

INDIflora cc

ENVIRONMENTAL SERVICES

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Mr S Dunsmore
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Dear Stuart

Please find attached the ecological report for Venus-Braamhoek 400 kV transmission line.

Various aspects (Veldtypes, wetlands, Vegetation, Medicinal plants, Mammals, Birds, Amphibia, Reptiles, Fish and Biodiversity indicators) were investigated.

I trust the report is acceptable to you.

Yours faithfully

Johan Bodenstein
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ND Horticulture (Natal Technikon)
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ECOLOGICAL ASSESSMENT FOR THE PROPOSED 400KV TRANSMISSION LINE FROM BRAAMHOEK TO VENUS SUB-STATION.

Terms of Reference:

PBA International (SA) has requested Johan Bodenstein of Indiflora cc Environmental Services to evaluate the proposed alignment corridor of the 400 kV transmission line and two alternatives, in ecological terms, for its suitability and potential environmental impacts and to produce a report on his findings.

General information:

Location:

Braamhoek substation is to be situated very near the north-western boundary of KwaZulu-Natal between Van Reenen's Pass and the Majuba Pass in the foothills of the Drakensberg. The proposed alignment for the transmission line is in a south-easterly direction (north-south alignment) to Venus substation situated just north of Estcourt.

Topography:

The North-south alignment passes over land that is in most parts fairly flat with koppies and hills scattered in the landscape. It becomes more undulated in the north. For the preferred option (the western-most option) is flat from Venus sub-station with a koppie on the farm Doornkop. The next undulated land is on the farms Gevonden and Goedgedacht. The next on the farm Brakfontein and the next koppie is on the farm Rietfontein. On the farm Wagenbeetjieskop there is much undulated land. The last bit of undulated land is found on the farms Maritzdrift, Welkom and Braamhoek.

For the central option remains fairly flat for a long distance before it becomes quite undulated on the farms Vertrek and Grobbelaarskloof. Another long stretch of fairly flat land follows with undulated land on the farms Kleinfontein, Walkershoek and Quaggasdrift. This is then followed by fairly flat land to the farms Nooitgedacht and Trekboer where the land becomes undulated once more. From here to the Braamhoek sub-station the land is fairly flat.

The eastern most option remains fairly flat to the Tugela River crossing. Beyond the Tugela the land becomes undulated on the farms Modderspruit and Lombard'skop. The land remains fairly flat for a short distance to the farm Rietkuil and Matuana'shoek where it becomes undulated. The line then follows fairly flat land for a long distance to just before Braamhoek where on the farm Roodepoort and Zaaifontein the land becomes undulated. The final short stretch is over fairly flat terrain.

Field visit:

The study area was visited on 4 to 5 October 2004 and again from 12 to 14 January 2005. The alignment options were traversed and the potential line routes investigated. The North-south alignment passes over farmland where various levels of transformation were observed. The grassland varied from disturbed grassland to pristine grassland with large stands of Thorn-veld. Towards the north the vast grass covered wetlands showed signs of overgrazing. There are areas where human settlements have greatly modified and transformed the natural vegetation to secondary growth,

particularly along the eastern border of the North-south alignment corridor.

Specialist information:

Veldtypes:

The north-south alignment between Braamhoek and Venus substations pass through 3 Acocks veldtypes (Acocks, 1975), namely #56 Highland sourveld, # 65 Southern tall grassveld and #64 Northern Tall Grassveld. According to Camp (1997) this alignment passes through 5 Bio-resource Groups (BRG's) namely # 8 Moist highland sourveld, #11 Moist transitional tall grassveld, # 12 Moist Tall Grassveld, # 13 Dry tall grassveld and #18 Mixed thornveld.

Highland sourveld is found between 1400 and 1800 m asl in rolling mountainous terrain. This veld is fire maintained and dominated by short bunch grasses of which *Alloteropsis semialata*, *Andropogon appendiculatus* and *Themeda triandra*. Disturbed and overgrazed veld becomes dominated by *Eragrostis species* and *Aristida junciformis*. Forbs are an important aspect of this grassveld. Forest patches with *Podocarpus falcatus* and *P.latifolius* occur in this veld type where they are not affected by fire, usually on steep slopes. Undergrazing leads to the veld becoming invaded by woody species such as *Leucosidea sericea* and *Buddleja salvifolia* which are both precursors to *Podocarpus* forest. Moist transitional tall grassveld (#11) is an endemic grassveld and is also known as *Themeda-Hyparrhenia* grassland.

Hyparrhenia is dominant in this grassveld but more dominant on disturbed land. *Eragrostis curvula*, *Eragrostis plana* and *Sporobolus africanus* are the dominant grasses where the veld is heavily overgrazed. Moist tall grassveld is near endemic and is a grass dominated by *Hyparrhenia hirta* and scattered paperbark *Acacia (Acacia sieberana)* trees. *Acacia* woodland of *Acacia caffra* occurs on dolerite hillsides. *Themeda triandra* (Rooigras) is the dominant grass in veld that is well managed. Dry tall grassveld is near endemic and is the dominant veld type for the eastern and central options. This veld is recognized by the *Hyparrhenia hirta* veld with occasional *Acacia sieberana* woodlands. Pockets of *Acacia karroo* and *A. nilotica* occur in confined areas on the dry north-facing slopes of hills and eroded areas. *Acacia caffra* woodland occurs on dolerite hills. Mixed thornveld is mainly secondary veld and has its origin in Valley bushveld from the Tugela River valley. Bush encroachment is transforming *Hyparrhenia* veld to woodland essentially through poor land management. The eastern most alignment passes for most of its length through this veld type and is noticeable from the Cornfields are all the way north to the flat land north of Modderspruit.

The western and preferred alignment passes through all 4 BRG's. Dry Tall Grassveld makes up the bulk of the landscape with only a small area of Mixed Thornveld where it passes the east-west line connecting Colenso and Bergville. Moist tall grassveld is only found in a small area in the vicinity of the turn-in before Braamhoek. The line passes over Moist transitional tall grassveld at the upper reaches near Braamhoek in the vicinity where the proposed line crosses the N3 freeway for the last time. The land along this alignment has not been transformed much through land-use practices and appears to have large tracts of virgin veld along the way. There is an existing transmission line, the 400 kV Venus-Majuba transmission line running parallel to the proposed route except for the last 10 – 12 km where the new line turns in to link up with the sub-station at Braamhoek. Moist highland sourveld

comes down in incised valleys close to where the line ends.

The central option also passes through 3 BRG's namely #11 Moist transitional tall grassveld, # 13 Dry tall grassveld and #18 Mixed thornveld. Dry Tall Grassveld still makes up the bulk of the landscape with a much larger area of Mixed Thornveld along the lower and central reaches of this line. The line passes over Moist transitional tall grassveld at the upper reaches near Braamhoek. Moist highland sourveld comes down in incised valleys close to where the line ends. Much of the veld along the lower reaches of the proposed line near Colenso has been transformed through land-use practice. The central regions of this alignment have large tracts of virgin veld. There is no existing transmission line along the north-south axis passing through along this alignment.

The eastern option passes over 4 Bio-resource Groups (BRG) (Camp, 1997), #11 Moist transitional tall grassveld, # 12 Moist Tall Grassveld, # 13 Dry tall grassveld and #18 Mixed thornveld. The far greater proportion of this lines passes through Mixed thornveld with a small portion passing through Moist tall grassveld and an even small section passing through #11 Moist transitional tall grassveld. Moist highland sourveld comes down in incised valleys close to where the line ends. There is an existing transmission line running parallel to the proposed route for about half the length of the new route. Much of the land along this route has been transformed through land-use practice of urbanization and subsistence agriculture.

Wetlands:

Wetlands were observed along the northern reaches of the proposed alignment of the power lines. The western most line passes through undisturbed wetland type grassland for +/- 15 km near Braamhoek. The central alignment passes through +/- 25 km of undisturbed wetland type grassland. The eastern most option passes through 15 km of disturbed wetland grassland and for only a short distance through undisturbed grassland. The impact of construction activities on wetlands is very detrimental to the wetlands as they recover very poorly from such damage. The impact of the erected power lines on the birdlife associated with wetland grassland is significant and mitigating measures taken do not prove the line to be free of impacts. The western-most alignment appears to be the preferred corridor due to its lower impact potential. The western most alignment will have the greatest negative impact on the wetland grassland whilst the eastern most alignment will have the least negative impact.

Vegetation:

There are 5 potential Red data species present in the Bio-resource Groups (BRG's) the proposed alignment alternatives pass through. Three red data species occur in Dry tall grassveld namely Green's Barleria (*Barleria greenii*) which is listed as endangered, *Phylica natalensis* listed as vulnerable and *Encephalartos msinganus* listed as endangered. There are two Red Data Species in Moist transitional tall grassveld namely *Craterostigma nanum* var *nanum* (Moles' spectacles) listed as vulnerable and *Kniphofia flammula* listed as vulnerable. *Barleria greenii* is found on land south of the Venus sub-station and impact on it is expected to be low. *Phylica natalensis* and *Craterostigma*

nanum var nanum are both found in the same habitat but are distributed in the Southern end of KwaZulu-Natal and the impact on these plants will therefore be none. *Encephalartos msinganus* occurs in the same habitat but is distributed much further east and the impact on this species by the proposed development will therefore be none. The distribution of *Kniphofia flammula* is uncertain although it is known to occur in the same habitat. The exact nature of the impact on this species is uncertain but is expected to be low as the mitigation measures of confining all activities to the Eskom servitude will limit any negative impact. *Kniphofia* is transplantable and any plants identified in the access road and tower areas are to be uplifted and relocated in the land adjacent to the disturbed area.

There are 6 priority medicinal plants present in the BRG's 11, 12 and 13. They are on the list of priority medicinal plants because of their conservation status and their economic value. Whilst they remain valuable for the medicinal trade their conservation status may remain the same or increase to a higher conservation status. The plants potentially present in the study area of the three alternative alignments include:

Alepidea amatymbica (Near threatened) is found in BRG 11 in untransformed grassland.

Bowiea volubilis (Vulnerable) is found BRG 8, 11 and 13 in untransformed grassland and thickets.

Curtisia dentata (Low risk) is found in BRG 8 and 11 in forest.

Haworthia limifolia (Vulnerable) is found in BRG 8, 12 and 13 in Mountain savanna and untransformed grassland

The expected impact on medicinal plants is expected to be negative but low. Mitigation revolves around the identification of the specific species and to remove them from the areas of road accesses and tower bases and to re-establish them in a safe but locally suitable area. Mitigation will reduce the potential impact which will remain low.

Mammals:

Only one species may be impacted on. In BRG 11 the Dobson's rough haired golden mole (*Chrysofalax villosus dobsonii*) prefers unimproved grasslands. The expected impact on this animal is expected to be negative but low. Moles generally move away from noise and it is expected that the activities of establishing access roads and tower bases will frighten the animals off which will reduce the impact. Mitigation measures to be taken include the confining of activities to the Eskom servitude and should such an animal be unearthed that it be placed away from the line where it can survive unharmed. It is expected that the level of significance after mitigation to remain as low.

Birds:

The proposed two corridors may conflict with 7 species of bird that are listed in the Red-data list for birds. This includes: the white winged flufftail (Globally endangered and nationally critical) found in BRG #8 and associated with wetlands. The wattled crane (Globally vulnerable and nationally critical) is found in BRG's 8, 11, 12 and 13 and associated with grasslands and wetlands. Blue cranes (Globally and nationally vulnerable) are found in BRG 12 and 13 and are associated with grasslands and wetlands. Crowned cranes

(Nationally vulnerable) are found in BRG 8, 11, 12 and 13 and are associated with grasslands and wetlands. Ground hornbills (Nationally vulnerable) are found in BRG 8 and 11 and are associated with grasslands and woodlands. Striped flufftails (Nationally vulnerable) are found in BRG 8, 11 and 12 and are associated with grasslands with long grass where over-grazing and too regular burning is limited. Blue korhaan (globally and nationally near threatened) is found in BRG 8 and 11, 12 and 13 and associated with grasslands with short grass.

Korhaan is known to be much reduced in number in the study area due to landuse practices and the status of the flufftails needs further investigation. The cranes are present in the study area and are likely to conflict with the proposed powerlines. Detail reporting on the impact with birds is to be reported on by a bird specialist appointed for this purpose. It is expected that the potential impact on birds to be negative and moderately significant. Mitigation revolves around confining activities to the Eskom servitude and to attach bird flappers to the lines in the areas where the birds occur that are known to conflict with powerlines. It is expected that the level of significance after mitigation to be low.

Amphibia:

Two potential conflict species are found in the BRG #8 (the moist highland sourveld). This BRG is situated just north-west of Braamhoek. The two species that may be affected are: the Natal leaf folding frog (*Afrivalus spinifrons intermedius*) occurring in highland wetlands in midland conditions and the long-toed tree frog (*Leptopelis xenodactylus*) preferring tree-less marshland in the grasslands along the foothills of the Drakensberg. The impact on these two species is expected to be negative and of low significance. Mitigation includes the routing of the line around wetlands and to confine activities to the Eskom servitude. The level of significance after mitigation remains low.

Reptiles:

There are 2 potential conflict species of reptiles occurring in two BRG's the alignments pass through. The first BRG is #12 Moist tall grassveld in which the Black-headed dwarf chameleon (*Bradypodion melanocephalum*) occurs. This chameleon is found in thickets, bushland and grassland of this BRG. The second reptile is the Natal midlands dwarf chameleon (*Bradypodion thamnobates*) prefers grassland and is found in BRG #8 Moist highland sourveld.

The expected impact on the reptiles is expected to be negative due to the potential destruction of habitat and the level of significance is moderate. Mitigation measures revolve around the limiting of activities to the Eskom servitude and the rapid rehabilitation after construction. After mitigation it is expected that the level of significance to be low.

Fish:

There appears to be no fish or crustaceans on the red data list within the study area.

Invertebrates:

Red data butterflies do occur in the study area.

Metisela meninx (Vulnerable) occurs in marsh areas where rice grass grows in thick clumps in unpolluted environments between 1400 – 1700 m asl. Much of the habitat of this species has been destroyed in Gauteng making the high lying wetland grasslands in the study area very suitable habitat.

Dingana dingana (Vulnerable) occurs in Southern tall grassland (Acocks #65) along rocky ridges in the Kwa-Zulu Natal midlands in the Mooi River to Estcourt area. This distribution is at the southern end of the proposed powerline alignment.

Capys penningtoni (Vulnerable) occurs as an endemic among Proteas on mountain slopes in the Natal midlands and the foothills of the Drakensberg. The area above the sub-station site at Braamhoek is potential habitat for this species.

Chrysothrix lyncurium (Vulnerable) inhabits rocky outcrops in Moist highland sourveld where stunted bushes of Diospyros and Myrsine occur. This habitat type is again situated above the sub-station site at Braamhoek.

Lepidochrysops pephredo (Vulnerable) is a butterfly that occupies habitat along rocky ridges in Moist highland sourveld in the area of Estcourt. It feeds on forbs in the grassland. Its habitat is threatened by agriculture and habitat modification.

Lepidochrysops hypopolia (Extinct) occurs in Moist highland sourveld in the Blue Bank area near Ladysmith. Only two specimens were ever recorded one at blue Bank and one at Potchefstroom. Not much is known about this species. The western-most option for the power line passes directly over the Blue Bank area.

The potential impact on the Red data species of butterflies is negative and the significance is moderate. Mitigation revolves around minimizing the damage to the landscape to a minimum by confining it to the Eskom servitude and by immediate rehabilitation. The impact is expected to be limited to the construction phase. With mitigation it is expected that the impact can be reduced to have a low significance.

Summary:

This study was conducted by visiting the study area twice making observations and confirming those with reference material on return to the office. The physiographic environment and biotic components were inspected and the likelihood of potential impacts assessed, and reported on. Mitigatory measures are suggested and the expected level of significance after mitigation.

Table 1: Levels of impact significance before and after mitigation.

	Significance	Vegetation	Wetlands	Plants	Medicinal plants	Birds	Mammals	Amphibia	Reptiles	Fish	Invertebrates
Option 1 (Western alignment)	Before mitigation	Low	Moderate	Low	Low	Moderate	Low	Low	Moderate	None	Moderate
	After mitigation	Low	Low	Low	Low	Low	Low	Low	Low	None	Low
Option 2 (Central alignment)	Before mitigation	Low	Moderate	Low	Low	Moderate	Low	Low	Moderate	None	Moderate
	After mitigation	Low	Low	Low	Low	Low	Low	Low	Low	None	Low
Option 3 (Eastern alignment)	Before mitigation	Moderate	Low	Moderate	Low	Moderate	Low	Low	Low	None	Moderate
	After mitigation	Low	Low	Low	Low	Low	Low	Low	Low	None	Moderate
	Cumulative	Low	Low	Low	Low	Low	Low	Low	Low	None	Low

Conclusion:

The area was studied and the potential impacts identified. Mitigation measures are suggested. From the impact tables there is no clear preference in terms of a preferred alignment. The western alignment is however the preferred alignment because there is an existing transmission servitude and it is desirable to limit new lines to existing servitudes. The existing servitude runs for the majority of the route parallel to the proposed alignment therefore limiting impacts to the proposed servitude only.

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IMPACT TABLES FOR THE VENUS-BRAAMHOEK 400 km TRANSMISSION LINE

Venus – Braamhoek 400kV Transmission Line		
Theme	Well being	
Nature of impact	<i>Use of creosote poles</i>	
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 restricted and preventative measures taken to limit pollution.	Not required
Level of significance after mitigation	Low	No significance
EMP requirements	<ul style="list-style-type: none"> • Use CCA treated poles instead of creosote poles, or use old weathered poles from which leaking creosote is unlikely. • All creosote poles must be sleeved with PVC sleeves resistant to abrasive action of creosote. 	
<p>Discussion: 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 in a registered landfill site and the receipt retained on file for auditing purposes.</p>		

Venus – Braamhoek 400kV Transmission Line

Theme	Well being	
Nature of impact	Erosion	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	None
Intensity	High	Low
Probability of occurrence	Highly probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	Moderate	Low
Level of significance	High	Low
Mitigation measures	<ul style="list-style-type: none"> • Identify potential areas for erosion at the outset and take preventative measures. • Where soil is exposed through construction activities, steps need to be taken to reduce the potential for erosion eg creating berms and use of soil binding emulsions. • Steep slopes at tower bases and access road cuttings must be protected with the use of bands of geofabric and organic matter sausages across the slope to trap moving sediment. • Frequent monitoring during the construction and decommissioning phases are required, particularly after recorded heavy rain storms, are required to determine places where mitigation measures have failed and where potential threats remain. • Careful planning of access roads could reduce the potential threat for erosion. 	<ul style="list-style-type: none"> • Maintenance teams are to be trained to become sensitive to sites where erosion is just starting. They are to advise the maintenance teams to respond and take appropriate mitigating measures. • Environmental auditing is required at least once a year along the entire route to identify potential threats.

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Level of significance after mitigation	Moderate	Low
EMP requirements	<ul style="list-style-type: none"> • Access roads to be carefully planned and selected – where possible use existing access roads • All streams and drainage lines to be crossed must be stabilised and rehabilitated immediately. • All wetland areas are to be avoided • All existing erosion areas along access routes used for construction and operation must be rehabilitated. • Environmental Officer to inspect all roads with landowner before contractor leaves site. A revisit before the 12 month contract period is also recommended so that the contractor can repair any unstable areas. 	<ul style="list-style-type: none"> • A locally operating independent Environmental Officer should be employed to monitor the environmental status of the lines in the area. • Maintenance agreements between Eskom Transmission and the landowner must be clearly stated and the status of the agreement audited twice annually. • The new line and access roads should be inspected twice in the wet season. Eskom Transmission regional office to affect any necessary repairs immediately.

Discussion: Erosion is a concern along the entire route of the proposed line. This is a manageable aspect of the proposed development, but there needs to be confidence that problems associated with the existing 400kV lines will be avoided. The issue is closely linked to other issues such as impacts on fauna, flora and general access.

Soil erosion is a major problem in the study area. Poor land management (overgrazing, etc) is the main cause of the problem mainly in the highly populated areas of Driefontein. The soils in the area are highly erosive and very sensitive to disturbance.

It is not the task of Eskom Transmission to resolve current erosion problems. However it will be important to rehabilitate any areas of erosion crossed by the construction teams in the attempt to protect new works..

The exact location of access roads will not be determined during the EIA. This will only be determined when the construction contract is let. An archaeologist and ecologist should visit the proposed access road sitings to ensure that sensitive environments are not disturbed.

Venus – Braamhoek 400kV Transmission Line

Theme	Well being	
Nature of impact	Fauna	
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	Probable	Improbable
Status of the impact	Negative	None
Accumulative Impact	Moderate	None
Level of significance	Moderate	No significance
Mitigation measures	<ul style="list-style-type: none"> • Avoid nesting burrows when discovered. • Access roads not to cross wetlands. • Cause as little disturbance to woodland areas. • Limit all activities to take place within servitude boundaries. 	Not required
Level of significance after mitigation	Low	No significance
EMP requirements	<ul style="list-style-type: none"> • Avoid rocky and wooded areas • Do not cross wetlands 	

Discussion: Animals require sites with adequate food and resting or nesting potential to survive. Rocks provide good shelter against the elements. Rocky areas should be avoided where possible when constructing access roads to limit the potential for destroying the habitats of resident animals. Wetland areas provide a different type of habitat to many animals and is considered very sensitive habitat. It should be avoided during the construction of access roads and tower bases. Wooded areas are where animals shelter during inclement weather and where many birds nest. Damage to these areas must be kept to the minimum.

Venus – Braamhoek 400kV Transmission Line

Theme	Well being	
Nature of impact	Flora	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction and decommissioning	None
Intensity	High	None
Probability of occurrence	Highly probable	Improbable
Status of the impact	Negative	None
Accumulative Impact	Moderate	None
Level of significance	Low	No significance
Mitigation measures	<ul style="list-style-type: none"> • Areas of sensitive plant communities are to be identified and flagged during the construction of road accesses so that they can be avoided. • Where conflict is unavoidable sensitive plants that are known to relocate well should be lifted and replanted to limit the cumulative impact. 	Not required
Level of significance after mitigation	Low	No significance
EMP requirements	<p>Keep all construction activities within the boundary of the servitude.</p> <p>Rehabilitate immediately after construction by levelling the disturbed land as best possible and to apply erosion control and seeding the exposed soil with veld grass seed of the species present in the surrounding area.</p>	

Discussion: Grassland vegetation types makes up most of the area. The areas most sensitive to the construction of the line are the wetland grasslands near the Braamhoek sub-station. Cutting servitudes through wooded areas will have a significant impact on them. Further site inspection and monitoring will be required during the design and construction stages.

A number of rare and medicinal plants, including red data species, are known to occur in the area. The specialist ecologist needs to survey the final route to see if any are at risk of damage/loss.

Venus – Braamhoek 400kV Transmission Line		
Theme	Well being	
Nature of impact	Avifauna	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Ongoing
Intensity	Low	Moderate
Probability of occurrence	Highly probable	Highly probable
Status of the impact	Negative	Negative
Accumulative Impact	Moderate	Moderate
Level of significance	Low	High
Mitigation measures	<ul style="list-style-type: none"> The routing of the line and the placement of the towers will significantly mitigate the potential threat. 	<ul style="list-style-type: none"> Bird flappers and bird guards will assist in limiting the potential threat on a long term basis. The introduction of new technology as it becomes available to assist with the reduction in bird impacts.
Level of significance after mitigation	Low	Moderate
EMP requirements	<ul style="list-style-type: none"> Position the line and towers away from wetlands. Attach bird flappers and bird guards during construction. Contractor and his staff to be made aware of sensitive areas, and to prevent them from raiding nests etc. Construction work to be confined to servitude 	<ul style="list-style-type: none"> Establish monitoring programme. Fit additional 'bird flappers' as appropriate.

Discussion: A diversity of birds eg Bustards, Secretary Birds, Cranes, Korhaans, Storks and Bald Ibis's occurs in the area that typically interact with transmission lines, including a number of Red Data species. The nature of impacts is listed below (see also specialist report).

Collision risk

If the new line runs parallel to one of the existing lines the significance (Potentially highly significant), is much reduced (Any diversion away from existing lines remain a concern). The bird specialist needs to review the location of 'bird flappers' during the design phase as a mitigation measure.

Disturbance

Cranes, storks, vultures and herons are more abundant along the upper reaches of the line near the Braamhoek Sub-station in the wet grasslands. There is a relatively low significance rating.

Bird streamers

Large birds (vultures etc.) can cause shorting when they defecate when the alighting after roosting above conductors - leading to power dips which can have a severe impact on downstream power users.

Venus – Braamhoek 400kV Transmission Line		
Theme	Well being	
Nature of impact	<i>Import of alien vegetation</i>	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Ongoing
Intensity	Moderate	Moderate
Probability of occurrence	Highly probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	High	Moderate
Level of significance	Moderate	Moderate
Mitigation measures	<ul style="list-style-type: none"> • Eliminate any alien plants in the area where construction takes place. • Prevent the movement of soil from one area to another. 	Ongoing monitoring and control actions taken when infestation is observed.
Level of significance after mitigation	Low	Low
EMP requirements	<ul style="list-style-type: none"> • Invader species in the area to be indicated to the contractor. • Eradication of the alien plants and treatment of stumps should be part of operating in the area. • Materials contaminated by alien plant seed etc should not be imported and must be obtained from controlled sources. • Alien plant areas should not be used for storage/stock piling of materials for fear of disturbance and spreading of seed. 	<ul style="list-style-type: none"> • Areas where alien plants become established to be monitored and control action taken to prevent further spreading.

Discussion: Alien invader species occur in the area, including Lantana, Black and Silver Wattle, Bugweed and Syringa. There is a risk that construction activities accelerate the spread of invader plants by disturbing these areas specifically during access road and tower base construction.

Careful management during the construction and rehabilitation process can minimise the potential spread of aliens. This to be addressed in the EMP. Alien vegetation within the Eskom servitude will be eradicated as indicated

Venus – Braamhoek 400kV Transmission Line		
Theme	Well being	
Nature of impact	<i>Poaching</i>	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	Ongoing
Intensity	Moderate	Low
Probability of occurrence	Probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	Low	Low
Level of significance	Moderate	Low
Mitigation measures	<ul style="list-style-type: none"> • Environmental education for construction staff to sensitise them to the need to conserve. • Limiting the activities of staff to the Eskom servitude. 	Ongoing education.
Level of significance after mitigation	Low	Low
EMP requirements	<ul style="list-style-type: none"> • Staff to be educated. • Activities to be limited to the Eskom servitude • Monitoring of construction camp area for signs of poaching. 	
Discussion: There will be increased poaching of fauna and flora due to immigration during the construction phase. Increased poaching due to improved access (new access roads).		

Venus – Braamhoek 400kV Transmission Line		
Theme	Well being	
Nature of impact	<i>Impact on conservation areas</i>	
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	Probable	Improbable
Status of the impact	Positive	None
Accumulative Impact	Low	Low
Level of significance	Low	Moderate
Mitigation measures	<ul style="list-style-type: none"> Routing the line over land not used for conservation landuse. 	Ongoing monitoring and control actions taken when necessary.
Level of significance after mitigation	None	None
EMP requirements	<ul style="list-style-type: none"> Keep all activities within the confines of the Eskom servitude. 	<ul style="list-style-type: none"> Ongoing monitoring through annual audits.
<u>Discussion:</u> The passes mainly over farm land. The line may pass over land under conservancy management. The potential impact on the conservation potential of the land should be minimised with the EMP.		

Venus – Braamhoek 400kV Transmission Line		
Theme	Well being	
Nature of impact	Fire	
Stage	Construction and Decommissioning	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	None
Intensity	High	None
Probability of occurrence	Probable	Probable
Status of the impact	Negative	Negative
Accumulative Impact	Moderate	Low
Level of significance	High	Moderate
Mitigation measures	<ul style="list-style-type: none"> As per EMP. 	Ongoing monitoring and control actions taken when necessary.
Level of significance after mitigation	Low	Low
EMP requirements	<ul style="list-style-type: none"> Contractors to be trained in fire fighting in veld and woodland areas (fire beaters and backpack sprayers to be made available with each construction team) Maintain vegetation in servitudes, particularly hotspot areas. Contact telephone number and name of Eskom operations control room to be published for line management (eg switching off line) during extreme fire conditions. Publish reporting procedures for fire fighting and line operations – eg names of local fire fighting representatives (eg conservancy and game farm representatives, farmers associations) and reporting of location by pylon number. Access routes to servitudes to be clearly marked with pylon numbers. 	<ul style="list-style-type: none"> Ongoing monitoring through annual audits.

Discussion: The occurrence and management of fires in the area may be altered by the construction and operation of the transmission line. Ecological, safety, and economic implications can result from the change in the nature of fire hazards and events. In the study area fires are a natural part of the environment, and are an important part of the management of grasslands in particular. The new line is not seen to change the nature and occurrence of fires during operation, and careful management during construction will minimise veld fire incidents. The line operation should not be significantly affected by fires, though the hotter, more intense fires in the woodland may cause occasional operational problems.

Venus – Braamhoek 400kV Transmission Line		
Theme	Well being	
Nature of impact	Access roads	
Stage	Construction	Operation
Extent of impact	Local	Local
Duration of impact	For the duration of construction	None
Intensity	Moderate	None
Probability of occurrence	Highly probable	Improbable
Status of the impact	Negative	None
Accumulative Impact	Moderate	Low
Level of significance	High	Moderate
Mitigation measures	<ul style="list-style-type: none"> • Acquire legal permission to enter the land through landuse agreements. • Erect gates for organised access and maintain gates closed and locked at all times. • Select access routes along existing roads as far as possible. • New access routes to be selected in consultation with the landowner and the Environmental Control Officer. • Keep earthworks to the minimum cut and fill. • All embankments to be of a gradient of 1:3 or more. • Rehabilitation should commence immediately after access road is constructed. • Erosion control on road works should form part of road construction specification. 	Ongoing monitoring and control actions taken when necessary.
Level of significance after mitigation	Low	None

<p>EMP requirements</p>	<ul style="list-style-type: none"> • Use existing roads where possible • Establish maintenance responsibilities and inform landowner • All erosion and water damage on access roads to be rehabilitated before construction is complete. (it may be required that interim damage will also need to be repaired – to prevent stock losses, etc – this will need to be monitored by the Environmental Officer and landowner and the necessary repairs undertaken. • Number of tracks within the servitude to be minimised – kept to one for all areas except the tower sites. • Wetland areas to be avoided • Eroded areas to be avoided unless proper erosion management is put in place 	<ul style="list-style-type: none"> • Ongoing monitoring through annual audits.
<p><u>Discussion:</u> Agreements between Eskom Transmission and the landowner for the life of the Transmission line. Individual landowners need to sign a release document before the contractor for the construction phase can be released from site after site rehabilitation. Eskom Transmission undertakes to maintain roads and access routes used for maintenance.</p> <p>Many concerns have been raised by I&AP's regarding problems with access roads for the existing Transmission lines. There is strong doubt that the situation will be any better for the proposed line. It is recognised that the impact of the establishment and maintenance of access roads can be minimised and mitigated by careful planning and management. However, there needs to be confidence that these will be put in place beyond the preparation of an EMP.</p>		

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