome**

Most Savanna has an herbaceous layer usually dominated by grass species and a discontinuous to sometimes very open tree layer. The following Savanna vegetation units are present in the proposed study area:

- Eastern Valley Bushveld;
- Swaziland Sour Bushveld;
- Zululand Lowveld;
- Northern Zululand Sourveld;
- Ngongoni Veld; and
- Zululand Coastal Thornveld.
**Eastern Valley Bushveld**

The Eastern Valley Bushveld is characteristic of the KwaZulu-Natal and Eastern Cape provinces, occurring in deeply incised valleys of rivers including the lower reaches of the Thukela, Mvoti, Mgeni, Mlazi, Mkhomazi, Mzimkulwana, Mtamvuna, Mtentu, Msikaba, Mzimvubu (and its several tributaries), Mthatha, Mbhashe, Shixini, Qhorha and Great Kei Rivers. This vegetation unit very seldom extends to the coast.

![Eastern Valley Bushveld with Aloes in the foreground and Euphorbia in the background.](image)

The unit consists of semi-deciduous savanna woodlands in a mosaic with thickets, often succulent and dominated by species of Euphorbia and Aloe. Most of the river valleys run along a northwest-southwest axis which results in unequal distribution of rainfall on respective north-facing and south-facing slopes since the rain-bearing winds blow from the south. The steep north-facing slopes are sheltered from the rain and also receive greater amounts of insulation adding to xerophilous conditions on these slopes.

This unit is considered least threatened with a conservation target of 24%. Only 0.8% is statutorily conserved, mainly in the Luchaba Wildlife Reserve and small patches are also conserved in the Oribi Gorge Nature Reserve. Approximately 15% has been transformed mainly by cultivation. Alien invasive species are a serious threat with *Chromolaena odorata*, *Lantana camara* and *Caesalpinia decapetala* being most problematic.
Swaziland Sour Bushveld

The Swaziland Sour Bushveld is located in the Mpumalanga province, Swaziland and marginally in KwaZulu-Natal. It occurs from Badplaas, Tjakastad east to the Piggs Peak area in the north, southwards through valleys around Manzini and slopes around the Grand Valley, with some isolated mountain outcrops in the lowveld plains, for example the Nkambeni Hills and the Bulungu Mountains.

The vegetation is characteristic of an open to closed, medium to tall tree layer with a closed well-developed grass layer. The landscape is very hilly with moderate to steep slopes. The unit is considered vulnerable with a conservation target of 19%. Only about 6% is statutorily conserved in mainly the Songimvelo, Ithala and Malalotja Nature Reserves, and a further 0.5% is conserved in the Mlilwane Game Sanctuary in Swaziland. Approximately 21% of this unit has been transformed by cultivation and plantations.

Zululand Lowveld

The Zululand Lowveld occurs in the KwaZulu-Natal province, Swaziland and Mpumalanga province with the main extent occurring from around Big Bend south of Mkuze, Hluhluwe, Ulundi to just north of the Ongoye Forest. An isolated patch is found in the Swaziland-Mpumalanga border.

The landscape is extensively flat or only slightly undulating supporting a complex of various bushveld units ranging from dense thickets of Dichrostachys cineria and Acacia species, through park-like savanna with flat topped A. tortilis to tree dominated woodland with broad-leaved open bushveld with Sclerocarya birrea subspecies caffra and A. Nigrescens. Tall grassland types occur with sparsely scattered solitary trees and shrubs from a mosaic with the typical savanna thornveld, bushveld and thicket patches.
This unit is considered vulnerable with a conservation target of 19%. Approximately 11% is statutorily conserved mainly in the Hluhlwe-iMfolozi Park and Phongolapoort Nature Reserve. Almost 1% is protected in the private Masibekela Wetland. Much of the area between Magudu, Mkuze and Nongoma is managed as private game farms and lodges. Approximately 26% of the area has been transformed, mostly by cultivation.

**Northern Zululand Sourveld**

The Northern Zululand Sourveld occurs in the KwaZulu-Natal province and in Swaziland, from the Lusthof area in Swaziland southwards with scattered patches in northern Zululand in the surrounds of Hlomohlomo, east of Louwsburg, Nongoma and the vicinity of Ulundi including Nkandla. It occurs in the highest altitudes of the Hluhlwe-iMfolozi Park. The dominant structural vegetation type in this unit is wooded grassland, in places pure sour grasslands occur and rarely dense bushveld thickets. The terrain is low, undulating mountains and sometimes highly dissected.

This unit is considered vulnerable with a 19% conservation target. Only 4% is statutorily conserved, mainly in the Hluhlwe-iMfolozi Park and the Ithala Game Reserve. Approximately 22% of this unit is already transformed, mainly by cultivation and plantations.
Ngongoni Veld

Th Ngongoni Veld is located in the KwaZulu-Natal and Eastern Cape provinces, from Melmoth in the north to near Libode in the former Transkei (including Eshowe, New Hanover, Camperdown, Eston, Richmond, Dumisa, Harding, Lusikisiki and the Libode area). The vegetation is dense, with tall grassland overwhelmingly dominated by unpalatable, wry Ngongoni grass (*Aristida junciformis*), with this monodominance associated with low species diversity. Wooden (thornveld) areas are found in valleys at lower altitudes, where this vegetation unit grades into KwaZulu-Natal Hinterland Thornveld and Bhisho Thornveld. Termitaria, support bush clumps with Acacia species, *Cussonia spicata*, *Ziziphus mucronata*, *Coddia rudis*, *Ehretia rigida* etc.

This unit is considered vulnerable with a 25% conservation target. Only less than 1% of this unit is statutorily conserved in the Ophathe and Vernon Crookes Nature Reserves. Approximately 39% has been transformed for cultivation, plantations and urban development.
Zululand Coastal Thornveld

The Zululand Coastal Thornveld only occurs the KwaZulu-Natal province, immediately west of Mtubtuba (in the north) and Empangeni (in the south) bisected by the iMfolozi River, extending westwards for 10-20km. The area is characteristic of gently rolling landscapes supporting wooded grassland dominated by *Themeda triandra*. The bush clumps are a strong feature and are more numerous on deeper soils, with *Phoenix reclinata* and *Gymnosporia senegalensis* usually dominant. These plant communities are species rich relative to the surrounding vegetation units. They grade into dense Acacia woodland on dry slopes and riverine bushland thickets and Lowveld Riveriene Forest in valley bottoms.

![Figure 8-59: Sugar Cane Fields near Empangeni](image)

This unit is considered endangered with a 19% conservation target. None of the area is protected in statutory conservation areas. It is highly transformed (58%), mostly by cultivation. This is high potential agricultural land, which is already much transformed to sugar cane. Most of the area is communal land. Large areas close to towns, such as Mtubatuba, are becoming an urban sprawl. Very little of the natural plant communities remain intact, heavy grazing has depleted the grasslands and wood harvesting has depleted the bush clumps, reducing them to the resistant and less useful species. Stunted forms of many of the woody species (e.g. *Euclea, Diospyros, Gymnosporia, Maytenus*) invade the grasslands in many places. Currently it is rare to find a site still with its natural plant composition. *Themeda triandra*, a ‘decreaser species’ has declined to critically low levels. Alien plant invasions are a threat, with Chromolaena odorata being the most problematic.

KwaZulu Natal Highland Thornveld

The KwaZulu-Natal Highland Thornveld vegetation unit occurs in the KwaZulu-Natal province, in patches scattered immediately above the Eastern Valley Bushveld unit, in river valleys mainly the
Mpisi (in the Thukela River catchment), Mvoti, Umgeni (below the Howick falls), Mlazi, Lufafa (vicinity of Ixopo) and Mtungwane (tributaries of the Mkomazi).

The vegetation is open thornveld dominated by Acacia species on undulating plains found on upper margins of river valleys. This unit is considered vulnerable with a 25% conservation target. None of this unit is currently conserved in statutory conservation areas. Approximately 22% has already been transformed by cultivation and some urban or built-up areas.

**Indian Ocean Coastal Belt**

The Indian Ocean Coastal Belt (IOCB) covers the seaboard in the KwaZulu-Natal and Eastern Cape provinces. This coastal belt in its subtropical facies extends beyond the national borders into Mozambique as far north as the Limpopo River mouth. The Maputaland Coastal Belt is the only vegetation unit from the Indian Ocean Coastal Belt biome in the proposed study area, a description of this unit is provided below:

**Maputaland Coastal Belt**

The Maputaland Coastal Belt occurs in the KwaZulu-Natal province (and continues into southern Mozambique), and occurs in an up to 35km broad strip along the coast of the Indian Ocean stretching from the Mozambique border in the north to Mtunzini in the south.

![Figure 8-60: Maputaland Coastal Belt.](image)

The landscape is characteristic of a flat coastal plain originally probably densely forested in places with a wide range of interspersed non-forest plant communities including dry grasslands (which include palm veld where special conditions prevail), hydrophilous grasslands and thicket groups. Today the vegetation landscape is composed of various forest types (separated into different vegetation units), thickets, primary and secondary grasslands, extensive timber plantations and cane fields.

This vegetation unit is classified as vulnerable with a conservation target of 25%. About 15% is statutorily conserved in the Greater St Lucia Wetland Park as well as Zileza, Enseleni and Amathikulu Nature Reserves. More than 30% has been transformed for plantations and cultivation.
and by urban sprawl. Aliens include scattered populations of *Chromolaena odorata* and *Lantana camara*. This vegetation type has a relatively high number of plant taxa at the southernmost and northernmost limits of their distribution range.

**Forests**

Indigenous forests in South Africa is defined as “a generally multilayered vegetation unit dominated by trees (largely evergreen or semi-deciduous), whose combined strata have overlapping crowns (i.e. the crown cover is 75% or more), and where graminoids in the herbaceous stratum (if present) are generally rare”. The following types of forests are present in the study area and are outlined below:

- Northern Afrotropical Forests; and
- Southern Misbelt Forests.

**Northern Afrotropical Forests**

The Northern Afrotropical Forests occur in the Free State, KwaZulu-Natal, Mpumalanga, North West, Gauteng and Limpopo provinces (as well as Lesotho), they are restricted to mountain kloofs and low ridges (Strydpoortberg, Waterberg, Pilanesburg, Witwatersrand, Magaliesburg, Suikerbosrand, Sekhukhuneland) interrupting the relatively flat northern Highveld. This group aso comprises forests found in kloofs along the northern and eastern flanks of the Drakensburg and those found on the slopes and scarps of Low Escarpment between Van Reenen’s Pass and Pongola Bush near Piet Retief. The westernmost localities of these forests are found in the Koranaberg (close to Thaba ‘Nchu).

This vegetation unit is characteristic of relatively species-poor forests of afromontane origin and some of them still show clear afromontane character. They can be found in small patches in kloofs and on sub-ridge scarps at high altitudes. The canopy is usually dominated by *Podocarpus latifolius*, *Olinia emarginata*, *Halleria lucida*, *Scolopia mundii*, and rarely also by *Widdringtonia nodiflora*, in drier facies also by *Pittosporum viridiflorum*, *Celtis Africana*, *Mimusops zeyheri*, *Nuxia congest* and *Combretum erythrophyllum*. *Xymalos monospora* sometimes dominate patches of species-poor mistbelt forests of northern KwaZulu-Natal.

This vegetation unit is considered least threatened with a conservation target of 31%. Approximately 30% is statutorily conserved in uKhahlamba Drakensburg Park, Phongols Bush, Vryheid Mountain, Poccolan/Robinson’s Bush, Ngome and Ncandu Nature Reserves, Magaliesburg Nature Area, Merville Ridge, Paardeplaats, Rustenburg, Suikerbosrand Nature Reserves, Marekele National Park and Pilanesburg Game Reserve. Some private nature reserves (e.g. Mooibron, Mhlongamvula, Tafelkop, Oudehoutdraai, Oshoek, and Ossewakop) protect some patches too. Occasional hot fires encroaching from the surrounding savanna woodlands, uncontrolled timber extraction, medicinal-plant harvesting, and grazing in forest can be viewed as current major threats.
The Southern Misbelt Forests occur in the KwaZulu-Natal and Eastern Cape provinces. These forests vary in size and occur in fire-shadow habitats on south and southeast facing slopes and located along the Great Escarpment, spanning a large area from Somerset East, the Amothole Mountains, scarp of Transkei to the KwaZulu-Natal Midlands as far east as Ulundi. In KwaZulu-Natal these forests are found in a wide band sandwiched between the Drakensburg Montane Forests and Northern KwaZulu-Natal Misbelt Forests at higher altitudes and Eastern Scarp Forests at lower altitudes.

On the Great Escarpment (Amothole, Transkei Escarpment) and in the KwaZulu-Natal Midlands these forests are tall (15-20m tall) and multilayered (having two layers of trees, a dense shrubby understorey and a well-developed herb layer). The forests found on low-altitude scarps are low (in places having the character of a shrub forest), and although less structured into different tree layers, they are still species rich. The tall forests show a mix of coarse-grained, canopy gap/disturbance driven dynamics and fine-grained, regeneration characteristics. Further east (Transkei, KwaZulu-Natal Midlands) *Podocarpus henkelii* become prominent in the canopy layer. Deciduous elements play an important role.
A major factor found all over the study area is the disturbance of the natural vegetation. Large tracks of land have been changed by cultivation (forestry and sugarcane), mining (coal) and urbanisation. In addition to these there is the impact of subsistence living. Large sections of the tribal lands in Kwazulu Natal have been steadily changed in species composition through years of communal grazing, burning and agriculture. Figure 8-64 below provides an illustration of the scale of the disturbance across the study area. Some examples are also shown below.
Figure 8-64: Disturbed Vegetation found along the corridors
Red data Flora Species

The red data species that potentially could occur along the route is listed in Appendix A. A total of 85 red data species potentially occur within the study area.

Site Description – Fauna

Invertebrates

A total of 796 arthropods and 308 butterflies are recorded for the study area. The large number is mainly due to the wide range of habitat available and the large area covered by the various alternatives.

Reptilia

A total of 96 reptilian species were recorded for the study site. The known red data specie is the African Rock Python.

Amphibia

Thirty seven species of amphibians were recorded as occurring within the study area and are given in Appendix 1. These species are not restricted in terms of habitat or distribution and none of the species recorded are classified as Red Data species.

Mammalia

Mammal species diversity was low across the bulk of the study area, as very little natural habitat remains. Most of the mammals occur in small pockets of remaining natural vegetation or within games farms or reserves, with a total of 102 species being recorded. Six of these species are listed as endangered, including the Black Rhino, Tonga Red Squirrel, Marley’s Golden Mole, Swinny’s Horseshoe Bat, the Damara Woolly Bat and Sclater’s Forest Shrew.

In addition 12 near threatened species that are included is Honey Badger, Serval, Spotted-necked Otter, Water Rat, Red Squirrel, Darling’s Horseshoe Bat, Lander’s Horseshoe Bat, Geoffrey’s Horseshoe Bat, Anchieta’s Pipistrelle, Temmick’s Hairy Bat, Schreiber’s Long Fingered Bat, and the Lesser Long Fingered Bat. Due to the habitat requirements for all the sensitive species mentioned above, there should be very little conflict with the proposed power line, with the exception being the Black Rhino. Several sections of the proposed routes near the Hluhluwe-Umfolozi Park is aligned through areas that are prime Black Rhino habitat that have been earmarked by the KZN Provincial Government as an area with high conservation status.
8.1.9 Avi-Fauna

Data Collection and Methodology

An ornithology specialist, Mr Chris van Rooyen, was appointed by Zitholele Consulting to undertake an avi-fauna specialist study. The avi-fauna data was obtained from various published literature sources.

Regional Description

Vegetation structure, rather than the actual plant species, is more significant for bird species distribution and abundance (in Harrison et al 1997). Therefore, the vegetation description below does not focus on lists of plant species, but rather on factors which are relevant to bird distribution. The description of the vegetation types occurring in the study area largely follows the classification system presented in the Atlas of southern African birds (Harrison et al, 1997). The criteria used to amalgamate botanically defined vegetation units, or to keep them separate were (1) the existence of clear differences in vegetation structure, likely to be relevant to birds, and (2) the results of published community studies on bird/vegetation associations. It is important to note that no new vegetation unit boundaries were created, with use being made only of previously published data. The description of vegetation presented in this study therefore concentrates on factors relevant to the bird species present, and is not an exhaustive list of plant species present.

The dominant plants in the grassland biome are grass species, with geophytes and herbs also well represented. Grasslands are maintained mainly by a combination of the following factors: relatively high summer rainfall; frequent fires; frost and grazing. These factors generally preclude the growth of trees and shrubs. Sweet grassland is generally found in the lower rainfall areas. Vegetation is taller and sparser, and nutrients are retained in the leaves during winter. Relatively few bird species favour sweet grassland over sour or mixed grassland. Sour grassland generally occurs in the higher rainfall areas on leached soils. Vegetation is shorter and denser, and nutrients are withdrawn from the leaves during the winter months. Many grassland bird species show a preference for sour grassland over sweet or mixed. Mixed grassland is a combination or a transition between the two grassland types above.

Savanna (or woodland) is defined as having a grassy under-storey and a distinct woody upper-storey of trees and tall shrubs. Soil types are varied but are generally nutrient poor. The savanna biome contains a large variety of bird species (it is the most species-rich community in southern Africa) but very few bird species are restricted to this biome. It is also relatively well conserved compared to the grassland biome.

Two forest vegetation types are present in southern Africa, namely Afromontane Forest and coastal forest. The study area contains small areas of Afromontane Forest. The tree-canopy cover in forests is continuous and mainly comprises evergreen tree species. Below the
canopy, vegetation is multi-layered. Epiphytes, lianas and ferns are common in Afromontane Forest. The tall, dense trees result in little ground vegetation and a thick leaf litter. Forests only occur in frost-free regions with a relatively high rainfall and protected from fires. Afromontane forests in the study area are mainly confined to moist valleys which are protected from fires, surrounded by grassland.

Subtropical thicket is a closed shrubland to low forest dominated by evergreen, sclerophyllous or succulent trees, shrubs and vines, many of which have stem spines. It is often almost impenetrable, is generally not divided into strata, and has little herbaceous cover. Thicket occurs only in the extreme south of the study area.

Whilst much of the distribution and abundance of the bird species in the study area can be explained by the description of biome types above, it is even more important to examine the micro habitats available to birds. These are generally evident at a much smaller spatial scale than the biome types, and are determined by a host of factors such as vegetation type, topography, land use and man made infrastructure.

Site Description

The micro habitats observed in this study area during the field visit are described below.

- Wetlands and rivers: Both wetlands and dams are of particular importance for birds in the study area particularly for all three crane species that occur in the area. The area contains some very important wetlands and dams, e.g. Fickland Pan, BP’s Dam, Clarens Pan, Wim Rabe Pan, Heyshoek Dam, Zaaihoek Dam, Wakkerstroom Vlei, a large wetland west of Utrecht called Boshoffsvlei, (just below the escarpment at the confluence of the Wasbankspruit and Dorpspruit) and Blood River Vlei and associated wetlands situated about halfway between Utrecht and Vryheid. Wakkerstroom Vlei is known to hold a significant proportion of the national Whitewinged Flufftail Sarothrura ayresi population, a globally endangered species. Apart from these, the study area also has permanent reed and sedge swamps, several seasonal pans, innumerable small sponges and seeps and numerous farm dams, particularly in the grassland areas (Tarbotton 2001). The study area contains hundreds of small perennial drainage lines for example the Slang River, Wielspruit, Sand River, Buffelspruit, Assegai River and many others. It also contains a few larger rivers, such as the Vaal River, Mhlatuze River, White Mfolozi and Pongolo River. Some drainage lines have been badly infested with Black Wattle. Amongst large terrestrial Red Data species it is especially the three cranes species that depend on shallow, vegetated wetlands that are unpolluted and not excessively disturbed by live-stock and fire (Young 2003). Wetlands are an important foraging habitat for the Southern Bald Ibis Geronticus calvus (Young 2003). It is also the preferred roosting and foraging habitat for the African Marsh Harrier Circus ranivorus (Hockey et al 2005). In the savanna biome, rivers and dams with shallow edges are important for large raptors and vultures for drinking and bathing purposes, and large trees in the riparian zone often serve as nesting and roosting substrate (Hockey et al 2005). Red Data stork
species such as Black Stork *Ciconia nigra*, Marabou Stork *Leptoptilos crumeniferus* and Woolly-necked Stork *Ciconia episcopus* are also forage in rivers and often roost in tall trees in the riparian zone (Hockey et al 2005). Thick riparian vegetation provides cover for shy species such as the African Finfoot *Podica senegalensis*.

- **Grassland:** A large portion of the northern part of the study area falls within the Ekangala Grassland Biosphere Reserve (EGBR), which is regarded as the most important IBA (Important Bird Area) in the whole of South Africa (Important Bird Area SA020)(Barnes 1998). The importance of this area is largely due to it being some of the last remaining rolling grasslands left in South Africa. Rocky slopes, gullies and ravines contain thickets dominated by Ouhout *Leucosidea sericea*, forming thickets in places (Young et.al. 2003). Due to the short growing season, the grasslands in the study area have escaped much of the ecological carnage caused by the transformation of most grasslands into agricultural monocultures. The dominant land use is pastoral with cattle and sheep farming, which is more benign to the environment, resulting in much of the fauna and flora remaining intact. In the southern sections of the study area, the grazing pressure is a lot more intense, resulting in significant erosion and bush encroachment. The grassland habitat is of particular importance for several large, power line sensitive Red Data grassland “specialists” such as Southern Bald Ibis, Wattled Crane, Blue Crane, Grey Crowned Crane, Denham’s Bustard *Neotis denhami*, Blue Korhaan *Eupodotis caerulescens*, White-bellied Korhaan *Eupodotis senegalensis* and Black-bellied Korhaan *Lissotis melanogaster* (EWT 2011a; CAR 2011; Glen Ramke 2011; Young 2003; Hockey et al 2005). The savanna biome also contains grassland areas, which are important for Red Data species such as Blue Crane, Secretarybird *Sagittarius serpentarius*, White-bellied Korhaan and Black-bellied Bustard (CAR 2011; Hockey et al 2005).

- **Woodland:** The state of the woodland varies from relatively intact in places to a relatively poor state with evidence of heavy overgrazing and pedestrian traffic very evident near towns and settlements. In some areas there has been significant bush encroachment, partly due to sustained overgrazing for more than a century (Young et al 2003). The woodland habitat is generally less sensitive as far as bird habitat is concerned, but some large terrestrial species have been recorded such as Secretarybird and Southern Ground-Hornbill (SABAP2 2011). The woodland habitat is generally less critical as far as large terrestrial species are concerned, but it forms the stronghold of Red Data raptors species such as White-backed Vulture *Gyps africanus*, Cape Vulture *Gyps coprotheres*, Martial Eagle *Polemaetus bellicosus*, Tawny Eagle *Aquila rapax*, and Lappet-faced Vulture *Torgos tracheliotis* (Hockey et al 2005; SABAP2 2011).

- **Commercial timber and sugar cane:** On the eastern side of the study area, between Ermelo and Piet Retief, and around Vryheid and Paulpietersburg, significant afforestation has taken place over the past fifty years (Young et al 2003). Apart from commercial plantations, there are stands of predominantly *Eucalyptus* species, presumably originally planted as windbreaks. They may be significant for birds in terms of roosting or nesting as few indigenous tall trees exist in the landscape. However, they do not represent an important micro-habitat in the context of this study. In the south near Mbewu substation,
large areas have been converted to sugar cane. The afforestation and sugar cane plantations have caused irreparable damage to the natural habitat, resulting in those areas becoming unsuitable for large terrestrial species.

- Arable land: Limited crop cultivation is practiced, often in conjunction with irrigation, but the sandy soils are generally not very nutrient rich, therefore cultivation is limited. Crops include maize, wheat, sorghum, soya beans, sunflower and a few pastures. This habitat has some importance for cranes, particularly the Grey Crowned Crane and to a lesser extent Blue Cranes, as well as White Storks *Ciconia ciconia*, particularly irrigated pivots. Blue Cranes and Grey Crowned Cranes sometimes use harvested maize fields for foraging (Tarbotton 2001; Young 2003).

- Afromontane Forest: There are several isolated patches of Afromontane forest on southern slopes in the study area. The most extensive patch of Afromontane forest occurs in the Pongolo Bush Nature Reserve, near Paulpietersburg and in the central part of the study area between Vryheid and Ulundi. This habitat is not frequented by most power line sensitive Red Data species, but habitat destruction could be an impact on Red Data forest species such as African Crowned Eagle *Stephanoaetus coronatus* and Orange Ground-Thrush *Zoothera gurneyi*.

Sensitivities

A total of 44 Red Data have to date been recorded by SABAP2 in the QDGCs that are bisected by the various alignments. The table below gives a list of Red Data species with a summary of potential impacts, habitat requirements and biome where impacts could be expected.
<table>
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<tr>
<th>Species</th>
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<th>HDD</th>
<th>Preferred habitat (CAR 2011; EWT 2011a; Ramke 2011; Hockey et al 2005; Young et al 2003; Taylor et al 1999; Personal obs.)</th>
<th>Biome</th>
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<td>Grassland and savanna</td>
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<tr>
<td>Southern Bald Ibis</td>
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<td></td>
<td>Cliff faces used for breeding, grassland (particularly burnt), wetlands</td>
<td>Grassland and savanna</td>
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<td>High-lying grasslands</td>
<td>Grassland</td>
</tr>
<tr>
<td>Black Stork</td>
<td>NT</td>
<td></td>
<td></td>
<td>Cliffs, rivers, dams and pans</td>
<td>Grassland and savanna</td>
</tr>
<tr>
<td>Black-bellied Korhaan</td>
<td>NT</td>
<td></td>
<td></td>
<td>In tall rank grassland</td>
<td>Grassland and savanna</td>
</tr>
<tr>
<td>Blue Crane</td>
<td>V</td>
<td>x</td>
<td></td>
<td>Occurs in grassland, wetlands and in harvested maize fields</td>
<td>Grassland and savanna to a lesser extent</td>
</tr>
<tr>
<td>Blue Korhaan</td>
<td>NT</td>
<td></td>
<td></td>
<td>Occurs widely on the higher lying areas in open flat grassland, preferring shortly grazed areas</td>
<td>Grassland</td>
</tr>
<tr>
<td>Cape Vulture</td>
<td>V</td>
<td>x</td>
<td></td>
<td>Cliff faces, but ranges wide over surrounding areas</td>
<td>Woodland</td>
</tr>
<tr>
<td>Grey Crowned Crane</td>
<td>V</td>
<td></td>
<td></td>
<td>Wetlands, marshes and harvested maize fields</td>
<td>Grassland and savanna to a lesser extent</td>
</tr>
<tr>
<td>African Crowned Eagle</td>
<td>NT</td>
<td></td>
<td></td>
<td>Afrotropical forest</td>
<td>Forest</td>
</tr>
<tr>
<td>Grass Owl</td>
<td>V</td>
<td></td>
<td></td>
<td>Requires rank grassland of at least 75cm high, on the edges of wetlands</td>
<td>Grassland and savanna to a lesser extent</td>
</tr>
<tr>
<td>Greater Flamingo</td>
<td>NT</td>
<td></td>
<td></td>
<td>Open shallow, eutrophic wetlands</td>
<td>Grassland</td>
</tr>
<tr>
<td>Southern Ground Hornbill</td>
<td>V</td>
<td></td>
<td></td>
<td>Open woodland, also grassland with few scattered trees</td>
<td>Savanna</td>
</tr>
<tr>
<td>Lanner Falcon</td>
<td>NT</td>
<td>-</td>
<td>-</td>
<td>Anywhere in the study area in all habitat types</td>
<td>Grassland and savanna</td>
</tr>
<tr>
<td>Martial Eagle</td>
<td>V</td>
<td>x</td>
<td></td>
<td>Occurs widely but sparsely. More common in woodland</td>
<td>Savanna</td>
</tr>
<tr>
<td>Secretarybird</td>
<td>NT</td>
<td></td>
<td></td>
<td>Grassland and open woodland</td>
<td>Grassland and savanna</td>
</tr>
<tr>
<td>Denham's Bustard</td>
<td>V</td>
<td>x</td>
<td></td>
<td>High-lying grasslands but also below the escarpment in grassland habitat. Limited use of stubble lands</td>
<td>Grassland and savanna to a lesser extent</td>
</tr>
<tr>
<td>Tawny Eagle</td>
<td>V</td>
<td>x</td>
<td></td>
<td>Woodland</td>
<td>Savanna</td>
</tr>
<tr>
<td>Wattled Crane</td>
<td>C</td>
<td>x</td>
<td></td>
<td>Extensive wetlands in high lying grasslands</td>
<td>Grassland</td>
</tr>
<tr>
<td>African Whitebacked Vulture</td>
<td>V</td>
<td></td>
<td></td>
<td>Woodland</td>
<td>Savanna</td>
</tr>
<tr>
<td>White-bellied Korhaan</td>
<td>V</td>
<td>x</td>
<td></td>
<td>Dense grassland. Most common in the interface between grassland and savanna</td>
<td>Grassland and savanna</td>
</tr>
<tr>
<td>Woolly-necked Stork</td>
<td>NT</td>
<td>x</td>
<td></td>
<td>Rivers and large dams</td>
<td>Savanna</td>
</tr>
<tr>
<td>Bateleur</td>
<td>V</td>
<td>x</td>
<td></td>
<td>Woodland</td>
<td>Savanna</td>
</tr>
</tbody>
</table>

Table 8-4: Red Data species recorded by SABAP2 in the study area.
<table>
<thead>
<tr>
<th>Common Name</th>
<th>IBA Category</th>
<th>IBA Code</th>
<th>Site Description</th>
<th>Landscape Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black-winged Lapwing</td>
<td>NT</td>
<td>-</td>
<td>Short grassland</td>
<td>Grassland</td>
</tr>
<tr>
<td>Blue Swallow</td>
<td>C</td>
<td>x</td>
<td>High rainfall, short montane grassland next to streams</td>
<td>Grassland</td>
</tr>
<tr>
<td>Botha's Lark</td>
<td>E</td>
<td>-</td>
<td>Short, heavily grazed upland grassland</td>
<td>Grassland</td>
</tr>
<tr>
<td>Corn Crake</td>
<td>V</td>
<td>-</td>
<td>Rank moist grassland, but also in dry grassland in open savanna</td>
<td>Grassland and savanna</td>
</tr>
<tr>
<td>Great White Pelican</td>
<td>NT</td>
<td>x</td>
<td>Large pans and dams</td>
<td>Savanna</td>
</tr>
<tr>
<td>Greater Painted Snipe</td>
<td>NT</td>
<td>-</td>
<td>Vegetated waterside habitats with exposed mud</td>
<td>Savanna</td>
</tr>
<tr>
<td>Half-collared Kingfisher</td>
<td>NT</td>
<td>-</td>
<td>Clear, well vegetated, fast-flowing streams</td>
<td>Grassland</td>
</tr>
<tr>
<td>Lappet-faced Vulture</td>
<td>V</td>
<td>x</td>
<td>Woodland</td>
<td>Savanna</td>
</tr>
<tr>
<td>Lesser Flamingo</td>
<td>NT</td>
<td>x</td>
<td>Open shallow, eutrophic wetlands</td>
<td>Grassland</td>
</tr>
<tr>
<td>Lesser Kestrel</td>
<td>V</td>
<td>-</td>
<td>Grassland</td>
<td>Grassland</td>
</tr>
<tr>
<td>Marabou Stork</td>
<td>NT</td>
<td>x</td>
<td>Woodland and rivers</td>
<td>Savanna</td>
</tr>
<tr>
<td>Melodious Lark</td>
<td>NT</td>
<td>-</td>
<td>Fairly short climax grassland with open spaces between tuffs</td>
<td>Grassland</td>
</tr>
<tr>
<td>Pallid Harrier</td>
<td>NT</td>
<td>x</td>
<td>Grasslands associated with open pans or floodplains, also croplands</td>
<td>Grassland</td>
</tr>
<tr>
<td>Orange Ground-Thrush</td>
<td>NT</td>
<td>-</td>
<td>Afromontane forest</td>
<td>Forest</td>
</tr>
<tr>
<td>Red-billed Oxpecker</td>
<td>NT</td>
<td>-</td>
<td>Woodland</td>
<td>Savanna</td>
</tr>
<tr>
<td>Peregrine Falcon</td>
<td>NT</td>
<td>x</td>
<td>Areas with high cliffs</td>
<td>Savanna</td>
</tr>
<tr>
<td>Rudd's Lark</td>
<td>C</td>
<td>-</td>
<td>High altitude grassland with short dense grass</td>
<td>Grassland</td>
</tr>
<tr>
<td>White-headed Vulture</td>
<td>V</td>
<td>x</td>
<td>Woodland</td>
<td>Savanna</td>
</tr>
<tr>
<td>White-winged Flufftail</td>
<td>C</td>
<td>-</td>
<td>Dense sedges in permanent marshes with moist or shallow ground</td>
<td>Grassland</td>
</tr>
<tr>
<td>Yellow-billed Stork</td>
<td>NT</td>
<td>x</td>
<td>Shoreline of freshwater bodies</td>
<td>Grassland and savanna</td>
</tr>
<tr>
<td>Yellow-breasted Pipit</td>
<td>V</td>
<td>-</td>
<td>Lush montane grassland</td>
<td>Grassland</td>
</tr>
</tbody>
</table>

ZITHOLELE CONSULTING
8.1.10 Sensitive and Protected Areas

Data Collection and Methodology

As part of the approval of the Scoping Report and the PoSEIA the DEA requested that the protected and sensitive areas along the routes be identified and avoided through the impact assessment. This section aims to satisfy that request.

Data was obtained from the Draft National List of Threatened Ecosystems (Gazette No 32689, November 2009). This was supplemented with the SANBI and DEAT publication, Draft Threatened Ecosystems in South Africa: Description and Maps, May 2009. These two reports provided a list of the threatened ecosystems as per the National Environmental Management: Biodiversity Act (Act 10 of 2004).

Furthermore the SANBI National Protected Areas Expansion Strategy database was also used to identify focus areas for protected areas for future expansion as well as the existing formal and informal protected areas encountered along the alternative corridors.

Site Description

Threatened Ecosystems

The following threatened ecosystems where found along the routes with the route segment indicated in brackets:

- Critically Endangered - none
- Endangered;
  - Bivane Montane Grassland (KD);
  - Chrissiesmeer panveld (AP, AM);
  - Ngome Mistbelt and Forest (MN, PO); and
  - Wakkerstroom/Luneberg Grassland (BK, BC).
- Vulnerable;
  - Bivane Sour Grassland and Bushveld (PO);
  - Eastern Temperate Freshwater Wetlands (Various);
  - Imfolozi Savanna and Sourveld (SIJ, SOI, OI);
  - KaNgwane Montane Grassland (AP, SAM, AM);
  - Low Escarpment Mistbelt Forest (BK, KD); and
  - Paulpietersburg Moist Grassland (AM, MP, AP).

Unfortunately the spatial database is not yet available electronically and therefore a GIS map of the areas could not be produced.
Protected Areas

The route alignments of the various alternatives avoid all the existing formal and informal protected areas as shown in the figures below. The following protected areas occur within 10 km of the routes (SANBI):

- **Informal Protected Areas**
  - Emlwane Game Park;
  - Utrecht Town Park;
  - Balele Enlanzeni Valley Game Park; and
  - Wakkerstroom Wetland Nature Reserve.

- **Formal Protected Areas**
  - Sibudeni Nature Reserve;
  - Mome Nature Reserve;
  - Nkandla Forest Reserve;
  - Vungwini Nature Reserve;
  - Enseleni Nature Reserve;
  - Fundimvelo Nature Reserve;
  - Ophate Game Reserve;
  - Matshitsholo Nature Reserve;
  - Ntinini Training Center;
  - Hluhluwe-Imfolozi Game Reserve;
  - Vryheid Mountain Nature Reserve; and
  - Ithala Game Reserve.

When considering the National Protected Area Expansion Strategy (NPAES) there are several of the potential expansion focus areas that fall within the route corridors. The focus areas are:

- Maputuland Delagoa Imfolozi;
- Moist Escarpment Grassland; and
- Thukela.

As shown on the figures below there is no single route that can be taken to avoid all the NPAES focus areas.
Figure 8-65: Protected areas in the northern portion of the study area.
Figure 8-66: Protected areas in the central portion of the study area
Figure 8-67: Protected areas in the southern portion of the study area
8.1.11 Visual

The proposed power lines are aligned through a wide variety of landscapes, from grazed plains, to Pine and Eucalyptus plantations to mountains and the rolling hills of KwaZulu Natal and the sugar cane plantations of the lowlands. The bulk of the study area is utilised for agriculture with a varying topography.

A number of other existing power lines are found throughout the area including high voltage transmission lines similar to the new lines proposed. However due to the mainly agricultural nature of the land any linear infrastructure like existing power lines and roads featuring prominently in the landscape.

Methodology

The methodology adopted for the visual assessment includes the following tasks:

- Examine the baseline information (contours, building dimensions, vegetation, inter alia);
- Determine the area from which the proposed power line may be visible (viewshed);
- Identify the locations from which views of the proposed power line may be visible (observation sites), which include buildings and roads;
- Analyse the observation sites to determine the potential level of visual impact that may result from the proposed power line; and
- Identify measures available to mitigate the potential impacts.

Each component of the assessment process is explained in detail in the following sections of the Report.

The Viewshed

The viewshed represents the area from which the proposed site would potentially be visible. The extent of the viewshed is influenced primarily by the combination of topography and vegetation, which determine the extent to which the site would be visible from surrounding areas. The viewshed was determined by Zitholele through the following steps and presumptions:

- The likely viewshed was determined by desktop study (ArcGIS) using contour plans (20 m interval); and
- An offset of 2 m (maximum) for the observer and an offset of 52 m (maximum) for the proposed power lines were utilized during the spatial analysis.
Visibility Assessment

Site visibility is an assessment of the extent to which the proposed power lines would potentially be visible from surrounding areas. It takes account of the context of the view, the relative number of viewers, duration of view and view distance.

The underlying rationale for this assessment is that if the proposed power lines are not visible from surrounding areas then the development will not produce a visual impact. On the other hand if one or more power lines are highly visible to a large number of people in surrounding areas then the potential visual impact is likely to be high.

Based on a combination of all these factors an overall rating of visibility was applied to each observation point. For the purpose of this report, categories of visibility have been defined as high (H), moderate (M) or low (L).

Assessment Criteria

For the purpose of this report, the quantitative criteria listed in Table 8-5 have been determined and used in the Visibility Assessment. The criteria are defined in more detail in the subsection following.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category of Viewer</strong></td>
<td></td>
</tr>
<tr>
<td>Static</td>
<td>Farms, homesteads or industries</td>
</tr>
<tr>
<td>Dynamic</td>
<td>Travelling along road</td>
</tr>
<tr>
<td><strong>View Elevation</strong></td>
<td></td>
</tr>
<tr>
<td>Above</td>
<td>Higher elevation than proposed power lines.</td>
</tr>
<tr>
<td>Level</td>
<td>Level view with power lines</td>
</tr>
<tr>
<td>Below</td>
<td>Lower elevation than power lines viewed</td>
</tr>
<tr>
<td><strong>View Distance</strong></td>
<td></td>
</tr>
<tr>
<td>Long</td>
<td>&gt; 5 km</td>
</tr>
<tr>
<td>Medium</td>
<td>1 – 5 km</td>
</tr>
<tr>
<td>Short</td>
<td>200 m – 1 000 m</td>
</tr>
<tr>
<td>Very Short</td>
<td>&lt; 200 m</td>
</tr>
<tr>
<td><strong>Period of View</strong></td>
<td></td>
</tr>
<tr>
<td>Long Term</td>
<td>&gt; 120 minutes</td>
</tr>
<tr>
<td>Medium Time</td>
<td>1 – 120 minutes</td>
</tr>
<tr>
<td>Short Term</td>
<td>&lt; 1 minute</td>
</tr>
</tbody>
</table>

Category Viewer

The visibility of the proposed power lines will vary between static and dynamic view types. In the case of static views, such as views from a farmhouse or homestead, the visual relationship
between the proposed power lines and the landscape will not change. The cone of vision is relatively wide and the viewer tends to scan back and forth across the landscape.

In contrast views from a moving vehicle are dynamic as the visual relationship between the proposed power line infrastructure is constantly changing as well as the visual relationship between the proposed power line and the landscape in which they it is seen. The view cone for motorists, particularly drivers, is generally narrower than for static views.

**View Elevation**

The elevation of the viewer relative to the object observed significantly influences the visibility of the object by changing the background and therefore the visual contrast. In situations where the viewer is at a higher elevation than the building/structure it will be seen against a background of landscape. The level of visual contrast between the proposed power line and the background will determine the level of visibility. A white/bright coloured structure seen against a background of dark/pale coloured tree-covered slopes will be highly visible compared to a background of light coloured slopes covered by yellow/brown dry vegetation.

In situations where the viewer is located at a lower elevation than the proposed power lines it will mostly be viewed against the sky. The degree of visual contrast between white coloured structures will depend on the colour of the sky. Dark grey clouds will create a significantly greater level of contrast than for a background of white clouds. The photos below illustrate this effect, where the view from above is far less visible.

![Figure 8-68: Difference in view from below (left) and above (right)](image)

**View Distance**

The influence of distance on visibility results from two factors:

- With increasing distance the proportion of the view cone occupied by a visible structure will decline; and
- Atmospheric effects due to dust and moisture in the air reduce the visual contrast between the structure and the background against which they are viewed.

**Period of View**

The visibility of structures will increase with the period over which they are seen. The longer the period of view the higher the level of visibility. However, it is presumed that over an extended period the level of visibility declines as people become accustomed to the new element in the landscape.

Long term views of the proposed power line will generally be associated with farm houses, informal settlements and a couple of towns located within the viewshed. Short term and moderate term views will generally relate to commuters moving through the viewshed mostly by vehicle.

**Site Visibility**

The procedure followed by Zitholele to assess Site Visibility involved:

- Generate a viewshed analysis of the area utilizing ArcGIS 10.
- Determine the various categories of observation points (e.g. Static, Dynamic).

**Impact Assessment Methodology**

Visual impact is defined as the significance and/or severity of changes to visual quality of the area resulting from a development or change in land use that may occur in the landscape.

Significance or severity is a measure of the response of viewers to the changes that occur. It represents the interaction between humans and the landscape changes that they observe. The response to visible changes in the landscape may vary significantly between individuals.

Perception results from the combination of the extent to which the proposed power line is visible (level of visibility) and the response of individuals to what they see. A major influence on the perception of people/tourist in relation to the proposed power line will be the visual character and quality of the landscape in which it would be located. Natural landscape areas such as national parks, mountain areas or undeveloped sections of coast are valued for their high visual quality. The introduction of buildings and associated infrastructure may be seen as a negative impact on these areas of high visual quality. In the case of power lines some people perceive them in a positive manner because they represent progress essential to the economy of South Africa and contributing the local and national economy. On the other hand some people perceive them negatively due to the large structures that impact on the unspoilt natural landscape.

The potential visual impact of the proposed power line will primarily result from changes to the visual character of the area within the viewshed. The nature of these changes will depend on the
level of the visual contrast between buildings/structures and the existing landscape within which they would be viewed.

The degree of contrast between the proposed power line and the surrounding landscape will result from one or more of the following visual characteristics:

- Colour;
- Shape or form;
- Scale;
- Texture; and
- Reflectivity.

Site Description

Landscape Character

The northern section of the study area can be described as an agricultural landscape with intermittent mining and power generation activities. The proposed Alternative 1 power line will be located on a slope starting at Ermelo (Camden) and moving down the slope towards Volksrust over land that is mainly used for maize and grazing with some isolated sport of tourism like Wakkerstroom. This area has very little screening from topography or vegetation due to the relatively flat nature of the area and the mainly grassland vegetation. Please refer to Figure 8-4 for the topography of the site. The Alternative 2 and 3 alignments traverse eastwards to Piet Retief before turning southwards towards Paul Pietersburg. This area is characterised by large stands of Pine, Poplar and Bluegum plantations forming monocultures. Here the plantations will provide quite significant levels of screening when the plantations are near maturity, however due to the harvesting schedule, there will be a cycle when the visibility will be high when the trees are removed until such time that they have regrown.

In the central section of the study area the routes move down the escarpment and the vegetation changes from grassland to savanna. Alternative 1 traverses through the relatively pristine areas past Groenvlei before entering the farm and tribal lands past Utrecht to Nqutu. Alternatives 2 and 3 traverses from the high lying areas around Paul Pietersburg to the rolling savanna hills around Vryheid and Gluckstadt. The bulk of these areas are open savanna with little cover that can shield the power lines, with the exception being small patches of forestry around Gluckstadt.

In the southern section Alternative 1 traverses through Melmoth and the area has become typified by rolling hills and ridges and the coverage is dominated by plantations and sugarcane fields. Once down the ridges the route turns eastward along the Nkwalini Valley which is a fertile stretch of land with numerous fruit and sugarcane farms. Alternatives 2 and 3 enter the very hilly areas around Ulundi and finally stopping at Empangeni. This area is very hilly with mostly natural scrub
vegetation that provides good cover at short distances, but it is too short to be effective over longer distance views.

There are several major rivers in the area, including the Vaal and White Umfolozi to name but a few. For an illustration of the surface water features please refer to Figure 8-33.

The landscape surrounding the proposed power line Alternatives vary quite substantially and hence so does the screening for the proposed power line. There are also several existing power lines on site. Figure 8-69 below provides a view of some the existing power lines found along the route. Note how the different structures and vegetation influence the visibility of the lines.

![Figure 8-69: View of existing power lines in the study area.](image)

**Viewshed**

It should be noted that the viewsheds for each of the alternatives, which are plotted on the figures below, are an approximation that may vary in some locations. Potential views to the proposed power line are likely to be blocked in some localised situations by buildings, vegetation or local landform features at specific locations within the viewshed. Similarly, glimpses of the proposed power line may be available from some isolated high-elevation locations outside the plotted viewshed. The figures illustrate the visibility of each of the alternatives. The coloured areas indicate areas that are visible with the red areas having very high visibility and the green having lower visibility. It should be noted that the variations in visual impact between Alternatives 2 and 3 are relatively small, considering they follow a very similar alignment.