

THE ECOLOGY OF THE PEGASUS –UMFOLOZI 400 KV TRANSMISSION LINE

1. Terms of reference:

Johan Bodenstein of Indiflora cc Environmental Services was requested on 1 November 2001 as confirmed in the appointment letter to conduct an ecological specialist study for Eskom's Pegasus-Umfolozi 400kV Transmission Line.

1.1 Scope of work:

1.1.1 Flora

- i. Assess the route as well as additional alternatives proposed during the scoping process in more detail with respect to sensitive floral habitats using available mapping of the transmission line route and site visits as necessary.
- ii. Identify any additional RDB flora on the proposed route especially taking into consideration the species listed in the issues raised by I&APs.
- iii. Access roads will need to be constructed to provide access to the pylons along the route – comment on the potential impact of the roads during construction and maintenance.
- iv. Identify any additional sensitive or proclaimed natural areas along the route.
- v. Identify floral habitats along the route that may be particularly sensitive to fire.
- vi. Comment on the season in which construction should occur in the different sections with reference to fire hazard, erosion and seasonal changes in sensitivity of different floral communities.
- vii. Identify areas along the proposed transmission line route where the fire hazard may be significant as a result of high vegetation and or dense alien vegetation.
- viii. Undertake any site visits necessary for ground truthing information.
- ix. Provide mitigation suggestions for any impacts which may be identified above.
- x. Tabulate impacts with respect to significance in the format both before and after mitigation.

1.1.2 Fauna:

- i. Assess the route as well as additional alternatives proposed during the scoping process in more detail with respect to sensitive faunal habitats using available mapping of the transmission line route and visits as necessary.
- ii. Identify any additional RDB fauna on the proposed route especially taking into consideration any species listed in the issues by I&APs.
- iii. Access roads will need to be constructed to provide access to the pylons along the route – comment on the potential impact of these roads during construction and maintenance.
- iv. Identify any additional sensitive or proclaimed natural areas along the route.

- v. Identify faunal habitats along the route that may be particularly sensitive to fire.
- vi. Comment on the season in which construction should occur in the different sections with reference to fire hazard, erosion and seasonal changes in sensitivity of different faunal communities.
- vii. Undertake any site visits necessary for ground truthing information.
- viii. Provide mitigation suggestions for any impacts that may be identified above.
- ix. Tabulate impacts with respect to significance in the format provided both before and after mitigation.

1.1.3 General ecology:

- i. Review the impacts of the Veld and Forest Fire Act for the proposed line.
- ii. Identify the type and make of herbicides proposed for use and comment.
- iii. Provide more detail on aspects of poaching of flora and comment generally on the issue as necessary.
- iv. Assess the proposed alternatives with respect to the general ecology of the area.

1.2 Methodology:

The study was done primarily at desk-top level, utilizing available literature and mapping to identify sensitive areas in more detail. Site verification was undertaken as required.

1.3 Assessment criteria:

1.3.1 Impact assessment criteria:

The assessment of impacts was based on the impact assessment criteria. These include:

- Theme: impacts are grouped in themes
- Area along servitude: refers to the exact location along the proposed development
- Nature of impact: description of impact
- Legal requirements: reference to relevant Acts and Regulations
- Stage: construction, operation or decommissioning
- Extent of impact: local, regional, provincial or national
- Duration of impact: short term: 0 – 5 years
Medium term: 5 – 15 years
Long term: 16 – 30 years
Permanent
- Intensity: determine whether the impact is destructive or benign and should be qualified as low, medium or high.
- Probability of occurrence:
Improbable – where the possibility of the impact to materialize is very
Low

Probable – where there is a distinct possibility that the impact will
Occur

Highly probable – Where it is most likely that the impact will occur

Definite – where the impact will definitely occur

- Status of impact: Negative, neutral or positive
- Accumulative impact: positive or negative and listed as negligible, low, medium or high
- Level of significance:
 - No significance – do not influence the proposed development and/or environment in any way
 - Low significance – will have a minor influence on the proposed development and/or environment
 - Moderate significance – will have a moderate influence on the proposed development and/or environment
 - High significance – will have a major influence on the proposed development and/or environment

Three phases of the existence of the line was considered:

- Construction
- Operation
- Decommissioning

Where possible to avoid, minimize or mitigate environmental impact is clearly set out in the specialist report.

1.3.2 Degree of confidence:

- **No significance:** the impacts do not influence the proposed development and/or environment in any way.
- **Low significance:** the impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.
- **Moderate significant:** the impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.
- **High significance:** the impacts will have a major influence on the proposed development and/or environment. The impacts could have the “no-go” implication on portions of the development regardless of any mitigation measures that could be implemented.

2. Issues:

- 2.1 Well being
 - 2.1.1 Fire
 - 2.1.2 Creosote
 - 2.1.3 Season for construction
 - 2.1.4 Loss of agricultural potential
 - 2.1.5 Access
- 2.2 Natural environment
 - 2.2.1 Erosion
 - 2.2.2 Fauna
 - 2.2.3 Flora
 - 2.2.4 Access
- 2.3 Farming related issues
 - 2.3.1 Access

3. General over-view:

3.1 The vegetation of the study area:

The vegetation of the study area according to Acocks (1975) is divided into five veld types. Ngongoni Veld, A5, Northern Tall Grassland, A64, Southern Tall Grassland, A65, Natal Sour Sand veld, A66, and finally Low veld, A10.

Barry Low and Tony Rebelo (1996) have reviewed the vegetation of South Africa, Lesotho and Swaziland. They break the vegetation of the study area into three veld types. They call them Afro-montane forest (2), Natal central bushveld (25) and Natal Low veld bushveld (26).

Kelvin Camp (1997) has divided the vegetation of Kwa-Zulu Natal into bioresource groups. The vegetation of the study area is represented in the following bioresource groups; Moist highland sour veld (8), Dry highland sour veld, Moist tall grass veld (12), Dry tall grass veld (13), Sour sand veld (14), Dry lowland tall grass veld (16) and Low veld (22).

The topography of the study area comprises of rolling hills and deep river valleys with steep mountain slopes. The physio-graphic nature of the land, the climate and the soils determine the type of vegetation to be found in the area. In broad general terms the vegetation is typified by sour grasslands with scrub or forest in the river valleys particularly on the south facing slopes.

3.1.1 Moist Highland sour veld

Moist highland sour veld can best be described as grassland dominated by +/- 0,5 m high, short bunch grasses maintained by fire. In areas where fire is not able to reduce the growth the vegetation develops towards *Podocarpus* forest. Tall grasses such as *Cymbopogon spp.* and *Hyparrhenia spp* become predominant and forest precursors are *Leucosidea sericea* and *Buddleja salvifolia*.

Grasses like *Themeda triandra* and *Tristachya leucothrix* dominates veld in good condition. Overgrazed veld is recognized by the presence of the following grasses: *Eragostis curvula*, *E. plana* and *Sporobolus africana*.

Grass species found most abundantly include: *Alloteropsis semialata*, *Andropogon appendiculatus*, *Brachiaria serrata*, *Cymbopogon excavatus*, *Cymbopogon validus*, *Digitaria tricholaenoides*, *Diheteropogon amplexans*, *D. filifolius*, *Eulalia villosa*, *Harpochloa falx*, *Elionurus muticus*, *Eragrostis capensis*, *E. curvula*, *E. plana*, *E. racemosa*, *Heteropogon contortus*, *Microchloa caffra*, *Monocymbium ceresiiforme*, *Setaria nigristrostris*, *Sporobolus africanus*, *Themeda triandra*, *Trachypogon spicatus*, *Tristachya leucothrix* and various forbs.

Some invasive species are observed in the study area, mainly along the watercourses. These include American bramble (*Rubus cuneifolius*), silver wattle (*Acacia dealbata*), black wattle (*Acacia mearnsii*) and green wattle (*Acacia decurrens*).

3.1.2 Dry Highland sour veld

This veld form lies above 1400 m in altitude in the rain shadow to Moist Highland sour veld. This veld form is grassland and identified by the presence of *Hyparrhenia hirta*. Areas with poor soils are sensitive to grazing pressure. Areas with soils derived from dolerite tend to be more grazing resistant. *Themeda triandra* is dominant in veld in good condition. Overgrazing leads to an increase in *Eragrostis curvula*, *E. plana* and *Sporobolus africanus*.

Leucosidea sericea poses a bush encroachment problem on south facing aspects. This encroachment is a result of overgrazing.

3.1.3 Moist tall grass veld

Moist tall grass veld is identified by the abundance of *Hyparrhenia hirta* and sparsely scattered paper bark thorn tree (*Acacia sieberana*). *Hyparrhenia hirta* is found along with other *Hyparrhenia spp.* along roadsides and is dominant in old fields. *Acacia* woodlands are found on dolerite hillsides in isolated areas. Bush encroachment occurs in isolated areas by *Acacia* species and areas become invaded by the alien plant *Lantana camara*.

In areas where good management has taken place *Themeda triandra* is dominant. Common species include: *Diheteropogon filifolius*, *Harpechloa falx* and *Trachypogon spicatus*. Areas where the veld is overgrazed becomes dominated by *Eragrostis curvula*, *E. plana*, *Sporobolus africanus* and *S. pyramidalis*. Where selective overgrazing occurs *Elionurus muticus* becomes abundant.

3.1.4 Dry tall grass veld

The dominant *Hyparrhenia hirta* grass and the occasional *Acacia sieberana* woodlands is indicative of dry tall grass veld. *Acacia karroo* and *A. nilotica* bushlands occur in pockets with thickets mainly on north facing slopes. Various *Hyparrhenia spp.* is found in the veld, in old lands and road verges. Soil plays an important role in the composition of the veld. The veld found on red or black soils has good resistance to grazing. Yellow-brown soils have low resistance to grazing and are thus prone to erosion. Grey soils have very low tolerance and most likely to become eroded.

Other species observed in this veld include: *Themeda triandra*, *Tristachya leucothrix*, *Eragrostis racemosa*, *E. capensis* and *Heteropogon contortus*. Where disturbance or overgrazing takes place *Hyparrhenia hirta* becomes abundant.

3.1.5 Sour sand veld

In this grassland there is almost no woody plants. In well-drained sites some *Acacia karroo*, *A. nilotica*, *A. caffra* and *Diospyros lycioides* trees may be found. Grasses commonly found include *Alloteropsis semialata*, *Monocymbium ceresiiforme*, *Digitaria tricholaenoides*, *Harpechloa falx* and *Setaria nigrirostris*. Where the veld is heavily grazed *Aristida spp.*, *Cynodon dactylon*, *Eragrostis spp.*, and *Sporobolus spp.* becomes dominant.

3.1.6 Dry Lowland tall Grassveld

Hyparrhenia hirta dominates this grassveld. Areas overgrazed can be identified by the presence of *Sporobolus pyramidalis*. Some secondary thickets occur consisting mainly of *Acacia karroo*, *A. nilotica*, *A. tortillis* and *A. sieberana*. *Dichrostachys cinerea* is causing problem with bush encroachment.

3.1.7 Lowveld

Is distinguished from other veld cover by the number of tree species forming thickets. The veld cover may vary from savanna type cover to woodland thickets. The vegetation becomes dense along watercourses. Trees found in this environment include *Acacia nigrescens*, *A. tortillis*, *A. burkei*, *Schotia brachypetala*, *Spirostachys africana* and *Sclerocarya birrea*.

On heavy clay soils *Themeda triandra*, *Aristida bipartite*, *Eragrostis superba* and *Panicum maximum* abound.

On sandy soils *Aristida diffusa*, *Brachiaria nigropedata*, *Cymbopogon excavatus* and *Sporobolus fimbriatus* are most common.

3.1.8 Discussion:

See map 3 titled Sensitive Habitats attached. Moist tall grass veld and Dry tall grass veld are two near endemic communities within the study area. Sour sand veld and Dry lowland tall grass veld are endemic veld forms present in the study area. That means these specific forms of veld are not found anywhere else in the world. It gives them a notable conservation status. Activities in these endemic veld forms will need to be kept to the minimum. They are poorly represented in official conservation areas and are in need of protection measures. Any indiscriminate actions within these veld forms may hamper any future conservation plans.

Fire forms part of the natural maintenance of the following veld forms, Moist highland sour veld, Dry highland sour veld, Moist tall grass veld, Dry tall grass veld, Sour sand veld and Dry lowland tall grass veld. The veld is best when burnt every three years. More frequent fires will favour increaser species and too infrequent fires will allow bush encroachment leading too hot subsequent fires. Fires are to be restricted to the seasons identified in the Fire Act. Moist highland sour veld, Dry

highland sour veld and Moist tall grass veld are placed in the Cool Moist grass veld fire zone. Burning in this zone is to take place between 1 August and 30 September of every year.

Dry tall grass veld and Sour sand veld are placed in the Dry tall grass veld fire zone. Vegetation in this zone may be burnt between 15 August and 31 October. Dry lowland tall grass veld is fire zoned Warm intermediate grass veld and this zone may be burnt from 15 July to 30 September. Low veld is placed in its own fire zone (Low veld) and burning is not part of the natural regime and permission must be specifically requested prior to burning. This vegetation zone is very sensitive to fire.

Construction should take place from mid December to late winter of the following year. Construction is not to take place during the spring months (First week of August through to mid December). This is the time when the grass veld is re-sprouting after the winter. In autumn the plants found in the veld types of the study area trans-locate energy to their roots systems. The stored energy is then used to produce new foliage when the climate and growing conditions become more favourable.

Should construction take place at this time the soft and tender growth will be destroyed. Such destruction will place additional stress on the stored reserves to produce new growth. The plants will then have less time to grow to their full seasonal potential before having to trans-locate energy to their roots once more.

3.1.9 Threatened plants:

The following plants are rated for its conservation status and the veld form in which it occurs is also indicated.

Plant name	Plant form	Conservation status	Veld form
Albizia suluensis	Tree	Vulnerable	Dry lowland tall grass veld
Encephalartos msinganus	Forb	Endangered	Dry tall grass veld

Care will have to be taken to avoid the areas where these plants occur to reduce the chance of any further and additional stress on these already diminished communities. The location of *Encephalartos msinganus* falls outside the study area (Roberts, 2001, pers.comm.).

3.1.10 Medicinal plants:

The following medicinal plants are found in the study area;

Plant	Veld form In study area	Red data status	Conservation status
<i>Alepidea amatymbica</i>	Moist Hlnd Sour veld	Near threatened	Becoming very rare
<i>Eucomis autumnalis</i>	Moist Hlnd Sour veld	Vulnerable	Rare
<i>Boophane disticha</i>	Sour sandveld	Protected	Restricted
<i>Brunsvigia natalensis</i>	Sour sandveld	Protected	Restricted
<i>Crinum macowanii</i>	Sour sandveld	Protected	Restricted
<i>Aloe cooperi</i>	Sour sandveld & Dry Tall grassveld	Protected	Restricted
<i>Aloe dominella</i>	Sour sandveld	Protected	Restricted
<i>Aloe prinslooii</i>	Sour sandveld & Dry tall grassveld	Protected	Rare

These medicinal plants are of the priority medicinal plants in the province. Their habitats are under threat by “muti” collectors. Any other land use factors place additional stress on these communities. All possible attempts should be made to avoid these habitat areas. Locality maps, available from Kwa-Zulu Natal Wildlife, should be drawn to indicate the exact locality of these species in terms of the positioning of the proposed transmission line. It is noted by McKean (2000) that data on these species is deficient and a clear picture of the distribution and abundance still need to be established.

3.1.11 Alien invader plants:

Alien plants occur in the study area for various reasons. Some plants were introduced into the area deliberately and some have migrated into the study area through natural succession processes. The plants introduced deliberately are mainly woody plants brought in by commercial farmers.

The following aliens were identified in the study area:

Scientific name	Common name
<i>Acacia dealbata</i>	Silver wattle
<i>Acacia decurrens</i>	Green wattle
<i>Acacia mearnsii</i>	Black wattle
<i>Cinnamomum camphora</i>	Camphor tree
<i>Eucalyptus grandis</i>	Saligna gum
<i>Lantana camara</i>	Lantana
<i>Melia azedarach</i>	Syringa
<i>Populus alba</i>	White poplar

Discussion:

Alien plants in the study area appear in localized areas and easy to control. Any alien plants directly in line of the proposed transmission line must be cut and stump treated as part of the environmental management plan.

3.1.12 Over grazing:

The veld types in the study area and the topography of the study area is highly suitable to extensive farming and the keeping of plains game. The under lying soils support mainly grassland veld types. The commercial framers stock mainly cattle and do limited crop farming mainly as feed for the cattle. In the tribal area more subsistence farming practices are observed. Throughout the study area erosion is a serious problem and stocking rates determine the ability of the veld to recover.

3.2 Wetlands:

Begg (1986) in his authoritative works on South African wetlands adopts the definition of the United fish and wildlife Service “A wetland is land where an excess of water is the dominant factor determining the nature of soil development and the types of plant and animal communities living at the soil surface. It spans a continuum of environments where terrestrial and aquatic systems integrate.” He includes marshes, bogs and swamps in his definition.

Wetlands form an integral part of the catchments of rivers. Wetlands are the habitat of many forms of faunal life apart from being of importance in retaining water.

A number of rivers pass through the study area, see map 2 titled Red flag and no-go areas. The major rivers include the Sandspruit, Blood river, Buffalo river, Nondweni river, Umvunyana River and White Umfolozi River. The catchments of some of these rivers are situated within the study area

These ecosystems are very sensitive to external influences and physical damage. Care should be taken to avoid passing through wetlands during the construction and maintenance phases. No access road should pass through a wetland. Where the conductors must span a wetland the conductors must be pulled through by hand. Wetlands should be treated as “no-go” areas.

3.3 Erosion:

The soil types in the study are very erodable, see map 5 titled Erosion attached. This is confirmed by the number of dongas and the area affected by sheet erosion seen in the study area. The two main forms of erosion are gully erosion and sheet erosion. Much soil is lost by erosion and the potential agricultural land is constantly under threat. Various reasons can be put forward for the erosion in the study area.

The soils found in the Dry tall grassveld are particularly susceptible to erosion especially along the watercourses. There is historical evidence of erosion in this area and of the soils in the study area. Subsequently farming practices have increased the incidence of soil erosion.

3.4 Season of construction:

It would be best if construction and rehabilitation could take place during the winter months. Most of the vegetation of the study area is grassveld. During the autumn months grass plants translocate much of its energy into the underground plant parts (ie stem and roots). The leaves become parched and will suffer little when it is physically damaged. In spring after the first spring rains the reserves stored will promote new growth.

If the construction is to take place during the mid summer, autumn and winter months when physical damage by moving vehicles, personnel, material and equipment will be minimized. During rehabilitation much local grass seed need to be sown and worked into the soil. Once the spring rains come the existing plants and the seed sown in autumn and the seed sown during the rehabilitation phase will begin to germinate and bind the soil with their roots.

3.5 Mammals:

The following mammals may occur in the study area:

Animal	Scientific name	Conservation status
Greater musk shrew	(<i>Crocidura flavescens</i>)	
Egyptian free-tailed bat	(<i>Tadarida aegyptiaca</i>)	
Cape serotine bat	(<i>Eptesicus capensis</i>)	
Common slit-faced bat	(<i>Nycteris thebaica</i>)	
Scrub hare	(<i>Lepus saxatilis</i>)	
Natal red rock rabbit	(<i>Pronolagus crassicaudatus</i>)	
Common mole rat	(<i>Cryptomys hottentotus</i>)	
Porcupine	(<i>Hystrix africae australis</i>)	
Woodland dormouse	(<i>Graphiurus murinus</i>)	
Greater cane rat	(<i>Thryonomys swinderianus</i>)	
Angoni vlei rat	(<i>Otomys angoniensis</i>)	
Vleirat	(<i>Otomys irroratus</i>)	
Striped mouse	(<i>Rhabdomys pumilo</i>)	
Water rat	(<i>Dasymys incomtus</i>)	
Multimammate mouse	(<i>Praomys natalensis</i>)	
Red veld rat	(<i>Aethomys chrysophilus</i>)	
Highveld gerbil	(<i>Tatera leocogaster</i>)	Problem animal
Brant's climbing mouse	(<i>Dendromus mesomelas</i>)	
Aardwolf	(<i>Proteles cristatus</i>)	Rare
Brown hyaena	(<i>Hyaena brunnea</i>)	
Black-backed jackal	(<i>Canis mesomelas</i>)	
Cape clawless otter	(<i>Aonyx capensis</i>)	
Spotted-necked otter	(<i>Lutra macucollis</i>)	
Honey badger	(<i>Mellivora capensis</i>)	Vulnerable
Striped polecat	(<i>Ictonyx striatus</i>)	
African civet	(<i>Civettictis civetta</i>)	
Large-spotted genet	(<i>Genetta tigrina</i>)	
White-tailed mongoose	(<i>Ichneuria albicauda</i>)	
Water mongoose	(<i>Atilax paludinosus</i>)	
Antbear	(<i>Orycteropus afer</i>)	Vulnerable
Burchell's zebra	(<i>Equus burchelli</i>)	
Blue wildebeest	(<i>Connonchaetes taurinus</i>)	
Common duiker	(<i>Sylvicapra grimmia</i>)	
Springbok	(<i>Antidorcas marsupialis</i>)	
Oribi	(<i>Ourebia aurebi</i>)	
Steenbok	(<i>Raphicerus campestris</i>)	
Impala	(<i>Aepyceros melampus</i>)	
Kudu	(<i>Tragelaphus strepticerus</i>)	
Nyala	(<i>Tragelaphus angasii</i>)	
Bushbuck	(<i>Tragelaphus scriptus</i>)	

Eland	(<i>Taurotragus oryx</i>)
Reedbuck	(<i>Redunca arundinum</i>)
Mountain reedbuck	(<i>Redunca fulvorufula</i>)

Only three animals have red data status.

Habitats of animals that are critical for their survival are areas of shelter. Areas along watercourses and bush or forest ecotones are most important to protect, particularly against the onslaught of fire.

3.6 Amphibia

The following frogs occur within the study area:

- Common platanna (*Xenopus laevis*)
- Spotted Shovel-nosed frog (*Hemisis guttatus*)
- Rattling frog (*Semnodactylus wealii*)
- Bubbling kassina (*Kassina senegalensis*)
- Painted reed frog (*Hyperolius marmoratus*)
- Bushveld rain frog (*Breviceps adspersus*)
- African bullfrog (*Pyxicephalus edulus*)
- Tremolo sand frog (*Tomopterna cryptottus*)
- Natal sand frog (*Tomopterna natalensis*)
- Raucus toad (*Bufo rangeri*)
- Guttural toad (*Bufo gutturalis*)
- Red toad (*Schismaderma careens*)
- Striped stream frog (*Strongylopus fasciatus*)
- Common river frog (*Afrana angolensis*)
- Cape stream frog (*Afrana fuscigula*)
- Plain Grass frog (*Ptychadena anchietae*)
- Sharp-nosed Grass frog (*Ptychadena oxyrhynchus*)
- Striped Grass frog (*Ptychadena porosissima*)
- Bronze Caco (*Cacostermum nanum*)
- Common Caco (*Cacostermum boettgeri*)
- Snoring puddle frog (*Phrynobatrachus natalensis*)

There are no red data species present in the study area.

3.7 Reptiles:

3.7.1 Lizards

The following lizards may appear in the study area:

Name	Scientific name	Red data book status
Legless lizard	(<i>Scelotis mira</i>)	
Giant legless skink	(<i>Acontias plumbeus</i>)	
Striped skink	(<i>Mabuya striata punctatissima</i>)	
Wahlberg's dwarf skink	(<i>Panapsis wahlbergii</i>)	
Highveld crag lizard	(<i>Cordylus melanotus melanotus</i>)	
Flapnecked chameleon	(<i>Chamaeleo dilepis</i>)	

Four endemic species occur in the study area and are also listed in the Red data book.

3.7.2 Snakes:

Name	Scientific name	Red data book status
African rock python	(<i>Python sebrae natalensis</i>)	
Dusky-bellied water snake	(<i>Lycodonomorphus laevisissimus</i>)	
Aurora house snake	(<i>Lamprophis aurora</i>)	
Olive house snake	(<i>Lamprophis inoratus</i>)	
Spotted house snake	(<i>Boaedon guttatus</i>)	
Brown house snake	(<i>Boaedon fuliginosus fuliginosus</i>)	
Natal green water snake	(<i>Philothamnus natalensis</i>)	
Sundeval's shovel-snout	(<i>Prosymna sundevalli sundevalli</i>)	
Common mole snake	(<i>Pseudaspis cana</i>)	
Southern slug-eater	(<i>Duberria lutrix lutrix</i>)	
African egg-eater	(<i>Dasypeltis scabra scabra</i>)	
Southern brown egg-eater	(<i>Dasypeltis inornata</i>)	
Olive grass snake	(<i>Psammophis sibilans sibilans</i>)	
Cape centipede-eater	(<i>Aparallactus capensis capensis</i>)	
Rinkhals	(<i>Hemachatus haemachatus</i>)	
Black mamba	(<i>Dendroaspis polylepis polylepis</i>)	
Natal garter snake	(<i>Elapoidea sundevalli sundevalli</i>)	
Burrowing adder	(<i>Atractaspis bibroni bibroni</i>)	
Rhombic night-adder	(<i>Caustus rhombeatus</i>)	
Snouted night-adder	(<i>Caustus defilippi</i>)	
Common puff-adder	(<i>Bitis arietans arietans</i>)	
Boomslang	(<i>Dispholidus typus</i>)	
Cape file snake	(<i>Mehelya capensis</i>)	

Only the African rock python is listed in the Red data book.

3.7.3 Tortoises:

Only one tortoise occurs in the study area. It is the Natal hinged tortoise (*Kinixys natalensis*). It is listed in the Red data book as Rare.

3.8 Fresh water fish:

Name	Scientific name	Red data status
African mottled eel	(<i>Anguilla bengalensis</i>)	
Goldie barb	(<i>Barbus qallidus</i>)	Limited distribution
Three spot barb	(<i>Barbus trimaculatus</i>)	
Scaly	(<i>Barbus natalensis</i>)	
Leaden labeo	(<i>Labeo molybdinus</i>)	
Carp	(<i>Cyprinus carpio</i>)	
Sharptooth catfish	(<i>Clarias gariepensis</i>)	
Large mouth bass	(<i>Micropterus salmoides</i>)	
Mazambique tilapia	(<i>Oreochromis mossambicensis</i>)	
Pongolo rock catlet	(<i>Chiloglanis emarginatus</i>)	Rare

Of all the fresh water fish potentially present in the study area only one is recorded in the Red data book as rare. One other is recorded as having a limited distribution. The conservation of the upper reaches of rivers and catchments are very important for the survival of threatened species.

3.9 Invertebrates:

Distribution data drawn from the Final report on the Determining the conservation value of land in Kwa-Zulu Natal of the conservation authority, Kwa-Zulu Natal Wildlife, can only be done graphically. The GIS distribution maps of critically, identified species is to be requested from KZN Wildlife and then it can be analyzed to determine how many species have their habitat within the study area. Only then will a picture emerge of the potential threat the proposed transmission line will have on these organisms.

3.10 Conservancies:

The resident farmers in the area between the Pegasus substation and the blood river established a conservancy (Dundee farmers association conservancy), see map 4 titled Conservancies attached. The purpose of the conservancy is to protect the dwindling natural resources. Various antelope still occur naturally in the conservancy area. Identified antelope include steenbok, blue duiker and grey rhebuck (Muller, pers. comm. 2001). In communications with farm owners it appears that they do not consider the proposed line as a threat to the resources on their farm (Muller and Nebbe, pers. Comm. 2001).

3.11 Natural Heritage Sites:

A natural heritage site is registered with the Department of Environmental Affairs and Tourism (No 283,1997) on the farm Jordan (portion 1 & 2) of Mr. J.G.L Pretorius, known as Leopard Rock Reserve, see map 4 titled Conservancy. This site is registered for its high cliffs and Red Data Species. Species such as aardwolf and oribi (*Ourebia ourebi*) occur on this farm. The farm is one of five privately owned farms in KwaZulu-Natal on which klipspringer occur. It is situated in the eastern third of the line in the district of Bloubaank. It is primarily situated on a west facing aspect, straddling a tributary of the White Umfolozi River.

3.12 Conclusion

The alternative routes area marked A for the northern route, B for the southern route, C for the southern route with a switch over to the northern route in the eastern third of the line and D for the southern route with an alternative deviation further south in the eastern third of the line, see map 1 titled Locality map.

Route C is the most preferred for there is less pristine natural elements along that route and the impact on the environment will be least along that route. Route B is the second most preferred route due to the amount of existing disturbance along that route. Route A would be the third most preferred route as the veld is most pristine along this route and the impact will be greatest. Route D is the least preferred route as it will enter the White Umfolozi River environment and the impact would be greatest along that route.

Environmental Services

4. Reference:

- Acocks, J.P.H. 1975. Veld types of South Africa. Memoirs of the Botanical Survey of South Africa No 40. Botanical Research Institute, Pretoria.
- Begg, G. W. 1989. The location, status and function of the priority wetlands of Natal. Natal Town and Regional Planning Report, Volume 73. Pietermaritzburg
- Camp, K.G. 1997. The Bioresource Groups of Kwazulu-Natal. Cedara report No. N/A/97/6, Cedara.
- Carruthers, V. 2001. Frogs and frogging in Southern Africa. Struik, Cape Town.
- FitzSimons, V.F.M. 1970. A field guide to the snakes of Southern Africa. Collins, London.
- Goodman, P.S. 2000. Determining the conservation value of land in KwaZulu-Natal. KwaZulu-Natal Nature Conservation Service, Pietermaritzburg.
- Kleynhans, C.J. 1987. Red Data Book of Reptiles and fish. CSIR, Pretoria.
- Low, B and Rebelo, A.G. 1996. Vegetation of South Africa, Lesotho and Swaziland. Department of Environmental Affairs and Tourism, Pretoria.
- Muller, M, 2001. Dundee farmers association conservancy. Personal Communication.
- Nebbe, R, 2001. Dundee farmers association conservancy. Personal Communication.
- Pooley, E. 1998. A field guide to Wildflowers of KwaZulu –Natal and the Eastern region. Natal Flora Publications Trust, Durban.
- Pooley, E. 1993. The complete field guide to Trees of Natal, Zululand and Transkei. Natal Flora Publications Trust, Durban.
- Roberts, T. 2001. The ecology of the Pegasus-Umfoloji 400kV transmission line. Personal communication. Dundee
- Skelton, P.1993. 'n Volledige gids tot die Varswatervisse van Suider-Afrika. Southern boekuitgewers, Halfweghuis.
- Visser, J. 1984. Akkedissie van Suid-Afrika. Landbouweekblad 20/7/84 – 30/11/84.
- Wyatt, J. 1993. Wetlands and wetland management. Natal Parks Board, Pietermaritzburg.

TABLES OF IMPACTS

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

Pegasus – Umfolozi 400kV Transmission Line		
Theme	Well being	
Nature of impact	Access: All of the alternatives A, B, C and D.	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983) and Environmental Conservation Act (1998)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	Short term	Permanent
Intensity	High	Medium
Probability of occurrence	Highly probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	High	Moderate
Level of significance	High	Medium
Mitigation measures	Use the existing service access route and extend to new line where possible. Identify possible erosion sites and mitigate as per site requirement. Rehabilitate with correct vegetation cover.	Identify on continued basis for erosion beginning and rehabilitate.
Level of significance after mitigation	Medium	Low
EMP requirements	Proper access construction instructions to be followed strictly. Rehabilitation of vegetation to be of high standard.	Follow-up rehabilitation where previous efforts have failed.
<u>Discussion:</u> The soils in the study area are highly erodible. Minor modifications of the vegetation cover lead to the soil being eroded. Active steps to be taken to prevent soil loss. Proper drainage structures must be installed on maintenance roads passing through gully erosion areas to ensure future access.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

Pegasus-Umfolozi 400kV Transmission Line		
Theme	Well being	
Nature of impact	Use of creosote poles – all of the alternatives: A, B, C & D.	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	None
Intensity	Low	None
Probability of occurrence	Highly probable	Improbable
Status of the impact	Negative	None
Accumulative Impact	Med	None
Level of significance	Moderate	No significance
Mitigation measures	Plastic sleeves on the wooden poles will restrict leakage. Storage area to be limited and preventative measures taken to limit pollution.	Not required
Level of significance after mitigation	Low	No significance
EMP requirements	Use CCA treated poles instead of creosote poles, or use old weathered poles from which leaking creosote is unlikely.	
<p><u>Discussion:</u> Material resistant to the corrosive action of creosote should be placed on the ground in the storage areas to trap any leaking creosote. Sleeves on poles will trap creosote in the sleeve and prevent soil pollution. After the poles served their purpose and are removed the soiled sleeves can be discarded in an appropriate manner.</p>		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

Pegasus-Umfolozi 400kV Transmission Line		
Theme	Well being	
Nature of impact	Fire – all the alternatives: A, B, C & D: Safety of personnel and fire fighters	
Legal requirements	National Veld and Forest (Act 101 of 1998) and Conservation of Agricultural Resources Act (No 43 of 1983)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	Short term	Permanent
Intensity	Medium	Low
Probability of occurrence	Fairly probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	Med	Low
Level of significance	Moderate	Low
Mitigation measures	Occupational health and safety management plans drafted prior to commencement of construction. These to be adopted and complied with.	Occupational health and safety plans to be complied with by maintenance workers.
Level of significance after mitigation	Low	Low
EMP requirements	Include restrictions on the making of fires by construction workers in the EMP. Workers to be trained in basic fire fighting techniques prior construction. Contractors to carry limited basic fire fighting equipment.	Maintenance workers to comply with EMP.
<u>Discussion:</u> Veld fires are dangerous on level country, in strong winds in winter when the grass is long and dry. Construction and maintenance workers must be aware of the ability of veld fires to spread and trap personnel. Their safety depends on their response to the potential threat.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

Pegasus-Umfolozi 400kV Transmission Line		
Theme	Well being	
Nature of impact	Fire – all the alternatives: A, B, C & D: need to switch off the lines	
Legal requirements	National Veld and Forest (Act 101 of 1998) and Conservation of Agricultural Resources Act (No 43 of 1983)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction and decommissioning	Permanent
Intensity	Low	Low
Probability of occurrence	Improbable	Improbable
Status of the impact	Negative	Negative
Accumulative Impact	Low	Low
Level of significance	No significance	No significance
Mitigation measures	Cut the grass in the servitude at the time when the grass grows too tall in hotspots in the servitude under the lines	Cut the grass in the servitude at the time when the grass grows too tall in hotspots in the servitude under the lines
Level of significance after mitigation	No significance	No significance
EMP requirements	Annual survey of the transmission line servitude to determine the fuel load during autumn to identify hot spots and then to take preventative measures	Annual survey of the transmission line servitude to determine the fuel load during autumn to identify hot spots and then to take preventative measures
<p><u>Discussion:</u> Fire is likely to take place and may interfere with the working of the transmission lines only in areas where the topography brings the vegetation close to the conductors. Preventative measures will limit this incidence. Only under extreme situations may it be necessary to switch off the line. Annual surveys are to be carried out of the transmission line servitude to determine the fuel load during autumn to identify hot spots and then to take preventative measures</p>		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

Pegasus-Umfolozi 400kV Transmission Line		
Theme	Well being	
Nature of impact	Fire- all the alternatives: A, B C and D - fire fighting requirements	
Legal requirements	Regulations on fire under the Veld and Forest Fire Act (No 101 of 1998) and Conservation of Agricultural Resources Act (No 43 of 1983)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction and decommissioning	Permanent
Intensity	Low	Low
Probability of occurrence	Probable	Improbable
Status of the impact	Negative	Negative
Accumulative Impact	Low	Low
Level of significance	Moderate	Low
Mitigation measures	Contractors to have basic fire fighting equipment at hand and take pre-cautionary measures.	None
Level of significance after mitigation	Low	Low
EMP requirements	Fire beaters and backpack sprayers be available at each construction site. Basic firebreaks be cut by mowers and waste cleared prior to commencement at each site.	None
<u>Discussion:</u>		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

Pegasus-Umfolozi 400kV Transmission Line		
Theme	Well being	
Area along servitude	A46, A47, C42, C43 – Alternative C + D and G5, G6, G7 – Alternative A, B, C and D.	
Nature of impact	Fire in wooded areas In Alternative A, B, C and D: – Burns the vegetation, burning will alter the species composition	
Legal requirements	Regulations on Fire under Forest and Fire Act	
Stage	Construction and Decommissioning	Operation
Extent of impact	Site and surroundings	Site and surroundings
Duration of impact	Short term	Permanent
Intensity	High	High
Probability of occurrence	Highly probable	Definite
Status of the impact	Negative for the project	Positive for the environment
Accumulative Impact	Medium	Medium
Level of significance	Moderate	Low
Mitigation measures	Bush clearing through wooded areas will reduce the impact	None
Level of significance after mitigation	Low	Low
EMP requirements	Bush clearing to remove all woody plants from the servitude.	Follow-up treatments to restrict re-growth of woody material
<u>Discussion</u>		
Wooded areas have a higher fuel load and will lead to more intense fires with increase carbon production. Such fires impacts negatively on transmission lines by carbon build-up on isolators leading to flash-overs and line-down time.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

Pegasus-Umfolozi 400 kV Transmission Line		
Theme	Well being	
Nature of impact	Fire – all the alternatives A, B, C & D – access for fire management	
Legal requirements	Regulations on fire under the Veld and Forest Fire Act 101 of 1998 and Conservation of Agricultural Resources Act (Act No 43 of 1983)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction and decommissioning	Permanent
Intensity	Low	Low
Probability of occurrence	Probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	Low	Low
Level of significance	Low	Low
Mitigation measures	None	None
Level of significance after mitigation	Low	Low
EMP requirements	Markers to be placed indicating the access points from district roads to the servitude. The marker should also indicate the pylon numbers serviced by the access roads since there is no direct route from the beginning to the end. Agreed joint access control measures to be negotiated with landowners	Markers to be placed indicating the access points from district roads to the servitude. The marker should also indicate the pylon numbers serviced by the access roads since there is no direct route from the beginning to the end. Agreed joint access control measures to be negotiated with landowners

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

Discussion:

Access roads to the transmission line to prevent or control fires are necessary at all times. The contractor is to ensure drainage systems are in place in gullies to ensure the service road to be passable at all times.

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

Pegasus-Umfolozi 400kV Transmission Line		
Theme	Well being	
Nature of impact	Fire – All the alternatives: A, B, C and D: Grassland	
Legal requirements	Regulations on fire under the Forest and Fire Act	
Stage	Construction and Decommissioning	Operation
Extent of impact	Site and surrounds	Site and surrounds
Duration of impact	For the duration of construction	Permanent
Intensity	High - disruptive	High – determines species composition
Probability of occurrence	Highly probable	Definite
Status of the impact	Negative if too frequent or in the wrong season	Negative if too frequent or too seldom
Accumulative Impact	Medium	Low
Level of significance	Moderate	Low
Mitigation measures	Construction is not to take place during the active growing season when the vegetation is too wet to burn.	The maintenance program to allow for periodical cutting of the grass around pylon bases.
Level of significance after mitigation	Low	Low
EMP requirements	Mow the grass at the new pylon bases prior the commencement of construction	Grass cutting maintenance programme
<p><u>Discussion:</u> Grass veld is always at risk of being set alight purposely or accidentally. Preventative and restrictive measures will limit damage to structures, property and injuries to life forms.</p>		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

Pegasus-Umfolozi 400k V Transmission Line		
Theme	Well being	
Nature of impact	Fire – all alternatives: A, B, C and D. - construction, operation and decommissioning activities	
Legal requirements	Regulations on fire under the Veld and Forest Fire Act (No 101 of 1998) and Conservation of Agricultural Resources Act (No 43 of 1983)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	Short term	Permanent
Intensity	Low	Low
Probability of occurrence	Probable	Improbable
Status of the impact	Negative	Negative
Accumulative Impact	Low	Low
Level of significance	Moderate	Low
Mitigation measures	Staff training, preventative measures	None
Level of significance after mitigation	Low	Low
EMP requirements	Staff training on fire prevention, fire break mowing prior to commencement of work	Fire preventative actions
<u>Discussion:</u>		
Normal construction, operation and decommissioning activities do not hold a significant fire threat. Fire preventative training and fire-break preparation activities reduce the potential risk.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Well being	
Area along servitude	All the alternatives: A, B, C and D.	
Nature of impact	Loss of Agricultural Potential – Impacts on crop spraying	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	N/A	Low
Probability of occurrence	N/A	Improbable
Status of the impact	N/A	Negative
Accumulative Impact	N/A	Low
Level of significance	N/A	Low
Mitigation measures	N/A	Markers on conductors over commercial fields sprayed as a rule.
Level of significance after mitigation	N/A	Low
EMP requirements	N/A	Markers on the conductors over commercial sprayed as a rule.
<u>Discussion:</u>		
The study area does not lend itself to commercial crop farming and the likelihood of fields being in need of crop spraying is very limited.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Well being	
Area along servitude	All the alternatives: A, B, C and D.	
Nature of impact	Loss of Agricultural Potential – Limitations on crop types	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	N/A	Low
Probability of occurrence	N/A	Low probability
Status of the impact	N/A	Negative
Accumulative Impact	N/A	Low
Level of significance	N/A	Low
Mitigation measures	N/A	None
Level of significance after mitigation	N/A	Low
EMP requirements	N/A	None
<u>Discussion:</u>		
Agriculture in the study area is basically limited to stock farming and dry-land crops due to the topography, climate and soils. The line would not restrict the crops grown in the area.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Well being	
Area along servitude	All the alternatives: A, B, C and D.	
Nature of impact	Loss of Agricultural Potential – Limiting irrigation systems	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	N/A	Low
Probability of occurrence	N/A	Low probability
Status of the impact	N/A	Negative
Accumulative Impact	N/A	Low
Level of significance	N/A	Low
Mitigation measures	N/A	None
Level of significance after mitigation	N/A	Low
EMP requirements	N/A	None
<u>Discussion:</u>		
The agricultural potential of the study area does not lend itself for crop farming. The likelihood of such systems operating is very limited and the line would not have an impact on such systems.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE		
Theme	Well being	
Area along servitude	The study area	
Nature of impact	Loss of Agricultural potential – wind breaker avenues	
Legal requirements	Conservation of Agricultural Resources (No 43 of 1983)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	Low	N/A
Probability of occurrence	Improbable	N/A
Status of the impact	Negative	N/A
Accumulative Impact	Low	N/A
Level of significance	Low	N/A
Mitigation measures	None	N/A
Level of significance after mitigation	No significance	N/A
EMP requirements	None	N/A
<u>Discussion:</u>		
There are at present no windbreaks around cultivated fields. The environment does not lend itself to crop production on a commercial scale and windbreaks are not utilised by local farmers.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

Pegasus – Umfolozi 400 kV Transmission Line		
Theme	Well being	
Area along servitude	All of the alternatives: A, B, C and D.	
Nature of impact	Loss of Agricultural Potential: Restricting farming equipment	
Legal requirements	Conservation of Agricultural Resources Act (No43 of 1983)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	Short term	Permanent
Intensity	Medium	Medium
Probability of occurrence	Probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	Medium	Medium
Level of significance	Low	Low
Mitigation measures	Reviewing pylon structure design to accommodate farmers need to work the arable land available.	N/A
Level of significance after mitigation	Low	Low
EMP requirements	Clearly mark guide ropes	Maintain guide rope markers.
<u>Discussion:</u>		
<p>The land, climate and soil type in the study area lend itself to extensive farming and grazing is good for cattle and sheep. Only in limited areas are the soils arable. Many old cultivated fields are observed in the study area where crops were grown previously. Crops grown are mainly maize where the fields are ploughed, harrowed and planted mechanically. Harvesting takes place manually. Standard farming equipment should not be excessively affected by the line.</p>		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Well being	
Area along servitude	The study area	
Nature of impact	Loss of Agricultural Potential: Clearance space under lines	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	N/A	Low
Probability of occurrence	N/A	Probable
Status of the impact	N/A	Negative
Accumulative Impact	N/A	Low
Level of significance	N/A	Low
Mitigation measures	N/A	None
Level of significance after mitigation	N/A	Low
EMP requirements	N/A	Markers on guidelines
<u>Discussion:</u>		
The agriculture of the study area is mainly extensive agriculture with minor intensive agriculture, mainly subsistence farming. Crops grown are limited to maize production. The likelihood of the guideline or transmission lines interfering with the production of these crops is unlikely.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Well being	
Area along servitude	All the alternatives: A, B, C and D.	
Nature of impact	Season for construction activities - fauna	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983), Environmental Conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	High	Low
Probability of occurrence	Highly probable	Low probability
Status of the impact	Negative	Negative
Accumulative Impact	Medium	Low
Level of significance	Medium	Low
Mitigation measures	Limit construction activities to the drier season	Limit maintenance activities to the drier season
Level of significance after mitigation	Low	Low
EMP requirements	Construction to take place from April to July	Maintenance to take place from April to July
<u>Discussion:</u>		
Most animal species breed in the spring season and are vulnerable through the early part of summer. Construction would be best to take place from December through to July.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Well being	
Area along servitude	All the alternatives: A, B, C and D.	
Nature of impact	Season for construction activities - flora	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983), Environmental Conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	High	Low
Probability of occurrence	Definite	Low probability
Status of the impact	Negative	Negative
Accumulative Impact	Medium	Low
Level of significance	Medium	Low
Mitigation measures	Construction work to take place in the drier seasons ie late autumn and winter damage to vegetation can be limited.	None
Level of significance after mitigation	Low	Low
EMP requirements	A rehabilitation programme to follow-up on construction before the next growing season commences	None

Discussion:

The study area comprises mostly of grassland vegetation. Grass plants, bulbous plants and many herbaceous plants translocate their growth energy to their roots during autumn to protect the plants against the coming cold of winter. In spring the plants use the stored energy to grow leaves and reproductive systems. Construction in spring will be very detrimental as it will destroy the tender, new growth. It will markedly reduce the available energy to re-sprout and produce fruit.

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Well being	
Area along servitude	All the alternatives: A, B, C and D.	
Nature of impact	Season for construction activities - social	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983), Environmental Conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	Medium	Low
Probability of occurrence	Probable	Low probability
Status of the impact	Negative	Negative
Accumulative Impact	Low	Low
Level of significance	Low	Low
Mitigation measures	Limit construction activities to the drier season	Limit maintenance activities to the drier season
Level of significance after mitigation	Low	Low
EMP requirements	Construction to take place from December to July	Maintenance to take place from December to July
<u>Discussion:</u>		
Most cops are planted in the spring season and are vulnerable through the early part of summer. Construction would be best to take place from December through to July.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Natural environment	
Area along servitude	Existing erosion sites on Northern line: D19, D20, D21, C22, C23, C25, B25, B33, B37, C52 Southern line: H8, H12, H14, H15, H16, G16, G18, G20, F24, F25, F27, F29, D38, D41 High erosion potential sites: B27 - B37, C27 - C37, F27 - F30 - E35, D35 - D38	
Nature of impact	Erosion – Areas of high potential erodibility	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983), Environmental conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	High	Medium
Probability of occurrence	Highly probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	Medium	Medium
Level of significance	High	Medium
Mitigation measures	Good drainage management Using energy dissipatory engineering Immediate rehabilitation	Annual inspection and rehabilitation
Level of significance after mitigation	Medium	Low
EMP requirements	As many preventative measures to be taken as possible	Manage run-off

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

Discussion:

These identified areas already suffer erosion or have high potential of being affected by erosion. Measures to be taken to reduce the potential for surface run-off water to accelerate. Use of energy dissipating structures is to be made to slow the water down and force it to move under ground. Rehabilitation of any ground works must take place immediately after construction to give the plants chance to become effective before the next dry season.

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Natural environment	
Area along servitude	All the alternatives: A, B, C and D: Specifically: G4, G6 - G11, F12, F13, E14, F14, G14, E15, G18, D19, E19, G20, C22, G22, G23, B24, B26, F30, B32, B33, E33, B34, E34, B35, B36, B37, D38, D39, C41, B42, C43, A44, C44, A45, C45, C46, B48, C52, D52 C53, D53, C54, D54, D55	
Nature of impact	<i>Erosion – Impact on water quality</i>	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983), Environmental conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	High	Medium
Probability of occurrence	Highly probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	Medium	Low
Level of significance	Medium	Low
Mitigation measures	Good rehabilitation practice Energy dissipating engineering	Good rehabilitation
Level of significance after mitigation	Low	Low
EMP requirements	Rehabilitate any construction activity, slow surface water movement down	Annual inspections and rehabilitation to be done

Discussion:

The soils in the study area have a clay content that is high and is easily eroded. This means soils particles are carried by the run-off water into the streams and later in the rivers. The clay particles make the water turbid reducing the potential for aquatic plant material thus reducing the possible biodiversity in the local rivers and further down stream. Silt carried away by run-off water silts up the streams decreasing the depth of the streams reducing the potential carrying capacity for bio-diversity as clearly seen at F13.

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Natural environment	
Area along servitude	All the alternatives: A, B, C and D:	
Nature of impact	Erosion – Wetlands	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983), Environmental conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	High	Medium
Probability of occurrence	Highly probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	Medium	Low
Level of significance	High	High
Mitigation measures	Avoid wetlands at all costs Good rehabilitation practice Energy dissipating engineering	Avoid wetlands at all costs Good follow-up rehabilitation Energy dissipating engineering
Level of significance after mitigation	Potentially Medium	Medium
EMP requirements	Staff to avoid movement in wetlands, rehabilitate any construction activity, slow surface water movement down	Annual inspections and rehabilitation to be done
<u>Discussion:</u> Wetlands are extremely sensitive habitats. Any major disturbance to the wetland may be sufficient to initiate the final destruction of the wetland. Movement through a wetland should be restricted to pedestrian movement. Staff needs to be trained on how to identify wetlands. Johan Wyatts booklet on wetlands is recommended as a reference works.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Natural environment	
Area along servitude	All the alternatives: A, B, C and D: Specifically:	
Nature of impact	Erosion – social	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983), Environmental conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	High	Medium
Probability of occurrence	Highly probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	Medium	Low
Level of significance	High	High
Mitigation measures	Good rehabilitation practice Energy dissipating engineering	Good rehabilitation
Level of significance after mitigation	Medium	Medium
EMP requirements	Rehabilitate any construction activity, slow surface water movement down	Annual inspections and rehabilitation to be done
<u>Discussion:</u>		
The soils in the study area have a high, clay content and are easily eroded. This means soils that are disturbed by any social activity is prone to be eroded by the elements. Rehabilitation is required at any site where construction camps or personnel operated.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Natural environment	
Area along servitude	All the alternatives: A, B, C and D: A43, A44, A47, B23, B32, B33, B34 B35, B43 - B47, B49, C23, C27 - C30, C32, C33, C34, C36, C37, C38, C39, C40, C41, C44, C45, C50, C51, C53, D20, D21, D36, D38, D39, D51, DD54, D55, E17, E18, E19, E20, E30, E34, E35, E36, E54, F6, F9, F10, F11, F13, F14, F15, F25, F30, G4, G5, G6, G11, G12, G14 - G22, H7, H19, H20	
Nature of impact	Erosion – Areas of access to the lines	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983), Environmental conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	High	Medium
Probability of occurrence	Highly probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	Medium	Medium
Level of significance	High	High
Mitigation measures	Good rehabilitation done immediately after construction Good drainage construction on access roads Energy dissipaters to be used where ever water flow will have the opportunity to become accelerated	Annual erosion inspections with preventative measures taken at the time of inspection
Level of significance after mitigation	Medium	Medium
EMP requirements	Rehabilitate after construction, slow water flow down, use energy dissipaters	Annual inspections and rehabilitation to be done

Discussion:

The type of soils in the study area is highly erodable. Construction work on the access roads will definitely expose the soil to the elements and increase the potential for erosion. Rehabilitation will have to be done immediately after construction to give the plants the best possible chance to grow and bind the soil before the next dry season. All possible efforts will be required to slow the movement of water across the land down to prevent soil loss.

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Natural environment	
Area along servitude	G3, G4, G5, G6, G7, G8, F9, G9, F10, G10, F11, G11, F12, G12, F13, G13, E14, F14, G14, E15	
Nature of impact	Fauna – Conservancy area	
Legal requirements	Environmental conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Regional	Regional
Duration of impact	For the duration of construction	Permanent
Intensity	Medium	Low
Probability of occurrence	Probable	Low probability
Status of the impact	Negative	Negative
Accumulative Impact	Medium	Low
Level of significance	Medium	Low
Mitigation measures	Rehabilitation program	Monitor and maintain limited re-growth
Level of significance after mitigation	Low	Low
EMP requirements	Rehabilitation program	Annual audits with action plans
<u>Discussion:</u>		
Local farmers from the district of Dundee has established a conservancy named the Dundee Farmers Association Conservancy and stretches from the Pegasus substation to the Blood river border with the tribal land. Local farmers (Mr Ralph Nebbe Tel: 0346421654 and Mr Martiens Muller Tel: 0342123512) does not view the line as a threat and do not think the line will impact negatively on the conservancy.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Natural environment	
Area along servitude	All the alternatives: A, B, C and D.	
Nature of impact	Fauna - creosote	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983), Environmental conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	Low	N/A
Probability of occurrence	Low probability	Improbable
Status of the impact	Negative	Neutral
Accumulative Impact	Low	N/A
Level of significance	Low	N/A
Mitigation measures	Dress the poles with polymer sleeves	N/A
Level of significance after mitigation	Low	N/A
EMP requirements	Dress the poles with polymer sleeves	N/A
<u>Discussion:</u>		
Creosote poles pose a threat of leaching creosote that may poison the soil and poison fauna living in close proximity to where the poles are stored or planted. Using polymer sleeves will drastically reduce the potential for leakage. Creosote drip traps are to be set up in the material storage area to prevent pollution in the material yard.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Natural environment	
Area along servitude	All the alternatives: A, B, C and D.	
Nature of impact	Fauna - poaching	
Legal requirements	Environmental conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	Medium	Low
Probability of occurrence	Probable	Improbable
Status of the impact	Negative	Neutral
Accumulative Impact	Medium	Low
Level of significance	Medium	Low
Mitigation measures	Informing staff and contractors of the importance of conserving the fauna, advising them of the regulations enforceable when fauna is poached	Inform maintenance crews of same.
Level of significance after mitigation	Low	Low
EMP requirements	Inform staff and contractors prior to commencing construction	Inform staff annually on regulations prohibiting poaching.
<u>Discussion:</u>		
Various forms of fauna occur naturally in the study area. Law protects all the fauna. Poaching of any of these animals would be in contravention of the Regulations protecting fauna in KZN.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Natural environment	
Area along servitude	G7, H7, E14, F14, E32, E33, D36, D37, C38, B40, C41, D41, C42, B42, D42, C43, B44, C44, A46, B46, B47, C47, D47, C48, D48, C49, D49, B50, C50, D52, E52, D53, D54, E54	
Nature of impact	Fauna – sensitive habitats	
Legal requirements	Environmental conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	High	Low
Probability of occurrence	Highly probable	Low probability
Status of the impact	Negative	Negative
Accumulative Impact	High	Low
Level of significance	High	Low
Mitigation measures	Rehabilitation program	Monitor and maintain limited re-growth
Level of significance after mitigation	Medium	Low
EMP requirements	Rehabilitation program	Annual audits with action plans
<u>Discussion:</u>		
<p>Certain areas are more sensitive than the general environment. These areas create habitats that will be affected by the construction of the proposed line. The reigning environment regimes limit these sensitive areas to the areas where they occur presently. Their distribution range is limited and any external influences will divide or reduce the habitat area even further. Animals and birds dependent on these limited areas will come under greater threat when these areas are disturbed further.</p>		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Natural environment	
Area along servitude	All the alternatives: A, B, C and D.	
Nature of impact	Flora - creosote	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983), Environmental conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	Low	N/A
Probability of occurrence	Low probability	Improbable
Status of the impact	Negative	Neutral
Accumulative Impact	Low	N/A
Level of significance	Low	N/A
Mitigation measures	Dress the poles with polymer sleeves	N/A
Level of significance after mitigation	Low	N/A
EMP requirements	Dress the poles with polymer sleeves	N/A

Discussion:

Creosote poles pose a threat of leaching creosote that may poison the soil and poison flora growing in close proximity to where the poles are stored or planted. Using polymer sleeves will drastically reduce the potential for leakage. Creosote drip traps are to be set up in the material storage area to prevent pollution in the material yard.

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Natural environment	
Area along servitude	All the alternatives: A, B, C and D.	
Nature of impact	Flora – Impact of the line on the flora – Fire	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983), Environmental conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	High	Low
Probability of occurrence	Highly probable	Probable
Status of the impact	Negative in wrong season or too frequent or too seldom, Positive if it is a managed and controlled fire	Negative in wrong season or too frequent or too seldom, Positive if it is a managed and controlled fire
Accumulative Impact	Medium	Low
Level of significance	Medium	Low
Mitigation measures	Contractors to carry fire fighting equipment to protect themselves, equipment and the construction activities	None
Level of significance after mitigation	Low	Low
EMP requirements	Fire fighting training and strategies to take place before construction	None

Discussion:

Fire maintains the vegetation of the study area. Without fire the vegetation will become invaded by more turpentine grasses and other unpalatable species and eventually convert to scrub and later to forest. It will continue to convert until a fire rages through the area exposing it and allowing the grasses to re-establish. Too frequent fires will reduce the ability the vegetation has to re-sprout after the fire. Less palatable species and annual species will become more prevalent under such circumstances reducing the carrying capacity of the veld. Good veld require a fire every two to three years to remove the moribund grass allowing the extant nutrients to be recycled and the grass plants to be vitalised. Fire that originates from beyond the construction area during the construction period should be allowed to rage through. Construction personnel should only be concerned with their own safety and that of their equipment. Fires caused by the construction team should be brought under control immediately with the equipment on board to prevent damage to winter grazing of the land owners to further prevent legal claims from Eskom.

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Natural environment	
Area along servitude	All the alternatives: A, B, C and D.	
Nature of impact	Flora – Impact of the line on the flora – grassland	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983), Environmental conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	Low	N/A
Probability of occurrence	Highly probable	Improbable
Status of the impact	Negative	Neutral
Accumulative Impact	Medium	N/A
Level of significance	Medium	N/A
Mitigation measures	Rehabilitation after construction	None
Level of significance after mitigation	Low	N/A
EMP requirements	Rehabilitation program	Annual audit and rehabilitation if required
<u>Discussion:</u>		
The impact of the proposed line on the grasslands will be minor negative. Good rehabilitation after construction will effectively mitigate the negative impact.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Natural environment	
Area along servitude	All the alternatives: A, B, C and D.	
Nature of impact	Flora – Red data species	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983), Environmental conservation Act (No 73 of 1989), KZN Wildlife, DAEA, DWAF	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	High	Low
Probability of occurrence	Probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	Medium	Low
Level of significance	High	Low
Mitigation measures	Train and educate the staff and contractor on the value of rare and threatened plants ie. medicinal and floristic species when they are left in <i>situ</i> . Any of the identified plants to be destroyed by construction activities are to be lifted taking care of the roots and replanted beyond the construction site.	Low
Level of significance after mitigation	Medium	Low
EMP requirements	Training staff and contractors on the value of plants left in place where found. Plants threatened by construction	Annual audits

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

activities should be lifted and replanted in close proximity
to where found

Discussion:

Red data plants present in the study area have been given their status due to the pressure borne on them by the local tribal population using these plants for natural remedies and spiritual rituals. Many of these plants are harvested in the rural areas and sent to the city “muti” markets as a source of income.

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Natural environment	
Area along servitude	All the alternatives: A, B, C and D.	
Nature of impact	Flora – Impact of the line on the flora – season of construction	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983), Environmental conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	High	N/A
Probability of occurrence	Highly probable	Improbable
Status of the impact	Negative	Neutral
Accumulative Impact	Medium	N/A
Level of significance	Medium	N/A
Mitigation measures	Construction to take place mid-summer to late winter, Rehabilitation after construction	None
Level of significance after mitigation	Low	N/A
EMP requirements	Rehabilitation program	Annual audit and rehabilitation if required
<u>Discussion:</u>		
The impact of the proposed line on the vegetation will be major negative if done in the wrong season ie spring and early summer. The best time for construction is late summer through to late winter ie mid December through to late July.		

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE		
Theme	Natural environment	
Area along servitude	All the alternatives: A, B, C and D.	
Nature of impact	Flora – Impact of the line on the flora – wooded areas and Lowveld	
Legal requirements	Conservation of Agricultural Resources Act (No 43 of 1983), Environmental conservation Act (No 73 of 1989)	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Permanent
Intensity	High	N/A
Probability of occurrence	Highly probable	Improbable
Status of the impact	Negative	Neutral
Accumulative Impact	Medium	N/A
Level of significance	Medium	N/A
Mitigation measures	Rehabilitation after construction	None
Level of significance after mitigation	Low	N/A
EMP requirements	Rehabilitation program	Annual audit and rehabilitation if required
<u>Discussion:</u> Wooded areas eg Acacia scrub, Diospyros scrub, rivierine forest and Lowveld will be impacted negatively by the proposed line. Rehabilitation will not replace the woody plants but merely replace it with grass species. Dividing wooded areas with a servitude increases the edge effect of the wooded area placing the species dependent on a wooded area for survival under greater pressure.		

SUMMARY TABLES

PEGASUS-UMFOLOZI 400Kv transmission line:

SUMMARY TABLE: WELL BEING - ACCESS

ISSUE	DESCRIPTION	ENVIRONMENTAL IMPACT	IMPACT AFTER MITIGATION	EMP REQUIREMENTS
<i>Well being</i>	<i>Access (See map 1 Titled Locality map)</i>	<p>Overall significance rating during construction and decommissioning = High</p> <p>Overall significance rating during operation = medium</p> <p><u>Discussion:</u> The line itself will have high significant negative impact on access to the environment.</p>	<p>Overall significance rating during construction and decommissioning = medium</p> <p>Overall significance rating during operation = <i>Low</i></p> <p><u>Discussion:</u> Using existing access routes will minimise the need to disturb new areas for road construction. Applying proper rehabilitation techniques at the time of construction will minimise soil loss.</p>	√

PEGASUS – UMFOLOZI 400 kV TRANSMISSION LINE: EIA SUMMARY: WELL BEING - CREOSOTE

ISSUE	DESCRIPTION	ENVIRONMENTAL IMPACT	IMPACT AFTER MITIGATION	EMP REQUIREMENTS
<i>Well being</i>	<i>Creosote</i>	<p>Overall significance during construction and decommissioning rating = Moderate Overall significance during operation rating =Low</p> <p><u>Discussion:</u> <i>The line will have a moderate significant negative impact on the environment.</i></p>	<p>Overall significance during construction and decommissioning rating = Low Overall significance during operation rating =Low</p> <p><u>Discussion:</u> <i>Dressing the creosote poles with sleeves will prevent seepage of creosote and preventative measures in storage yards will limit pollution.</i></p>	<p>✓</p>

PEGASUS - UMFOLOZI 400kV TRANSMISSION LINE:

EIA SUMMARY TABLE

ISSUE	DESCRIPTION	ENVIRONMENTAL IMPACT	IMPACT AFTER MITIGATION	EMP REQUIREMENTS
<i>Well being – Fire(See map 3 titled Sensitive Habitats)</i>	<i>Safety of personnel and fire fighters</i>	Overall significance during construction and decommissioning rating = Moderate Overall significance during operation rating =Low <u>Discussion:</u> The likelihood of a fire threatening the safety of personnel and fire-fighters is moderately negative.	Overall significance during construction and decommissioning rating = Low Overall significance during operation rating =Low <u>Discussion:</u> Choosing the correct season for construction, Bush- clearing and grass cutting, having fire fighting equipment at hand.	✓
	<i>Access for fire management</i>	Overall significance during construction and decommissioning rating = Low Overall significance during operation rating =Low <u>Discussion:</u> Access to manage fires has a low negative impact as the quality of access to manage fire may be poor in places.	Overall significance during construction and decommissioning rating = Low Overall significance during operation rating =Low <u>Discussion:</u> Access routes should be clearly marked on the main routes indicating which pylons are serviced by the access road.	✓
	<i>Fire fighting requirements</i>	Overall significance during construction and decommissioning rating = Moderate Overall significance during operation	Overall significance during construction and decommissioning rating = Low Overall significance during operation rating =Low	✓

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

ISSUE	DESCRIPTION	ENVIRONMENTAL IMPACT	IMPACT AFTER MITIGATION	EMP REQUIREMENTS
		rating =Low <u>Discussion:</u> Fire will have a moderate negative impact on wooded areas	<u>Discussion:</u> Fire will have a low negative impact on wooded areas after bush-clearing actions	
	<i>Construction, operation and decommissioning activities</i>	Overall significance during construction and decommissioning rating = Moderate Overall significance during operation rating =Low <u>Discussion:</u> Fire will have a moderate negative impact on construction, operation and decommissioning activities	Overall significance during construction and decommissioning rating = Low Overall significance during operation rating =Low <u>Discussion:</u> Fire will have a low negative impact after training and preventative actions	✓

PEGASUS - UMFOLOZI 400kV TRANSMISSION LINE:

EIA SUMMARY TABLE

ISSUE	DESCRIPTION	ENVIRONMENTAL IMPACT	IMPACT AFTER MITIGATION	EMP REQUIREMENTS
<i>Well being – Fire(See map 3 titled Sensitive Habitats)</i>	<i>Safety of personnel and fire fighters</i>	Overall significance during construction and decommissioning rating = Moderate Overall significance during operation rating =Low <u>Discussion:</u> The likelihood of a fire threatening the safety of personnel and fire-fighters is moderately negative.	Overall significance during construction and decommissioning rating = Low Overall significance during operation rating =Low <u>Discussion:</u> Choosing the correct season for construction, Bush- clearing and grass cutting, having fire fighting equipment at hand.	√
	<i>Access for fire management</i>	Overall significance during construction and decommissioning rating = Low Overall significance during operation rating =Low <u>Discussion:</u> Access to manage fires has a low negative impact as the quality of access to manage fire may be poor in places.	Overall significance during construction and decommissioning rating = Low Overall significance during operation rating =Low <u>Discussion:</u> Access routes should be clearly marked on the main routes indicating which pylons are serviced by the access road.	√
	<i>Fire fighting requirements</i>	Overall significance during construction and decommissioning rating = Moderate Overall significance during operation	Overall significance during construction and decommissioning rating = Low Overall significance during operation	√

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

ISSUE	DESCRIPTION	ENVIRONMENTAL IMPACT	IMPACT AFTER MITIGATION	EMP REQUIREMENTS
	<p><i>Need to switch off the lines</i></p> <p><i>Grassland</i></p> <p><i>Wooded areas</i></p> <p><i>Construction, operation and decommissioning activities</i></p>	<p>rating =Low</p> <p><u>Discussion:</u> Fire may have a moderate negative disruptive and destructive impact</p> <p>Overall significance during construction and decommissioning rating = Low</p> <p>Overall significance during operation rating = No significance</p> <p><u>Discussion:</u> The impact of the fire on the line is of low significance</p> <p>Overall significance during construction and decommissioning rating = Moderate</p> <p>Overall significance during operation rating =Low</p> <p><u>Discussion:</u> The impact of fire on grassland will be moderately negative in the active growing season</p> <p>Overall significance during construction and decommissioning rating = Moderate</p> <p>Overall significance during operation rating =Low</p>	<p>rating =Low</p> <p><u>Discussion:</u> All construction crews should carry a range of fire fighting equipment to prevent fires caused by construction to spread</p> <p>Overall significance during construction and decommissioning rating = No significance</p> <p>Overall significance during operation rating = No significance</p> <p><u>Discussion:</u> The management of the vegetation under the line makes the impact of the fire on the line to be of no significance</p> <p>Overall significance during construction and decommissioning rating = Low</p> <p>Overall significance during operation rating =Low</p> <p><u>Discussion:</u> Mowing grass on construction sites in the drier seasons and a fire starts then the impact will be low negative.</p> <p>Overall significance during construction and decommissioning rating = Low</p> <p>Overall significance during operation rating =Low</p>	<p>✓</p> <p>✓</p> <p>✓</p>

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

ISSUE	DESCRIPTION	ENVIRONMENTAL IMPACT	IMPACT AFTER MITIGATION	EMP REQUIREMENTS
		<p><u>Discussion:</u> Fire will have a moderate negative impact on wooded areas</p> <p>Overall significance during construction and decommissioning rating = Moderate</p> <p>Overall significance during operation rating =Low</p> <p><u>Discussion:</u> Fire will have a moderate negative impact on construction, operation and decommissioning activities</p>	<p><u>Discussion:</u> Fire will have a low negative impact on wooded areas after bush-clearing actions</p> <p>Overall significance during construction and decommissioning rating = Low</p> <p>Overall significance during operation rating =Low</p> <p><u>Discussion:</u> Fire will have a low negative impact after training and preventative actions</p>	<p>✓</p>

PEGASUS – UMFOLOZI 400kV TRANSMISSION LINE

SUMMARY OF IMPACTS

LOSS OF AGRICULTURAL POTENTIAL

ISSUE	DESCRIPTION	ENVIRONMENTAL IMPACT	IMPACT AFTER MITIGATION	EMP REQUIREMENTS
Well being- Loss of Agricultural Potential, (See map 1 titled Locality map)	<i>Restricting farming equipment</i>	Overall significance during construction and decommissioning rating = Low Overall significance during operation rating =Low <u>Discussion:</u> The impact the line will have on restricting farming equipment will have a low negative significance	Overall significance during construction and decommissioning rating = Low Overall significance during operation rating =Low <u>Discussion:</u> Pylon design is so selected to accommodate the farmers needs and this keeps the impact to be a low negative impact	✓
	<i>Windbreaker avenues</i>	Overall significance during construction and decommissioning rating = Low Overall significance during operation rating =N/A	Overall significance during construction and decommissioning rating = Low Overall significance during operation rating = N/A	✓
	<i>Limiting irrigation systems</i>	<u>Discussion:</u> The impact of the line on windbreaker avenues is low negative Overall significance during construction and decommissioning rating = N/A Overall significance during operation	<u>Discussion:</u> N/A Overall significance during construction and decommissioning rating = N/A Overall significance during operation	✓

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

ISSUE	DESCRIPTION	ENVIRONMENTAL IMPACT	IMPACT AFTER MITIGATION	EMP REQUIREMENTS
	<p><i>Impacts on crop spraying</i></p> <p><i>Clearance space under lines</i></p>	<p>rating = Low</p> <p><u>Discussion:</u> N/A</p> <p>Overall significance during construction and decommissioning rating = N/A</p> <p>Overall significance during operation rating = Low</p> <p><u>Discussion:</u> N/A</p> <p>Overall significance during construction and decommissioning rating = N/A</p> <p>Overall significance during operation rating = N/A</p> <p><u>Discussion:</u> N/A</p>	<p>rating =Low</p> <p><u>Discussion:</u> The impact of the line on crop spraying will be low negative</p> <p>Overall significance during construction and decommissioning rating = N/A</p> <p>Overall significance during operation rating = Low</p> <p><u>Discussion:</u> Markers on conductors will keep the impact at low negative</p> <p>Overall significance during construction and decommissioning rating = Low</p> <p>Overall significance during operation rating = Low</p> <p><u>Discussion:</u> Markers on guidelines makes the impact to be low negative</p>	<p>✓</p> <p>✓</p>

PEGASUS - UMFOLOZI 400 kV TRANSMISSION LINE

SUMMARY: Well being – Season for construction activities

ISSUE	DESCRIPTION	ENVIRONMENTAL IMPACT	IMPACT AFTER MITIGATION	EMP REQUIREMENTS
<p><i>Well being- Season for construction activities</i></p>	<p><i>Flora</i></p>	<p>Overall significance during construction and decommissioning rating = Medium Overall significance during operation rating = Low</p> <p>Discussion: The wrong season will be detrimental to the flora</p>	<p>Overall significance during construction and decommissioning rating = Low Overall significance during operation rating = Low</p> <p>Discussion: By working during the drier seasons and rehabilitating after construction the impact can be low negative</p>	<p>✓</p>
	<p><i>Social</i></p>	<p>Overall significance during construction and decommissioning rating = Medium Overall significance during operation rating = Low</p> <p>Discussion: Fawning season is the most sensitive time for the fauna and workers present at that time is a threat</p>	<p>Overall significance during construction and decommissioning rating = Low Overall significance during operation rating = Low</p> <p>Discussion: Keep workers out of the area at the time of fawning</p>	<p>✓</p>

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

ISSUE	DESCRIPTION	ENVIRONMENTAL IMPACT	IMPACT AFTER MITIGATION	EMP REQUIREMENTS
	<i>Fauna</i>	<p>Overall significance during construction and decommissioning rating = Medium</p> <p>Overall significance during operation rating = Low</p> <p><u>Discussion:</u></p> <p>Fauna is most sensitive in the spring season and activities will impact negatively on them</p>	<p>Overall significance during construction and decommissioning rating = Low</p> <p>Overall significance during operation rating = Low</p> <p><u>Discussion:</u></p> <p>Activities to be limited to the drier seasons</p>	<p>✓</p>

Pegasus- Umfolozi 400 kV Transmission Line

Summary table Natural environment - Erosion

ISSUE	DESCRIPTION	ENVIRONMENTAL IMPACT	IMPACT AFTER MITIGATION	EMP REQUIREMENTS
<p><i>Natural environment:</i> Erosion, (See map 5 titled Erosion)</p>	<p><i>Areas of access to the lines</i></p>	<p>Overall significance during construction and decommissioning rating = High Overall significance during operation rating = High</p> <p><u>Discussion:</u> The soil types of the study area, the natural vegetation, the land-use practice and the impact of the line makes this rating to be high.</p>	<p>Overall significance during construction and decommissioning rating = Medium Overall significance during operation rating = Medium</p> <p><u>Discussion:</u> Rehabilitation plays a major role to bind and hold the soil on the land. Engineering actions to slow the movement of the run-off water down will reduce the potential soil loss.</p>	<p>✓</p>
	<p><i>Impact on water quality</i></p>	<p>Overall significance during construction and decommissioning rating = High Overall significance during operation rating = Medium</p> <p><u>Discussion:</u> Movement by workers will increase the erosion potential that will increase the</p>	<p>Overall significance during construction and decommissioning rating = Medium Overall significance during operation rating = Low</p> <p><u>Discussion:</u> Good rehabilitation and energy dissipating engineering required</p>	

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

	<p><i>Areas of high potential erodibility</i></p>	<p>sediment load entering local streams and rivers Overall significance during construction and decommissioning rating = High Overall significance during operation rating = Medium</p>	<p>Overall significance during construction and decommissioning rating = Medium Overall significance during operation rating = Low</p>	<p>✓</p>
	<p><i>Wetlands</i></p>	<p>Soils are prone to erode when exposed, construction and operational activities may increase the potential Overall significance during construction and decommissioning rating = High Overall significance during operation rating = High</p> <p><u>Discussion:</u> The risk of causing a negative impact is high as wetlands are very sensitive habitats and should best be avoided at all cost</p>	<p><u>Discussion:</u> Management of drainage, energy dissipatory engineering and immediate rehabilitation with follow-up inspections will mitigate Overall significance during construction and decommissioning rating = Potentially Medium Overall significance during operation rating = Medium</p>	<p>✓</p>
	<p><i>Social</i></p>	<p>Overall significance during construction and decommissioning rating = High Overall significance during operation</p>	<p><u>Discussion:</u> With mitigation measures the impact could well be reduced to Medium but the sensitivity remains and that makes the impact medium negative Overall significance during construction and decommissioning rating = Medium Overall significance during operation rating = Medium</p>	<p>✓</p>

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

		rating = High <u>Discussion:</u> Social activities and the movement of people disturb the soil increasing the potential for erosion	<u>Discussion:</u> Good rehabilitation will mitigate the disturbance caused by people	
--	--	---	--	--

Pegasus- Umfolozi 400 kV Transmission Line

Summary table Natural environment - fauna

ISSUE	DESCRIPTION	ENVIRONMENTAL IMPACT	IMPACT AFTER MITIGATION	EMP REQUIREMENTS
Natural environment - Fauna	<i>Sensitive habitats</i>	Overall significance during construction and decommissioning rating = High Overall significance during operation rating = Low <u>Discussion:</u> The line will impact on habitats of the various fauna	Overall significance during construction and decommissioning rating = Medium Overall significance during operation rating = Low <u>Discussion:</u> Rehabilitate after construction	✓
	<i>Poaching</i>	Overall significance during construction and decommissioning rating = Medium Overall significance during operation rating = Low <u>Discussion:</u> Influx of workers increases the potential for poaching Overall significance during construction and decommissioning rating = Low	Overall significance during construction and decommissioning rating = Low Overall significance during operation rating = Low <u>Discussion:</u> Education of staff re the value natural populations and the cause of Act and Regulations prohibiting such actions Overall significance during construction and decommissioning rating = Low	✓

Pegasus- Umfolozi 400 kV Transmission Line

Summary table Natural environment - flora

ISSUE	DESCRIPTION	ENVIRONMENTAL IMPACT	IMPACT AFTER MITIGATION	EMP REQUIREMENTS
<p><i>Natural environment - Flora</i></p>	<p><i>Wooded areas and Lowveld</i></p>	<p>Overall significance during construction and decommissioning rating = Medium Overall significance during operation rating = N/A <u>Discussion:</u> The line will impact on wooded areas and lowveld</p>	<p>Overall significance during construction and decommissioning rating = Low Overall significance during operation rating = N/A <u>Discussion:</u> Rehabilitation will mitigate</p>	<p>✓</p>
	<p><i>Red data species</i></p>	<p>Overall significance during construction and decommissioning rating = High Overall significance during operation rating = Medium <u>Discussion:</u> The influx of staff will increase the pressure on the flora</p>	<p>Overall significance during construction and decommissioning rating = Low Overall significance during operation rating = Low <u>Discussion:</u> Education of staff and contractors re value of plants left <i>in situ</i>. Plants threatened by the construction activities to be lifted and replanted</p>	<p>✓</p>

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

ISSUE	DESCRIPTION	ENVIRONMENTAL IMPACT	IMPACT AFTER MITIGATION	EMP REQUIREMENTS
	<p><i>Grassland</i></p>	<p>Overall significance during construction and decommissioning rating = Medium Overall significance during operation rating = N/A</p> <p><u>Discussion:</u> The construction activities will impact on the grassland</p> <p>Overall significance during construction and decommissioning rating = Medium Overall significance during operation rating = Low</p> <p><u>Discussion:</u> Fire in the wrong season is negative and always a threat</p> <p>Overall significance during construction and decommissioning rating = Medium Overall significance during operation rating = N/A</p> <p><u>Discussion:</u> Creosote leakage will poison plants</p>	<p>Overall significance during construction and decommissioning rating = Low Overall significance during operation rating = N/A</p> <p><u>Discussion:</u> The rehabilitation program will mitigate</p> <p>Overall significance during construction and decommissioning rating = Low Overall significance during operation rating = Low</p> <p><u>Discussion:</u> Staff training and correct fire fighting equipment will mitigate</p> <p>Overall significance during construction and decommissioning rating = Low Overall significance during operation rating = N/A</p> <p><u>Discussion:</u></p>	<p>✓</p> <p>✓</p> <p>✓</p>

PBAI PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

ISSUE	DESCRIPTION	ENVIRONMENTAL IMPACT	IMPACT AFTER MITIGATION	EMP REQUIREMENTS
	<i>Season of construction</i>	<p>Overall significance during construction and decommissioning rating = Medium</p> <p>Overall significance during operation rating = N/A</p> <p><u>Discussion:</u> Construction in the wet season will impact negatively</p>	<p>Polymer sleeves will reduce the leakage potential</p> <p>Overall significance during construction and decommissioning rating = Low</p> <p>Overall significance during operation rating = N/A</p> <p><u>Discussion:</u> Construction in the drier season will mitigate</p>	<p>✓</p>

