DRAFT BASIC ASSESSMENT REPORT FOR THE CONSTRUCTION OF A 132kV DISTRIBUTION POWER LINE BETWEEN LYDENBURG TO MERENSKY SUBSTATIONS: MPUMALANGA AND LIMPOPO PROVINCES.

A REPORT FOR: ESKOM HOLDINGS SOC

DATE: JANUARY 2016

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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File Reference Number:	
Application Number:	
Date Received:	

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2014 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. This report format is current as of **08 December 2014**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
3. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
11. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
13. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.

14. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.
15. Shape files (.shp) for maps must be included in the electronic copy of the report submitted to the competent authority.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section? YES

If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.

1. PROJECT DESCRIPTION

a) Describe the project associated with the listed activities applied for

1. PROJECT DESCRIPTION

Eskom Holdings is proposing to build a new 132kV Power line which is approximately 55 km long from the existing Lydenburg Substation (Mpumalanga Province), situated adjacent to the R37 and R36 within the outskirts of Lydenburg, to the existing Merensky substation (Limpopo Province), situated adjacent to the R555 near Steelpoort (Refer to Figure 1). The Power line is needed to strengthen the network by improving the voltage levels and thermal loading in that specific portion of the network. The following supporting infrastructure will form part of the project:

- 1x132 kV Feeder bay at Merensky MTS; and
- 1x132 kV Feeder bay at Lydenburg Substation.

During the public participation process which was undertaken in June-July 2014 and the review of the draft Basic Assessment Report, comments were received by the Environmental Assessment Practitioner from Interested and Affected Parties as well as the Mpumalanga Tourism and Parks Authority opposing the identified preferred alternative (Alternative 1) for the project implementation (Refer to Figure 1). This alternative is traversing the Kudu Ranch which is the Nature Reserve. Therefore, Eskom Holdings has since identified three new feasible alternatives for the project and environmental investigation. These alternatives will be presented to the public for review and comments (Refer to Figure 2).

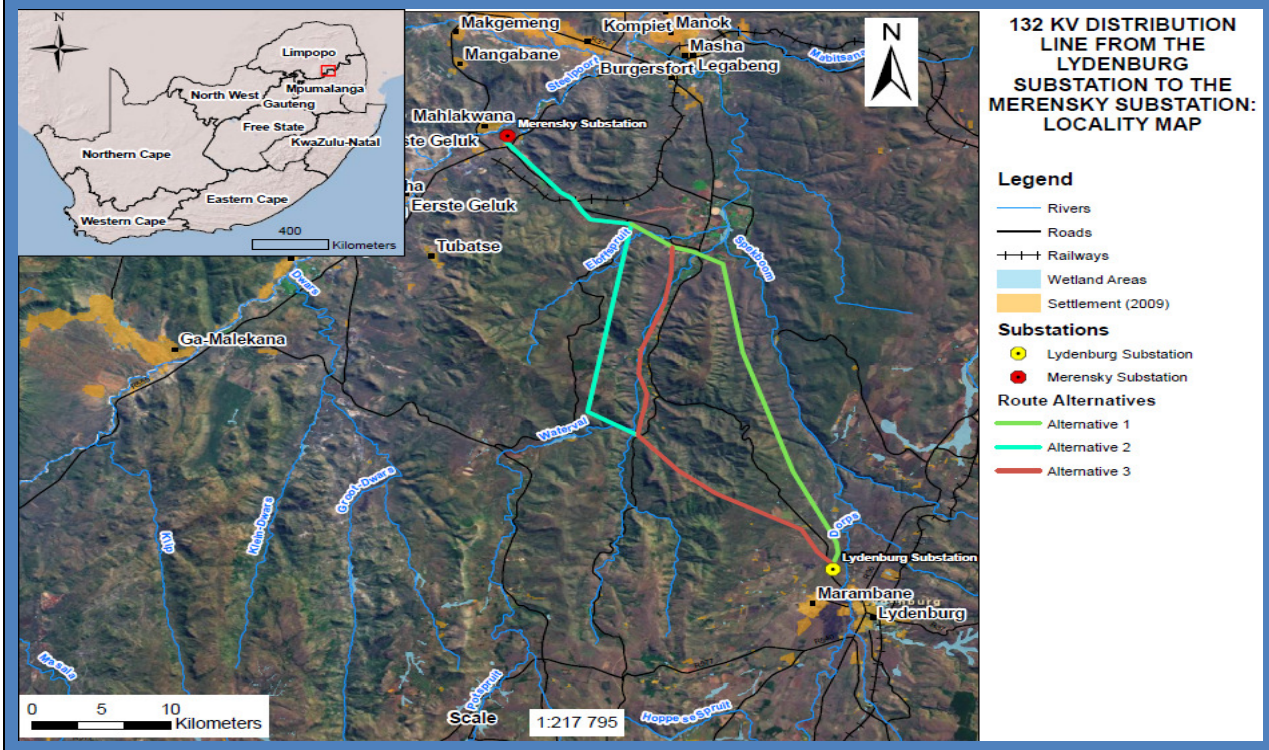


Figure 1: Locality map (with Old Alternatives)

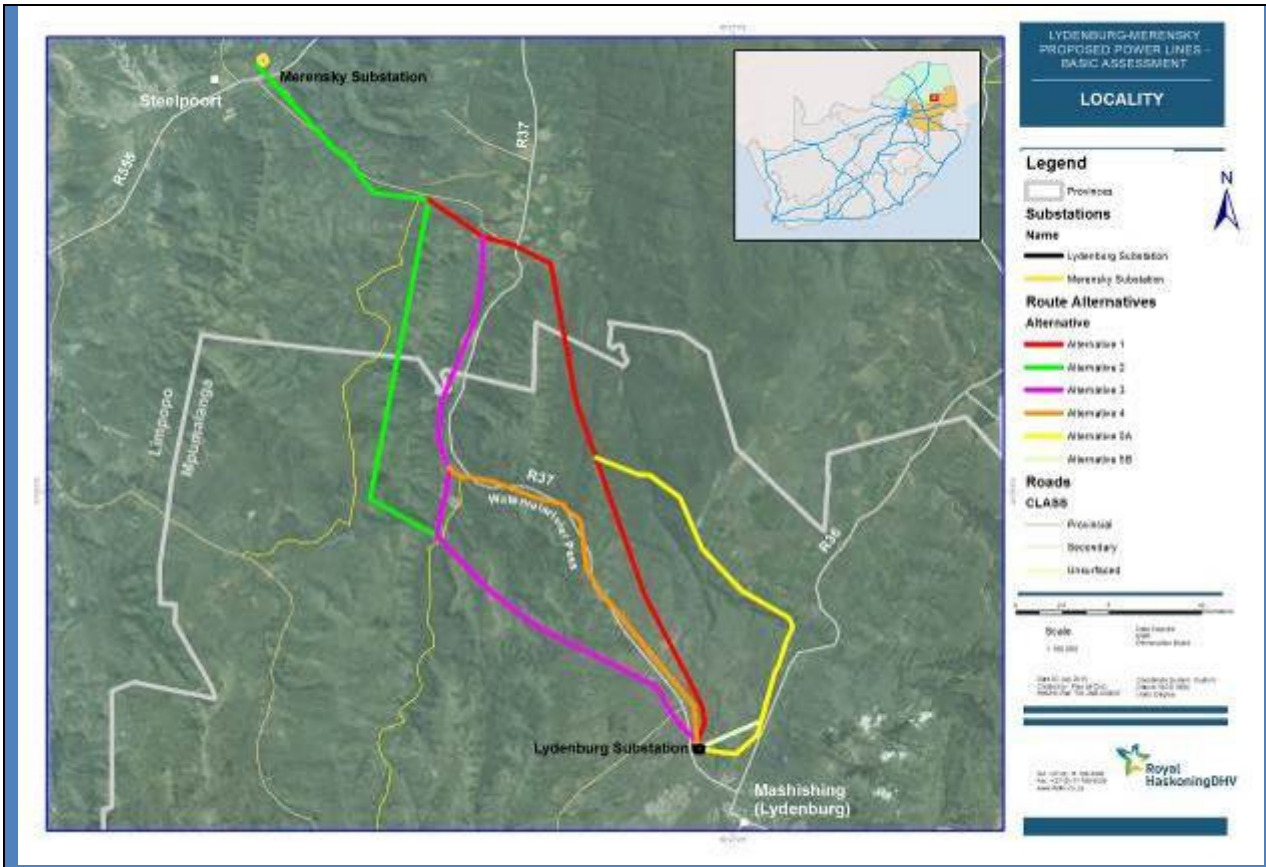


Figure 2: Locality map (New Alternatives)

1.1. Technical Details of the 132 kV Distribution Power Line

1.1.1. 132 kV Towers

This Single Mast Suspension structure was developed as an alternative to self supporting structures available at 132kV voltage level. This configuration is designed to be highly flexible during broken conductor conditions, resulting in a very light structure (Refer to Figure 3).

Figure 3: 132 kV steel monopole structure.

- **Length**

The proposed power line corridor will commence at the existing Merensky substation to the existing Lydenburg substation. The proposed length is approximately 55 km.

- **Servitude Requirements and Clearances**

The servitude width for a 132 kV Distribution Power Line is 32 m (15.5 m on either side of the centre line of the Distribution Power Line respectively). The minimum vertical clearance to buildings, poles and structures not forming part of the Distribution Power Line must be 3.8 m, while the minimum vertical clearance between the conductors and the ground is 6.7 m.

The minimum distance of a 132 kV Distribution line running parallel to proclaimed public roads is 95 m from the centre of the Distribution line servitude to the centre of the road servitude. The minimum distance between any part of a tree or shrub and any bare phase conductor of a 132 kV Distribution Power Line must be 3.8 m, allowing for the possible sideways movement and swing of both the Distribution Power Line and the tree or shrub.

On receipt of an approval of the final corridor by the environmental authorities and after negotiations with landowners, the final definition of the centre line for the Distribution Power Line and coordinates of each bend in the line will be determined. Optimal tower sizes and positions will be identified and verified using a ground survey (in terms of the Environmental Management Programme (EMPr) requirements).

A minimum 8 m (4 m either side of the centre line of the Distribution Power Line) wide strip is to be cleared of all trees and for stringing purposes only. If any tree or shrub in other areas will interfere with the operation and/or reliability of the Distribution Power Line it will be trimmed or completely cleared. The clearing of vegetation will take place, with the aid of a surveyor along approved profiles and in accordance with the approved EMPr as well as in accordance with the minimum standards to be used for vegetation clearing for the construction of the proposed new Distribution Power Line as listed in **Table 1** (Eskom, 2000).

Table 1: Minimum standards to be used for vegetation clearing for construction of a new Distribution Power Line

Item	Standard	Follow up
Centre line of the proposed Distribution Power Line	Clear to a maximum (depending on tower type and voltage) of an 8 m wide strip of all vegetation along the centre line. Vegetation to be cut within 100 mm of the ground. Treat stumps with herbicide.	Re-growth shall be cut within 100 mm of the ground and treated with herbicide, as necessary.
Inaccessible valleys (trace line)	Clear a 1 m strip for access by foot only, for the pulling of a pilot wire by hand.	Vegetation not to be disturbed after initial clearing – vegetation to be allowed to re-grow.
Access / service roads	Clear a maximum (depending on tower type) 5 m wide strip for vehicle access within the maximum 8 m width, including de-stumping/cutting stumps to ground level, treating with a herbicide and re-compaction of soil.	Re-growth to be cut at ground level and treated with herbicide as necessary.
Proposed tower position and proposed support / stay wire position	Clear all vegetation within proposed tower position and within a maximum (depending on tower type) radius of 5 m around the position, including de-stumping / cutting stumps to ground level, treating with an herbicide and re-compaction of soil. Allow controlled agricultural practices, where feasible.	Re-growth to be cut at ground level and treated with herbicide as necessary.
Indigenous vegetation within servitude area (outside of maximum 8 m strip)	Area outside of the maximum 8 m strip and within the servitude area, selective trimming or cutting down of those identified plants posing a threat to the integrity of the proposed Distribution line.	Selective trimming
Alien species within servitude area (outside of maximum 8 m strip)	Area outside of the maximum 8 m strip and within the servitude area, remove all alien vegetation within servitude area and treat with appropriate herbicide.	Cut and treat with appropriate herbicide.

Once the centre line has been cleared, the surveyor pegs every tower position and marks the crossing point with existing fences for new gate installation. Once the tower positions have been marked, the vegetation clearing team will return to every tower position and clear vegetation (in accordance with the EMPr) for assembling and erection purposes.

- **Foundations**

The type of terrain encountered, as well as the underlying geotechnical conditions determines the choice of foundation. The actual size and type of foundation to be installed will depend on the soil bearing capacity (actual sub-soil conditions). Strain structures require more extensive foundations for support than in-line suspension structures, which contribute to the cost of the construction of the line. The minimum working area required around a structure position is 20 m × 20 m.

Foundations will be mechanically excavated where access to the pole position is readily available. The same applies to the pouring of concrete required for the setting of the foundations. Prior to erecting the poles and filling of the foundations, the excavated foundations will be covered in order to safeguard unsuspecting animals and people from injury. All foundations are back-filled, stabilised through compaction, and capped with concrete at ground level.

- **Insulators**

Composite insulators are used to connect the conductors to the towers. Glass and porcelain have previously been used to connect the conductors for many years, and are the most common. They are, however, heavy and susceptible to breakage by vandals, as well as contamination by pollution. Composite insulators have a glass-fibre core with silicon sheds for insulation. Composite insulators are lightweight and resistant to both vandalism and pollution. Composite (Long rod type) insulators with silicone based weather shed material will be used for strain assemblies. Composite horizontal line post insulators will be used for the intermediate structures and on the jumper supports.

- **Access**

Approximately 60% of each of the proposed corridor alternatives are situated along existing access routes, and therefore access to the sites are readily available. A vehicle access road is usually required to be established to allow access along the entire length of the servitude. Access is required during both the construction and operation / maintenance phases of the Distribution Power Line life cycle. Areas without access points and roads will be negotiated with landowners, and are to be established during the construction phase. The access roads will be considered for the various alternative routes being evaluated for the proposed project. Should a new access road be required to be constructed for the final route, it will need to be negotiated with the individual landowner/s concerned.

- **Timing**

Construction for the project is planned to commence in April 2018 and the commissioning of the line is planned for December 2018.

- **On-going Maintenance**

During the life span of the Distribution Power Line i.e. approximately 25 years, on-going maintenance is required to be performed from time to time. This maintenance work is undertaken by contractors employed by Eskom, and in compliance with the Environmental Management Programme (EMPr).

- **Sub-transmission Lines**

In South Africa, thousands of kilometres of high voltage transmission lines (i.e. 765 kV, 400 kV or 220 kV transmission lines) transmit electricity generated at power stations to Eskom's major substations. At these major substations, the voltage is reduced, and the electricity is distributed to smaller substations all over the country through Distribution Power Lines and substations (i.e. 132 kV, 88 kV or 66 kV lines). At the smaller substations the voltage is further reduced and the power is distributed to local users via numerous small power lines (i.e. 22 kV and 11 kV lines) referred to as reticulation lines. The power generated by Eskom can only be utilised from those points of supply, which transform the power into a usable voltage.

- **Construction Process for Distribution Power Lines**

Distribution Power Lines are constructed in the following simplified sequence:

Step 1: Determination of technically feasible alternatives;

Step 2: EIA input into route selection and obtaining of relevant environmental permits;

Step 3: Negotiation of final route with affected landowners;

Step 4: Survey of the route;

Step 5: Selection of best-suited structures and foundations;

Step 6: Final design of Distribution Power line and placement of towers;

Step 7: Issuing of tenders and award of contract to construction companies;

Step 8: Vegetation clearance and construction of access roads (where required);

Step 9: Pegging of structures;

Step 10: Construction of foundations;

Step 11: Assembly and erection of structures;

Step 12: Stringing of conductors;

Step 13: Rehabilitation of disturbed area and protection of erosion sensitive areas;

Step 14: Testing and commissioning; and

Step 15: Continued maintenance.

2. DESCRIPTION OF THE RECEIVING ENVIRONMENT

2.1. Avifauna

2.2.1 Bird Species Occurrence in the Study Area

The South African Bird Atlas Project data has been consulted to gain an understanding of the recorded occurrence of bird species across the study area. Data from both the SABAP1 project (completed) and the SABAP2 project (on going since 2007) has been used to compile a species list the for the site (recorded species on the field visit were submitted to the SABAP2 project, thus the species recorded on the site assessment for this project have been captured through the SABAP2 data for the site). From this overall list a number of 'priority' species have been identified. The identification of priority species has been based upon the potential impacts of the proposed development on bird species which entails that certain species are more likely than others to be impacted, as well as on the respective rarity and endemism status of individual species that would potentially make them more vulnerable than others to potential impacts.

- **Overall Species Occurrence**

369 species have been recorded across the study area. SABAP1 data was collected at the scale of quarter degree squares. The lines cover three such quarter degree squares; the vast majority of the line alternatives fall with 2430CD with two more (2430CA and 2530AC) being partially traversed. In the case of these latter two quarter degree squares it should be noted that these cover a wider area than the area traversed by the lines, and the potential presence of species that may occur in different habitats to those in the study area were thus noted. Secondly current data for the current SABAP2 project was consulted to check if any new species had been recorded. The overall species database lists which species which are either endemic to southern Africa, or which are listed on the South African Red Data Bird Species list. The overall species list is contained in Appendix 1.

It should be noted that certain species recorded in quarter degree squares in which the line alternatives fall in the SABAP1 associated with habitats that are not well represented in the study area or previously recorded at extremely low reporting rates have been excluded from the study area bird list. This includes species associated with true Afromontane Forests such as the White-starred Robin (Pogonocichla stellata), Yellow-throated Woodland Warbler (Phylloscopus ruficapilla), Blue-mantled Crested Flycatcher (Trochocercus cyanomelas) Southern Double-collared Sunbird (Cinnyris chalybeus) and those species typical of the dry western interior of southern Africa which would only occur marginally in the study area such as the Kalahari Scrub-Robin (Cercotrichas paena).

- **Occurrence of Red Data Species**

A number of Red Data species could potentially occur within the study area. The table below lists the Red Data species that have been recorded in the study area, along with their conservation status. Red Data species are very important in the context of the proposed development, as any impacts on these threatened species will be potentially significant at the population level. In addition many of these species are large birds with poor flight mobility, and thus they are particularly vulnerable to collisions with power lines.

Table 2: Red Data species listing for study area

Common Name	*Scientific Name*	SA Red Data Status
Black Stork	*Ciconia nigra*	Near Threatened
Yellow-billed Stork	*Mycteria ibis*	Near Threatened
Southern Bald Ibis	*Geronticus calvus*	Vulnerable
Secretarybird	*Sagittarius serpentarius*	Near Threatened
Cape Vulture	*Gyps coprotheres*	Vulnerable
White-backed Vulture	*Gyps africanus*	Vulnerable
Martial Eagle	*Polemaetus bellicosus*	Vulnerable
African Crowned Eagle	*Stephanoaetus coronatus*	Near threatened
African Marsh-Harrier	*Circus ranivorus*	Vulnerable
Pallid Harrier	*Circus macrourus*	Near Threatened
Lanner Falcon	*Falco biarmicus*	Near Threatened
Red-footed Falcon	*Falco vespertinus*	Least Concern
Lesser Kestrel	*Falco naumanni*	Vulnerable
Blue Crane	*Anthropoides paradiseus*	Vulnerable
Grey Crowned Crane	*Balearica regulorum*	Vulnerable
Denham's Bustard	*Neotis denhami*	Vulnerable
White-bellied Korhaan	*Eupodotis senegalensis*	Vulnerable
Black-bellied Bustard	*Eupodotis melanogaster*	Near Threatened
Black-winged Lapwing	*Vanellus melanopterus*	Near Threatened
Half-collared Kingfisher	*Alcedo semitorquata*	Near Threatened
Yellow-breasted Pipit	*Anthus chloris*	Vulnerable
Red-billed Oxpecker	*Buphagus erythrorhynchus*	Near Threatened

- **Occurrence of Endemic Species**

The table below lists the endemic species have been recorded within the study area. It should be noted that species endemic to the southern African sub-region have been listed. A distinction has been drawn between birds completely endemic to the sub-region, as well as those species whose distributions mostly fall within the sub-region (near endemic). Bird species endemic to southern Africa are important as they do not occur anywhere else in the world. A minority of the World's bird species have small, restricted ranges, being confined to a particular area, and they are thus endemic to that area. Typically a bird is termed endemic if it is constricted to a range of 50,000 km2 or smaller. The constricted range makes these species vulnerable to population reduction - half of all restricted-range species in the world are globally threatened or near-threatened and the other half remain permanently vulnerable to the loss or degradation of habitat owing to the small size of their ranges. It is in this context that the endemic birds occurring in the study area are listed below.

Table 3: Endemic bird species occurring in the study area

Common Name	*Scientific Name*	SA Red Data Status	Endemism Status
Southern Bald Ibis	*Geronticus calvus*	Vulnerable	Endemic
Cape Vulture	*Gyps coprotheres*	Vulnerable	Endemic
Jackal Buzzard	*Buteo rufofuscus*		Endemic
Grey-winged francolin	*Scleroptila africana*		Endemic
Natal Spurfowl	*Pternistis natalensis*		Near Endemic
Blue Crane	*Anthropoides paradiseus*	Vulnerable	Endemic
Double-banded Sandgrouse	*Pterocles bicinctus*		Near Endemic
Knysna Turaco	*Tauraco corythaix*		Endemic
Burchell's Coucal	*Centropus burchellii*		Near Endemic
Southern Yellow-billed Hornbill	*Tockus leucomelas*		Near Endemic
Acacia Pied Barbet	*Tricholaema leucomelas*		Near Endemic
Ground Woodpecker	*Geocolaptes olivaceus*		Endemic
Cape Rock-Thrush	*Monticola rupestris*		Endemic
Sentinel Rock-Thrush	*Monticola explorator*		Endemic
Mountain Wheatear	*Oenanthe monticola*		Near Endemic
Buff-streaked Chat	*Campicoloides bifasciata*		Endemic
Anteating Chat	*Myrmecocichla formicivora*		Endemic
Cape Grassbird	*Sphenoeacus afer*		Endemic
Cloud Cisticola	*Cisticola textrix*		Near Endemic
Fiscal Flycatcher	*Sigelus silens*		Endemic
Cape Batis	*Batis capensis*		Endemic
Yellow-breasted Pipit	*Anthus chloris*	Vulnerable	Endemic
Cape Longclaw	*Macronyx capensis*		Endemic
Southern Boubou	*Laniarius ferrugineus*		Endemic
Bokmakierie	*Telophorus zeylonus*		Near Endemic
Olive Bush-Shrike	*Chlorophoneus olivaceus*		Near Endemic
Pied Starling	*Lamprotornis bicolor*		Endemic
Gurney's Sugarbird	*Promerops gurneyi*		Endemic
Greater Double-collared Sunbird	*Cinnyris afer*		Endemic
Cape White-eye	*Zosterops capensis*		Endemic
Cape Sparrow	*Passer melanurus*		Near Endemic
Cape Weaver	*Ploceus capensis*		Endemic
Violet-eared Waxbill	*Uraeginthus granatinus*		Near Endemic
Red-headed Finch	*Amadina erythrocephala*		Near Endemic
Cape Canary	*Serinus canicollis*		Endemic
Cape Bunting	*Emberiza capensis*		Near Endemic

Importantly a number of threatened species found in the study area are endemic to the southern African sub-region, and certain of these are larger bird species that are vulnerable to collisions with overhead wires as discussed below. Most of the other species listed as endemic are not threatened and have viable populations within a southern African context. The proposed development is not likely to be associated with large-scale loss of habitat, thus it is highly unlikely that the proposed development would exert an impact of any significance on most of the more common endemic bird species.

- **Occurrence of Priority Bird Species**

Based on the species lists compiled for the study area, a number of 'priority species' with respect to the proposed development have been identified. This has been based on the conservation or endemism status of the species, as well as whether the species would be vulnerable to collisions with overhead power lines. Species recorded in the wider area have been included as these could easily move into the study area. The priority species are:

- Black Stork;
- Southern Bald Ibis;
- Cape Vulture;
- Verreauxs' Eagle;
- African Crowned Eagle;
- Lanner Falcon;
- Peregrine Falcon;
- Denham's Bustard;
- White-bellied Korhaan; and
- Black-bellied Bustard.

Many of these species could potentially be affected / impacted or interact with the power lines due to their behavioural habits (i.e. a significant part of their behaviour would entail that they would fly at an elevation above the ground at which the lines are located) along with their generally poor mobility in flight. These types of behaviour would include:

- Flying between foraging / roosting / breeding sites;
- Hunting or foraging for prey on the ground at a height above the ground at which the overhead lines are located high altitudes (in the case of many raptors), or hunting aerial prey (e.g. other birds in flight);
- Undertaking aerial displays;
- Perching / roosting on power line towers; and
- Nesting on power line towers.

2.2. Climate

2.2.1. Rainfall and Temperatures

Lydenburg receives about 625mm of rain per year, with most rainfall occurring during summer. It receives the lowest rainfall (0mm) in July and the highest (115mm) in December. The average midday temperatures for Lydenburg range from 17.4°C in June to 24.3°C in January. The area is the coldest during July when the temperatures drop to 3.1°C on average during the night. Steelpoort receives about 440mm of rain per year, with most rainfall occurring during summer. It receives the lowest rainfall (0mm) in June and the highest (86mm) in December. The average midday temperatures for Steelpoort range from 21.2°C in June to 28.2°C in January. The area is the coldest during July when the temperatures drop to 6°C on average during the night (SA Explore 2014).

2.3. Biodiversity

2.3.1. Flora of the Study Area

The study area falls within the 2430 DA, 2430 DB and 2530 AB quarter degree grid cells. Vegetation composition in these two grid cells consists of Lydenburg Montane Grassland (Gm 18), Lydenburg Thornveld (Gm 21), Ohrigstad Mountain Bushveld (SVcb 26), Sekhukhune Mountain Grassland (Gm 19), Sekhukhune Mountain Bushveld (SVcb 28), Sekhukhune Plains Bushveld (SVcb 27) and Subtropical Freshwater Wetlands (AZ f6) within the flood benches of the Waterval River a tributary of the Spekboom River, (Refer to Figure 4).

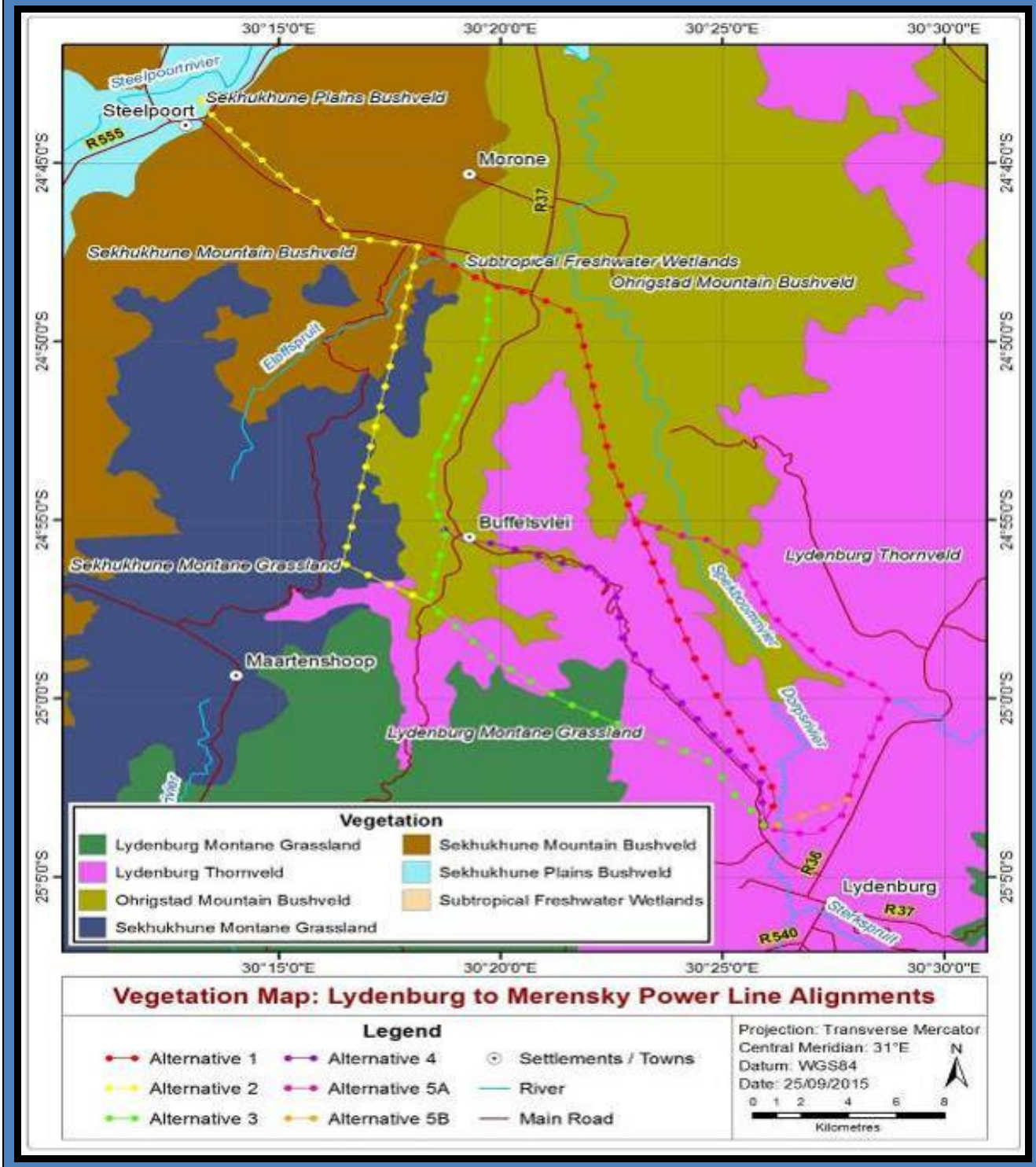


Figure 4: Vegetation map of the study area.

- **Lydenburg Montane Grassland (Gm 18)**

The grassland was previously known as North-Eastern Sandy Highveld (53%) and (LR 43) North-Eastern Mountain Grassland (73%). Its distribution is from Pilgrim's Rest in the north, southwards and westwards skirting Lydenburg, extending to Dullstroom, to Belfast and Waterval Boven in the south. It includes both the Steenkampsberg and Mauchsberg (Mucina & Rutherford 2006). The example and characteristics of Lydenburg Montane Grassland are depicted in Figure 5 and Table 4 below.

Figure 5: Example of Lydenburg montane grassland.

Table 4: Characteristics of Lydenburg Montane Grassland

Vegetation Type	Lydenburg Montane Grassland (Gm 18)	**Tree cover**	0-40 %
Soil	Mispah and Glenrosa soil forms.	**Shrub cover**	0-50 %
Topography	Plateau	**Herb cover**	0-40 %
Land use	Agricultural lands and Livestock (Cattle) grazing activities	**Grass cover**	0-90 %
Dominant Tree Species	*Vachellia karroo, Senegalia caffra, Protea caffra, Faurea galpinii, Cussonia transvaalensis, Cussonia paniculata, Searsia pyroides, Celtis africana, Combretum erythrophyllum, Dombeya rotundifolia*		
Dominant Shrub Species	*Diospyros lycoides, Gnidia caffra, Leucosidea sericea, Lopholaena disticha, Euclea crispa subsp. crispa, Rhemnus prinoides, Senecio microglossus, Lippia javanica, Seneghalia (Acacia) ataxacantha, Dichrostachys cinerea,*		
Dominant Grass spp.	*Aristida canescens, Aristida congesta, junciformis, Cymbopogon caesius, Dihetropogon amplectens, Heteropogon contortus, Themeda triandra, Hyparrhenia hirta, Cynodon dactylon, Panicum natalensis, Panicum maximum, Melinis repens, Setaria sphacelata, Digitaria sanguinalis, Eragrostis curvula, Eragrostis racemosa*		
Dominant Herb spp.	*Chamaesyce inaequilatera, Commelina erecta, Crotalaria lotoides, Hermannia depressa, Mariscus congestus, Pavonia burchellii, Pollichia campestris, Pseudognaphalium luteo-album, Rhynchosia totta, Schkuhria pinnata, Senecio microglossus, Senecio venosus,*		
	Monopsis decipiens, Gladiolus sp., Wahlenbergia undulata, Pelargonium luridum, Haplocarpha scaposa, Helichrysum nudifolium, H. rugulosum, Merremia tridentata,		

	Dicerocaryum eriocarpum, Rubus sp., Asclepias fruticosa, Helichrysum rugilosum, Hypoxis rigidula var. pilosissima, Aloe greatheadii var. davyana, Lantana rugosum; Ipomoea spp Achyranthes aspera, Bidens bipinnata, Chamaecrista mimosoides, Sida alba, Sonchus wilmsii, Tephrosia macrocarpa, Verbena brasiliensis.
Alien Invasive Species	*Acacia mearnsii*, Populus x canescens, Eucalyptus grandis*, Ipomoea alba*, Ipomoea indica*, Ipomoea purpurea*, Lantana camara*, Melia azedarach*, Jacaranda mimosifolia*, Morus alba*, Ricinus communis*, Rubus rigidus*, Robinia pseudoacacia*, Solanum mauritianum*.*
Red Data Species	None observed although summits and plateaus comprises suitable habitat for several red listed species (see attached list 2530 AB).

- **Lydenburg Thornveld (Gm 21)**

The vegetation unit situated around the Lydenburg substation comprises of Lydenburg Thornveld (Gm 21) (Mucina & Rutherford 2006) previously classified as North-eastern Mountain Sourveld (Acocks 1953) and North-Eastern Mountain Grassland (Low & Rebelo 1996). Its distribution is broad and is between the high-lying mountains from just north of Ohrigstad, tapering southwards through Lydenburg to as far south as the area in the vicinity of the Kwena Dam. Lydenburg Montane Grassland (Gm18) occurs in the eastern section of the Gustav Klingbiel Nature Reserve (Mucina et al. 2006). The example and characteristics of Lydenburg Thornveld are depicted in Figure 6 and Table 5 below.

Figure 6: Example of Lydenburg Thornveld.

Table 5: Characteristics of Lydenburg montane grassland

Vegetation Type	Lydenburg Thornveld (Gm 21)	**Tree cover**	0-40 %
Soil	Mispah, Glenrosa or Hutton soil forms. Red Clay soils as well a sandy-clay loams.	**Shrub cover**	0-50 %
Topography	Plateau	**Herb cover**	0-40 %
Land use	Agricultural lands and Livestock (Cattle)	**Grass cover**	0-90 %

	grazing activities.
Dominant Tree Species	Vachellia robusta subsp. robusta, Vachellia karroo, Senegalia caffra, Cussonia transvaalensis, Searsia pyroides, Celtis africana, Combretum erythrophyllum, Dombeya rotundifolia
Dominant Shrub Species	Diospyros lycoides subsp. guerkei, Euclea crispa subsp. crispa, Rhemnus prinoides,Senecio microglossus, Lippia javanica, Acacia ataxacantha, Dichrostachys cinerea, Euphorbia clavariodes
Dominant Grass spp.	Aristida canescens, Aristida congesta, junciformis, Cymbopogon caesius, Dihetropogon amplectens, Heteropogon contortus, Themeda triandra, Hyparrhenia hirta, Cynodon dactylon, Panicum natalensis, Panicum maximum, Melinis repens, Setaria sphacelata, Digitaria sanguinalis, Eragrostis curvula, Eragrostis racemosa
Dominant Herb spp.	Acanthospermum rigidum, Achyranthes aspera var. sicula, Conyza bonariensis, Crotalaria lotoides, Cyperus esculentus, Mariscus congestus, Pseudognaphalium luteo-album, Richardia brasiliensis, Solanum panduriforme, Sonchus wilmsii, Tagetes minuta, Verbena bonariensis, Wahlenbergia caledonica, Nidorella hottentotica, Vernonia oligocephala, Zornea milneana, Senecio inornatus, Merremia tridentata, Dicerocaryum eriocarpum, Rubus sp., Asclepias fruticosa, Helichrysum rugilosum, Hypoxis rigidula var. pilosissima, Aloe greatheadii var. davyana, Lantana rugosum; Ipomoea spp
Alien Invasive Species	Acacia mearnsii*, Opuntia ficus-indica, Cotoneaster pannosus, Cotoneaster franchetii*, Populus x canescens, Eucalyptus grandis*, Ipomoea alba, Ipomoea indica, Ipomoea purpurea*, Lantana camara, Melia azedarach, Jacaranda mimosifolia, Morus alba, Ricinus communis, Robinia pseudoacacia, Solanum mauritianum.
Red Data Species	Hypoxis hemerocallidea and suitable habitat for several red listed species within primary thornveld and grassland.

- **Ohrigstad Mountain Bushveld (SVcb 21)**

The vegetation unit situated around the area comprises of Ohrigstad Mountain Bushveld (SVcb 26) (Mucina & Rutherford 2006) previously classified as Sourish Mixed Bushveld (VT 19) (44%) and Mixed Bushveld (VT 18) (33%) (Acocks 1953) as well as North-eastern Mountain Sourveld (Acocks 1953) and North-Eastern Mountain Grassland (LR 43) (Low & Rebelo 1996). Its distribution is along the mountain slopes and steep valleys situated in Mpumalanga and Limpopo Provinces from the Blyde River Canyon, Ohrigstad and Burgersfort in the south continuing in the vicinity of the western side of the escarpment northwards to the Mohlapitse Valley and eastwards along the Strydpoort Mountains as far as Chuniespoort. The example and characteristics of Ohrigstad Mountain Bushveld are depicted in Figure 7 and Table 6 below.

Figure 7: Ohrigstad mountain bushveld (svcb 21).

Table 6: Characteristics of Ohrigstad mountain bushveld (svcb 21)

Vegetation Type	Ohrigstad Mountain Bushveld (SVcb 26)	**Tree cover**	20-80 %
Soil	Mispah or Glenrosa soil forms. Shallow sandy soils	**Shrub cover**	10-60 %
Topography	Undulating Mountains (Moderate-Steep slopes)	**Herb cover**	0-40 %
Land use	Livestock (Cattle) grazing activities	**Grass cover**	0-90 %
Dominant Tree Species	*Sclerocarya birrea subsp. caffra, Senegalia caffra, Vachellia exuvialis, Vachellia karroo, Vachelia tortilis* subsp. *hetaracantha, Combretum apicualtum, Combretum molle*, *Kirkia wilmsii, Dombeya rotundifolia, Croton gratissimus, Englerophytum magalismontanum, Terminalia prunoides, Ziziphus mucronata, Euphorbia cooperi, Olea europaea* subsp. *africana, Aloe marlothii*		
Dominant Shrub Species	*Dichrostachys cinerea, Grewia bicolour, Grewia monticola, Euclea crispa , Aloe spp.*		
Dominant Grass spp.	*Aristida canescens, Aristida congesta, junciformis, , Dihetropogon amplectens, Heteropogon contortus, Cynodon dactylon, Panicum maximum, Melinis repens, Setaria sphacelata, Digitaria sanguinalis, Eragrostis curvula, Eragrostis racemosa*		
Dominant Herb spp.	*Merremia tridentata,Clematis brachiata* (climber) *Dicerocaryum eriocarpum, Rubus sp., Asclepias fruticosa, Helichrysum sp., Hypoxis rigidula, Aloe greatheadii var. davyana, Lantana rugosum; Ipomoea* spp		
Alien Invasive Species	*Caesalpinia decapetala, Nicotiana glauca, Ipomoea indica*, *Ipomoea purpurea*, *Lantana camara*, *Melia azedarach*, *Jacaranda mimosifolia*, *Ricinus communis, Solanum mauritianum*		
Red Data Species	*Hypoxis hemerocallidea* as well as suitable habitat for several other species (see attached red list for 2430 DB)		

- **Sekhukhune Montane Grassland (Gm 19)**

The proposed Alternative 2 alignment is situated within a section of mountainous area on the Farms Bergfontein 383 KT and Doornhoek 355 KT comprising of Sekhukhune Montane Grassland (Gm 19) (Mucina & Rutherford 2006) previously classified as Bankenveld (VT 61) and North-eastern Sandy Highveld Mountain (VT 57) (Acocks 1953) and Mixed Bushveld (LR 18) (Low & Rebelo 1996). The distribution of the Sekhukhune Montane Grassland is in a continuous undulating norite hills in the Roosesenekal region from Stoffberg in the south, northwards through Mapochs Gronde to Schurinksberg in the north, with the Steelpoort River in the west (Mucina et al. 2006). The example and characteristics of Sekhukhune Montane Grassland are depicted in Figure 8 and Table 7 below.

Figure 8: Sekhukhune montane grassland.

Table 7: Characteristics of Sekhukhune montane grassland

Vegetation Type	Sekhukhune Montane Grassland (Gm 19)	**Tree cover**	0-20 %
Soil	High-clay content and include Arcadia, Mayo, Milkwood, Mispah, Shortlands ans Steendal	**Shrub cover**	0-10 %
Topography	Mountainous	**Herb cover**	0-40 %
Land use	Livestock (Cattle) grazing activities and eco-tourism	**Grass cover**	0-100 %
Dominant Tree Species	Senegalia caffra, Protea caffra subsp. caffra, Apodytes dimidiata subsp. dimidiata, Cussonia transvaalensis,		
Dominant Shrub Species	Diospyros austro-africana, Euclea crispa subsp. crispa, Brachylaaena ilicifolia, Pavetta zeyheri, Searsia discolorLippia javanica, Acacia ataxacantha, Dichrostachys cinerea		
Dominant Grass spp.	Aristida junciformis subsp. galpinii,, Cymbopogon caesius, Dihetropogon amplectens, Heteropogon contortus, Themeda triandra, Hyparrhenia hirta, Cynodon dactylon, Panicum natalensis, Panicum maximum, Melinis repens, Setaria sphacelata, Setaria		

	nigrigrostis, Digitaria sanguinalis, Eragrostis curvula, Eragrostis racemosa
Dominant Herb spp.	Berkheya setifera, Berkheya sp., Helichrysum nudifolium, Ipomoea crassipes, Vernonia natalensis, Xerophyta retinervis, Elephantorrhiza elephantiza, E. praetermissa, Leonotis leeonorus, Hypoxis rigidula var. pilosissima, Aloe greatheadii var. davyana, , Lantana rugosum; Ipomoea spp
Alien Invasive Species	Acacia mearnsii*, Populus x canescens, Eucalyptus grandis*, Ipomoea alba*, Ipomoea indica*, Ipomoea purpurea*, Lantana camara*, Melia azedarach*, Jacaranda mimosifolia*, Morus alba*, Ricinus communis*, Robinia pseudoacacia*, Solanum mauritianum*
Red Data Species	Hypoxis hemerocallidea, Aloe cooperi. Several other red listed species occur in the Roosenekal and Steelpoort subcentres of the Sekhukhuneland CE (Van Wyks & Smith 2001).

- **Sekhukhune Mountain Bushveld (SVcb 28)**

The Sekhukhune Mountain Bushveld (SVcb 26) (Mucina & Rutherford 2006) was previously classified as Sourish Mixed Bushveld (VT 19) (50%) (Acocks 1953) and Mixed Bushveld (LR 18) (Low & Rebelo 1996). This grassland is distributed within the Limpopo and Mpumalanga Provinces on the mountains and undulating hills above the lowlands of the Sekhukhune Plains Bushveld (SVcb 27), including the steep slopes of the Leolo Mountains, Dwars River Mountains and Thaba Sekhukhune, and a number of smaller isolated mountains such as Phepane And Morone. It also occurs of the undulating hills in the valley of the Steelpoort River up to and along the Klip River flowing past Roossenekal. The example and characteristics of Sekhukhune Montane Grassland are depicted in Figure 9 and Table 8 below.

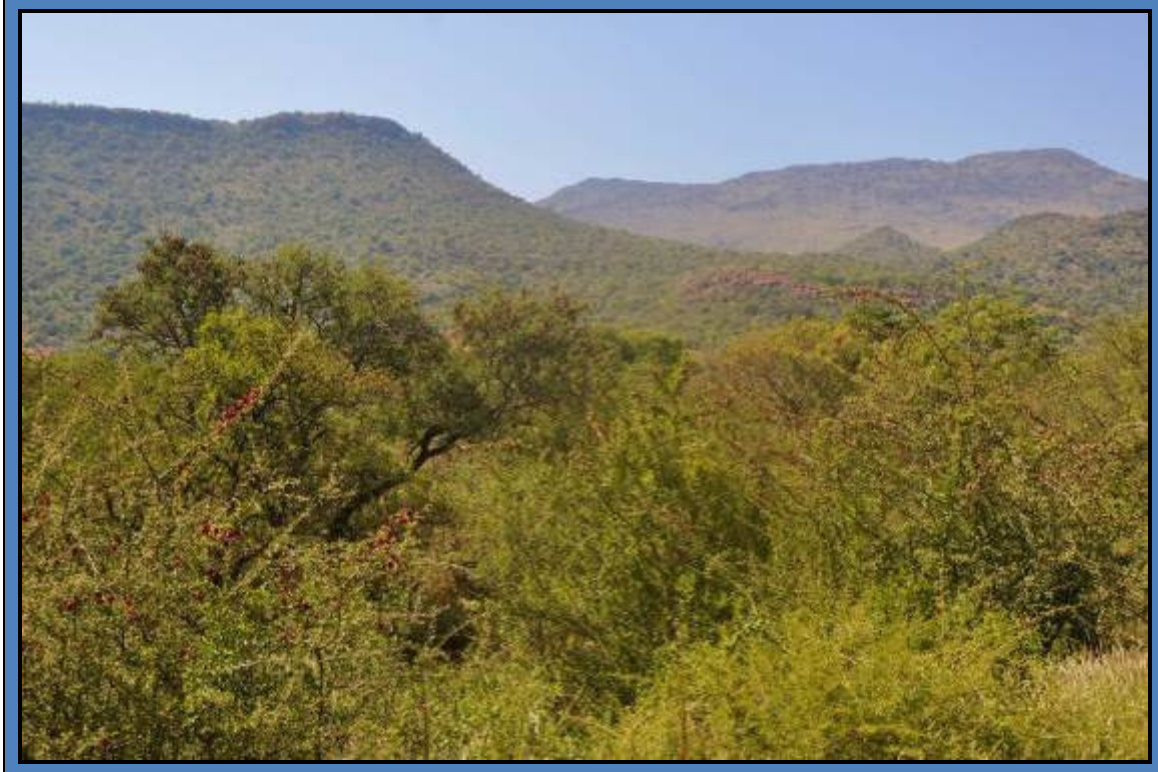


Figure 9: Sekhukhune mountain bushveld.

Table 8: Characteristics of Sekhukhune mountain bushveld

Vegetation Type	Sekhukhune Mountain Bushveld (SVcb 28)	**Tree cover**	20-80 %
Soil	Soils are dominantly shallow, rocky and clayey and typical of the Mispah and Gelnrosa soil forms (lime is present in low-lying areas).	**Shrub cover**	10-60 %
Topography	Undulating Mountains	**Herb cover**	0-40 %
Land use	Livestock (Cattle) grazing activities	**Grass cover**	0-90 %
Dominant Tree Species	Senegalia nigrescens, Combretum apiculatum, Combretum molle, Kirkia wilmsii, Commiphora mollis, Bolusanthus speciosus, Schotia latifolia, Cusonia transvaalensis, Croton gratissimus, Englerophytum magalismontanum, Sclerrocarya birrea subsp. caffra, Terminalia prunoides, Ziziphus mucronata, Euphorbia cooperi, Olea europaea subsp. africana, Aloe marlothii		
Dominant Shrub Species	Dichrostachys cinerea, Combretum hereroensis, Acacia ataxacantha, Grewia vernicosa, Euclea linearis and Euclea undulata, Euclea crispa, Aloe marlothii.		
Dominant Grass spp.	Aristida canescens, Aristida congesta, junciformis, Dihetropogon amplectens, Heteropogon contortus, Cynodon dactylon, Panicum maximum, Melinis repens, Setaria sphacelata, Digitaria sanguinalis, Eragrostis curvula, Eragrostis racemosa		
Dominant Herb spp.	Commeliana africana, Senecio latifolius, Zinnia peruviana*, Sansevieria hyacinthoides, Hypoxis rigidula, Aloe greatheadii var. davyana		
Alien Invasive Species	Nicotiana glauca*, Ipomoea indica*, Ipomoea purpurea*, Lantana camara*, Melia azedarach*, Jacaranda mimosifolia*, Ricinus communis*, Solanum mauritianum*		
Red Data Species	None observed although suitable habitat remains for several red listed species (see attached species list 2430 DB) Searsia sekhukhuniensis, Combretum petrophilum, Adenia fruticosa		

- **Sekhukhune Plains Bushveld (SV cb 27)**

The Sekhukhune Mountain Bushveld (SVcb 26) (Mucina & Rutherford 2006) was previously classified as Sourish Mixed Bushveld (VT 19) (50%) (Acocks 1953) and Mixed Bushveld (LR 18) (Low & Rebelo 1996). The Sekhukhune Plains Bushveld is situated within the Limpopo and Mpumalanga Provinces on the mountains and undulating hills above the lowlands of the Sekhukhune Plains Bushveld (SVcb 27), including the steep slopes of the Leolo Mountains, Dwars River Mountains and Thaba Sekhukhune, and a number of smaller isolated mountains such as Phepane And Morone. It also occurs of the undulating hills in the valley of the Steelpoort River up to and along the Klip River flowing past Roossenekal. The example and characteristics of Sekhukhune Montane Grassland are depicted in Figure 10 and Table 9 below.

Figure 10: Sekhukhune Plains Bushveld.

Table 9: Characteristics of Sekhukhune plains bushveld

Vegetation Type	Sekhukhune Plain Bushveld (SVcb 27)	**Tree cover**	0-40 %
Soil	Red Apedal, well-drained soils	**Shrub cover**	0-50 %
Topography	Plains	**Herb cover**	0-40 %
Land use	Mining, Urban & Livestock (Cattle) grazing activities	**Grass cover**	0-90 %
Dominant Tree Species	Senegalia nigrescens, Vachellia nilotica, Vachellia tortilis subsp. heteracantha, Boscia foetida subsp. rehmananiana, Combretum apiculatum, Combretum molle, Schotia latifolia, Cusonia transvaalensis, Terminalia prunoides, Ziziphus mucronata, Euphorbia cooperi, Olea europaea subsp. africana, Aloe marlothii		
Dominant Shrub Species	Dichrostachys cinerea, Ehretia rigida subsp. rigida, Jatropha sp. , Lantana rugosum, Combretum hereroensis, Senegalia ataxacantha, Grewia vernicosa, Euclea crispa , Aloe spp.		
Dominant Grass spp.	Aristida canescens, Aristida congesta, junciformis, Dihetropogon amplectens, Heteropogon contortus, Cynodon dactylon, Panicum maximum, Melinis repens, Setaria sphacelata, Digitaria sanguinalis, Eragrostis curvula, Eragrostis racemosa		
Dominant Herb spp.	Commeliana africana, Senecio latifolius, Zinnia peruviana*, Sansevieria hyacinthoides, Hypoxis rigidula, Aloe greatheadii var. davyana		
Alien Invasive Species	Nicotiana glauca*, Ipomoea indica*, Ipomoea purpurea*, Lantana camara*, Melia azedarach*, Jacaranda mimosifolia*, Ricinus communis*, Solanum mauritianum*		
Red Data Species	Dicliptera fruticosa, Elaeodendron transvaalense, Lydenburgia cassinoides, Adenia fruticosa, Searsia sekhukhuniensis, Combretum petrophilum, Euphorbia sekukuniensis, Searsia batophylla, Hypoxis hemerocallidea, Eulophia speciosa (see attached species list 2430 DA)		

- **Subtropical Freshwater Wetlands (AZf 6)**

The proposed alternative 1 alignment bisects a section of floodbench of the Waterval River which comprises of an azonal vegetation unit known as Subtropical Freshwater Wetlands (AZf 6) (Mucina et al. 2006). This vegetation unit occurs on flat topography supporting low beds dominated by reeds, sedges and rushes, water-logged meadows or hillslope seepage wetlands. It occurs in the Limpopo, North-West, Gauteng, Mpumalanga, KwaZulu-Natal and Eastern Cape Provinces as well as in neighbouring Swaziland. The example and characteristics of Sekhukhune Montane Grassland are depicted in Figure 11 and Table 10 below.

Figure 11: Subtropical freshwater wetlands.

Table 10: Characteristics of Subtropical Freshwater Wetlands

Vegetation Type	Subtropical Freshwater Wetland (AZf 6)	Tree cover (riparian species)	0-60%
Soil	Soils are waterlogged, clayey soils of Champagne and Arcadia Forms, containing high levels of decomposing organic material, especially in the very productive Phragmites australis beds. Other areas consist of recently "washed in" material which consists of light-brown sandy soils. .	Shrub cover	0-20%
Topography	Valley Bottom-Flood Bench of Waterval River	Herb cover	10-20%
Land use	Rural-agricultural (Livestock drinking & agricultural lands/irrigated citrus orchards)	Grass cover	0-80%
Dominant spp. (mainly upstream from R37) site)	Ficus sycomorus ssp. sycomorus, Ficus sur, Combretum erythrophylum, Celtis africana, Phragmites mauritianus, Phoenix reclinata, Typha capensis, Cyperus sexangularis, Thelypteris confluens, Cyclosorus interruptus, Cyperus textilis, Mariscus congestus,		

	Juncus spp., Scirpus ficinoides, Carex spp., Eleocharis spp., Pycreus nitidus, Senecio speciosus, Monopsis decipiens, Sesbania punicea*, ,Cirsium vulgare*, Setaria sp.
Alien Invasive Vegetation	Melia azedarach*, Arundo donax*, Lantana camara*, Morus alba*, Jacaranda mimosifolia, Ricinus communis*, Senna didymobotrya*

2.3.2. Fauna of the Study Area

- **Mammals**

Mpumalanga and Limpopo Provinces are faunally diverse with approximately 163 mammal species consisting of 98 smaller and 64 larger species. It is the objective of the relevant conservation authorities to conserve all of these species in situ. The grassland and savanna biomes sustain many endemic and red data mammal species. The grassland biome is one of the biomes in which Red Data Book (RDB) insectivore richness is concentrated (Gelderblom, Bronner, Lombard & Taylor, 1995). High mammalian species richness occurs in savannahs, which could be as a result of the wide variety of habitats available. In Mpumalanga Province, savanna areas with the availability of sufficient cover, karst areas, wetlands, pans and a well-managed mosaic of short and tall grassland, are habitats that significantly contribute towards the ecological requirements of several mammal species.

Table 11: Mammal species recorded in the study area

COMMON NAME	SCIENTIFIC NAME
Transvaal free-tailed Bat	*Tadarida ventralis*
Eastern Rock Elephant-Shrew	*Elephantulus myurus*
Scrub Hare	*Lepus saxatilis*
House Mouse	***Mus musculus***
*African (Common) Mole-rat	*Cryptomys hottentotus*
Greater Canerat	*Thryonomys swinderianus*
Rock Dormouse	*Graphiurus platyops*
Spiny Mouse	*Acomys spinosissimus*
Four-striped Grass Mouse	*Rhabdomys pumilio*
Desert Pygmy Mouse	*Mus indutus*
Natal Multimammate Mouse	*Mastomys natalensis*
Southern Multimammate Mouse	*Mastomys coucha*
Angoni Vlei Rat	*Otomys angoniensis*
Vlei Rat	*Otomys irroratus*
African Marsh Rat	*Dasymys incomtus*
House Rat	***Rattus rattus***
*Bushveld Gerbil	*Tatera leucogaster*
*Highveld Gerbil	*Tatera brantsii*
*South African Ground Squirrel	*Xenus inauris*
Striped Polecat	*Ictonyx striatus*
South African Large-spotted Genet	*Genetta tigrina*
*Marsh Mongoose	*Atilax paludinosus*
*Yellow Mongoose	*Cynictis penicillata*
*Slender Mongoose	*Galerella sanguinea*
Lesser Bushbaby	*Galago moholi*
*Black-backed Jackal	*Canis mesomelas*
*Cape Porcupine	*Hystrix africaeaustralis*
Smith's Red Rock Rabbit	*Pronolagus saundersiae*

Springhare	*Pedetes capensis*
*Common Duiker	*Sylvicarpa grimmia*
Mountain Reedbuck	*Redunca fulvorufula*
*Kudu	*Tragelaphus strepsiceros*
*Bushbuck	*Tragelaphus scriptus*
*Chacma Baboon	*Papio cynocephalus ursinus*
*Vervet Monkey	*Ceropithecus aethiops*

- **Reptiles**

Large areas of low-lying norite and gabbro rock outcrops occur around the Steelpoort area and provide favourable refuges for certain snake and lizard species (rupicolous species). Reptile species recorded from under loosely embedded rocks, fissures between rocks or observed basking on the low-lying rock sheets included Yellow-Throated Plated Lizard (Gerrhosaurus flavigularis), Giant Plated Lizard (Gerrhosaurus validus), Montane Speckled Skink (Trachylepis (Mabuya) punctatissima), Variable Skink (Trachylepis (Mabuya) varia), Southern Rock Agama (Agama atra), Ground Agama (Agama aculeata), Sekhukune Falt Lizard (Platysaurus orientalis orientalis), Common Flat Lizard (Platysaurus intermedius itermedius), Common Crag Lizard (Pseudocordylus melanotus melanotus), Transvaal Girdled Lizard (Cordylus vittifer) and Transvaal Thick-toed Gecko (Pachydactylus affinis).

The open and closed bushveld vegetation unit provides suitable habitat for several arboreal reptile species. Arboreal species recorded from trees as well as dead stumps along the alignments included Flap-necked Chameleon (Chamaeleo dilepis dilepis), Boomslang (Dispholidus typus typus), Spotted Bush Snake (Philothamnus variegatus) Southern Tree Agama (Acanthocercis atricolis) and Common Dwarf Gecko (Lygodactylus capensis). Wahlberg's Snake-eyed Skink (Panaspis walbergii) was observed in the loose leaf litter along the riparian zone of the Waterval River. The rivers offer favourable habitat for Nile Monitors (Varanus niloticus).

Several termite mounds Trinervitermes haberlandii were observed within the grassland vegetation units along and around the proposed alignments towards the Lydenburg substation. Numbers increased away from the agricultural areas (ploughed lands). Termite mounds offer important refuges for numerous frog, lizard and snake species. Large number of species of mammal, birds, reptiles and amphibians feed on the emerging alates (winged termites). These mass emergences coincide with the first heavy summer rains and the emergence of the majority of herpetofauna. Moribund termite mounds also provide nesting site for snakes (Striped Harlequin Snake, Yellow Bellied House Snake), lizards (varanids) and refuge habitats for several smaller mammals (shrews) and frogs.

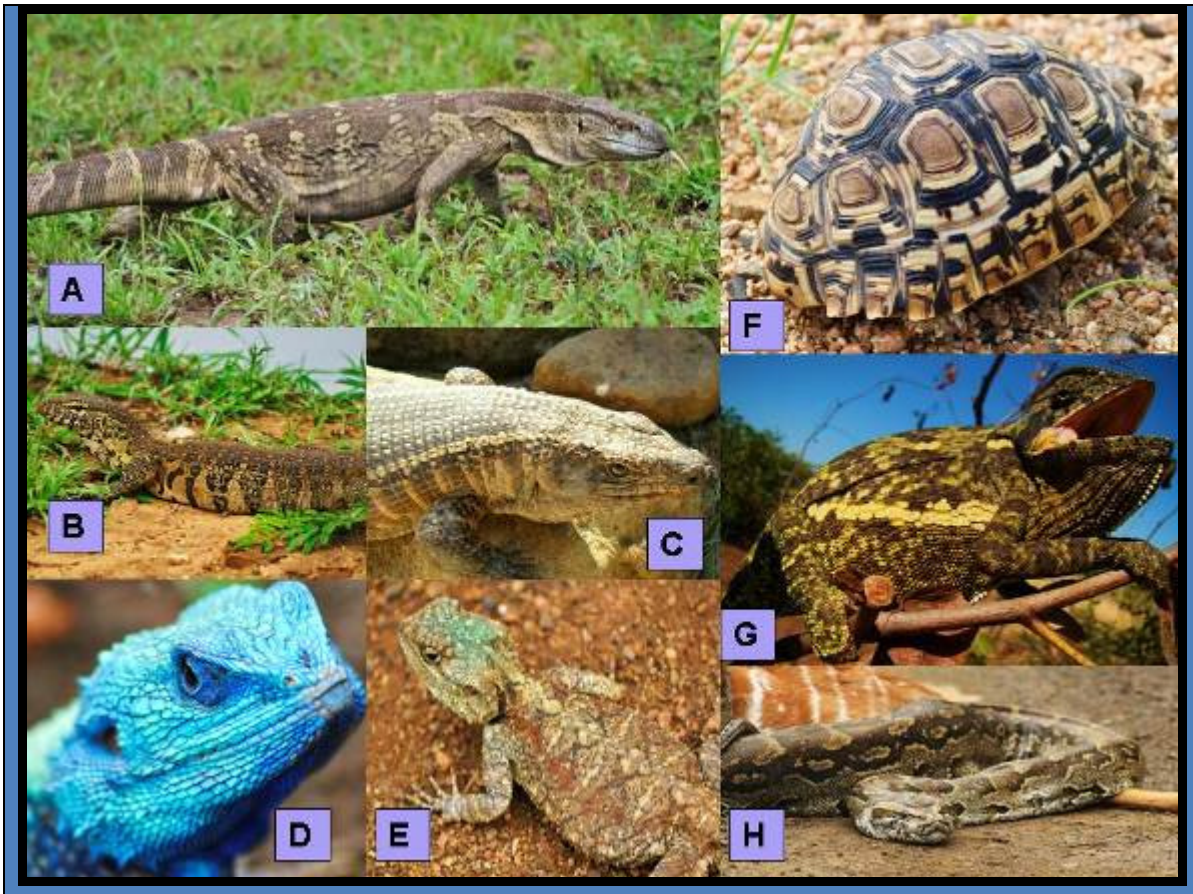


Figure 12: Reptile species recorded from the Lydenburg to Steelpoort

A: White-throated or Rock Monitor (Varanus albigularis),
B: Nile Monitor (Varanus niloticus),
C: Giant Plated Lizard (Gerrhosaurus validus validus),
D: Male Southern Tree Agama (Acanthocercus atricolis),
E: Female Southern Tree Agama (Acanthocercus atricolis),
F: Leopard Tortoise (Stigmochelys pardalis);
G: Common Flap-Necked Chameleon (Chamaeleo dilepis dilepis) and
H: African Rock Python (Python natalensis).

- **Amphibians**

The amphibian populations in Mpumalanga are faced with several environmental threats. Habitat destruction and alien vegetation resulting in fragmentation of populations is probably the major threats facing all frog species. Forestry and agriculture have already resulted in the rapid destruction and fragmentation of the habitat of populations of the species discussed here. Recent mining activities have resulted in severe habitat degradation around Burgesfort and Steelpoort. Overgrazing and severe fires in the grassland catchment areas result in extensive silting up of streams and wetlands, threatening the breeding habitat of these frogs. The biphasic life cycle of most frogs, as well as their semi-permeable skin makes them particularly vulnerable to pollutants and other environmental stresses. Consequently frogs can be used as environmental biomonitors to indicate the quality of the environment. Chemical pollution and acidification constitute a major threat to frog populations. Heavy metals such as aluminium, cadmium, copper, zinc and iron are all toxic to amphibians. It can be inferred from studies on fish that nickel, lead and manganese will also have deleterious effects on frog populations (Bishop 1996).

The majority of species in Mpumalanga and Limpopo Provinces are classified as explosive breeders completing their short duration reproductive cycle in the early summer months between (November-January). These frog species only emerge after the first heavy summer

rainfalls and are dormant during the cold winter months. Explosive breeding frogs utilise ephemeral pans or inundated grasslands for their short duration reproductive cycles.

Table 12: List of frog species recorded in the Lydenburg-Steelpoort-Burgersfort areas

COMMON NAME	SCIENTIFIC NAME	BREEDING HABITAT
African Bullfrog	*Pyxicephalus edulis*	Temporary shallow depressions and floodplain areas of the vlei. Also requires undisturbed open veld for foraging and sandy soils for burrowing.
Southern Ornate Frog	*Hildebrandtia ornata*	Shallow temporary pans in dry open woodland.
Tremolo Sand Frog	*Tomopterna cryptotis*	Temporary rain pools, pans and floodplain areas.
Russet-backed Sand Frog	*Tomopterna marmorata*	Temporary and semi-permanent seepage and seasonal pools within slow-flowing streams
Natal Sand Frog	*Tomopterna natalensis*	Seasonal mud pools, small ponds and flooplain areas.
Common Caco	*Cacosternum boettgeri*	Temporary marshes, ditches and grass inundated to a depth of about 2cm.
Bronze Caco	*Cacosternum nanum*	Small ponds, vleis, streams, rain pools alongside roads, inundated grassland and pastures.
Bubbling Kassina	*Kassina senegalensis*	Semi-permanent vleis, pans and shallows around dams.
Brown-backed Tree Frog	*Leptopelis mossambicus*	Shallow pans, pools and streams
Southern Foam Nest Frog	*Chiromantis xerampelina*	Temporary rain pools, pans and floodplain areas.
Red Toad	*Schismaderma carens*	Semi-permanent dams & ponds with water depth of more than one metre.
Eastern Olive Toad	*Ametiophrynus (Bufo) garmani*	Permanent or semi-permanent bodies of water, quiet backwaters of rivers, natural or man-made in open wooded savannah.
Guttural Toad	*Ametiophrynus (Bufo) gutturalis*	Permanent and semi-permanent ponds and backwaters in open habitat.
Raucous Toad	*Bufo rangeri*	Permanent or semi-permanent bodies of water, natural or man-made.
Northern Pygmy Toad	*Bufo fenoulheti*	Temporary pools on flat rocky outcrops or seasonal rain pools
Tropical Platanna	*Xenopus muelleri*	Permanent or semi-permanent bodies of water, natural or man-made, rivers.
Common Platanna	*Xenopus laevis laevis*	Permanent or semi-permanent bodies of water, natural or man-made.
Common River Frog	*Afrana angolensis*	Present in all major rivers as well as permanent standing water and floodplain areas. Recorded during brief site visit.
Banded Rubber Frog	*Phrynomantis bifasciatus*	Shallow ponds or inundated grass in savanna and Acacia veld.
Dwarf Puddle Frog	*Phrynobatrachus mababiensis*	Shallow stagnant water amongst emergent vegetation on the edges of grassy pans, vleis, marshes and in the back-waters of slow streams.
Snoring Puddle Frog	*Phrynobatrachus natalensis*	Pools or marshy area associated with the vlei
Plain Grass Frog	*Ptychadena anchietae*	Shallow pools (seasonal), inundated grassland areas of the vlei and dams.
Broad-banded Grass Frog	*Ptychadena mossambica*	Shallow pools (seasonal), inundated grassland areas of the vlei and dams, floodplains of rivers.
Sharp-nosed Grass Frog	*Ptychadena oxyrhynchus*	Shallow pools (seasonal), inundated grassland areas of the vlei and dams
Bushveld Rain Frog	*Breviceps adspersus*	Eggs deposited in a subterranean chamber about 30cm below surface.

Mozambique Rain Frog	*Breviceps mossambicus*	Eggs deposited in a subterranean chamber about 30cm below surface.
Mottled Shovel-nosed Frog	*Hemisus marmoratus*	Construct extensive tortuous tunnels in low muddy areas close to the edge of pools
Golden Leaf-folding Frog	*Afrixalus aureus*	Margins of seasonal pools and pans
Painted Reed Frog	*Hyperolius marmoratus*	Temporary pools, pans and vleis as well as permanent bodies of water such as dams, marshes, reedbeds on sluggish rivers and streams.
Water Lily Frog	*Hyperolius pusillus*	Shallow pans, ponds, vleis and dams with water lilies *Nymphaea sp.*

Figure 13: Amphibian species recorded from the Lydenburg to Steelpoort

A: Painted Reed Frog (Hyperolius marmoratus taeniatus),
B: Water Lily Frog (Hyperolius pusillus),
C: Brown-Backed Tree Frog (Leptopelis mossambicus) juvenile colouration,
D: Golden Leaf-Folding Frog (Afrixalus aureus);
E: Southern Ornate Frog (Hildebrandtia ornata),
F: African Bullfrog (Pyxicephalus edulis),
G: Banded Rubber Frog (Phrynomantis bifasciatus),
H: Southern Foam Nest Frog (Chiromantis xerampelina),
I: Bubbling Kassina (Kassina senegalensis),
J: Russet-Backed Sand Frog (Tomopterna marmorata),
K: Tremelo Sand Frog (Tomopterna cryptotis),
L: Eastern Olive Toad (Amietophrynus garmani),
M: Mottled Shovel-nosed Frog (Hemisus marmoratus),

N: Bushveld Rain Frog (Breviceps adspersus),
O: Dwarf Puddle Frog (Phrynobatrchus mababiensis) and
P: Plain Grass Frog (Ptychadena anchietae).

2.4. Heritage

The cultural landscape qualities of the region consists of two components which are described below Rural area in which the human is made up of a pre-colonial (Stone Age and Iron Age) occupation and a much later colonial (farmer) components. The rural landscape has always been sparsely populated. The second component is an urban area consisting of smaller towns most which developed in the last 150 years or less. Linked to this landscape is an industrial landscape made up of a number mines and infrastructure elements such as roads and bridges.

2.4.1. Early History

Very habitation of the Highveld area took place during the Stone Age times. Tools dating to Early Stone Age period are mostly found in the vicinity of a watercourse (Steelpoort River) and sheltered areas (Lulu Mountains). During the Middle Stone Age, people became mobile occupying areas formerly avoided. The Middle Stone Age is a technological stage characterised by flakes and flake blades with facet platforms, produced from prepares cores. Late Stone Age people had more advanced technology and therefore succeeded in occupying diverse habitats. Some of these habitats are known to occur in the study region. These habitats are small rock shelters found in sandstone cliffs near rivers and are located towards the east and north of the study area.

2.4.2. Iron Age

Large number of stoned-walled archaeological sites which dates to Late Iron Age are known to exist in the larger study region. The sites are associated with Nguni-speaking people although a second viewpoint states that these sites were built by Sotho speaking people. The alternative interpretation by a specific individual is that these sites are of Hindu origin. These homesteads are easily recognised and their variation is easily identified. The homesteads have been classified as Simple ruins which consist of isolated circular enclosure and Complex ruins which consists of two or more contiguous circular and semi circular enclosure. A fourth category site has recently been identified which is an initiation site that falls within into a category of sites that considered having special meaning.

2.4.3. Historic Period

The various battles and skirmishes resulting from the conflict during the Anglo Boer War had a huge impact on heritage resources in the area, as many farms were burned down. This left a legacy of heritage sites scattered across the veld: fortifications and war cemeteries occur all over. Although most of the conflict centred on the railway line to Lorenco Marques (Maputo), incidents also took place in other areas. The area remained a farming oriented community and much of the heritage potential of the study area is located within farmsteads. Farmhouses and related structures (barns, sheds etc.) and cemeteries dot the landscape. Equally important are homesteads, related structures and cemeteries of the farm labourers living on these farms.

2.4.4. Heritage Sites Found Along the Route Alternatives

The alternative routes would pass in the vicinity of Late Iron Age stone walled sites and Historical features such as farm houses (Refer to Figure 14).

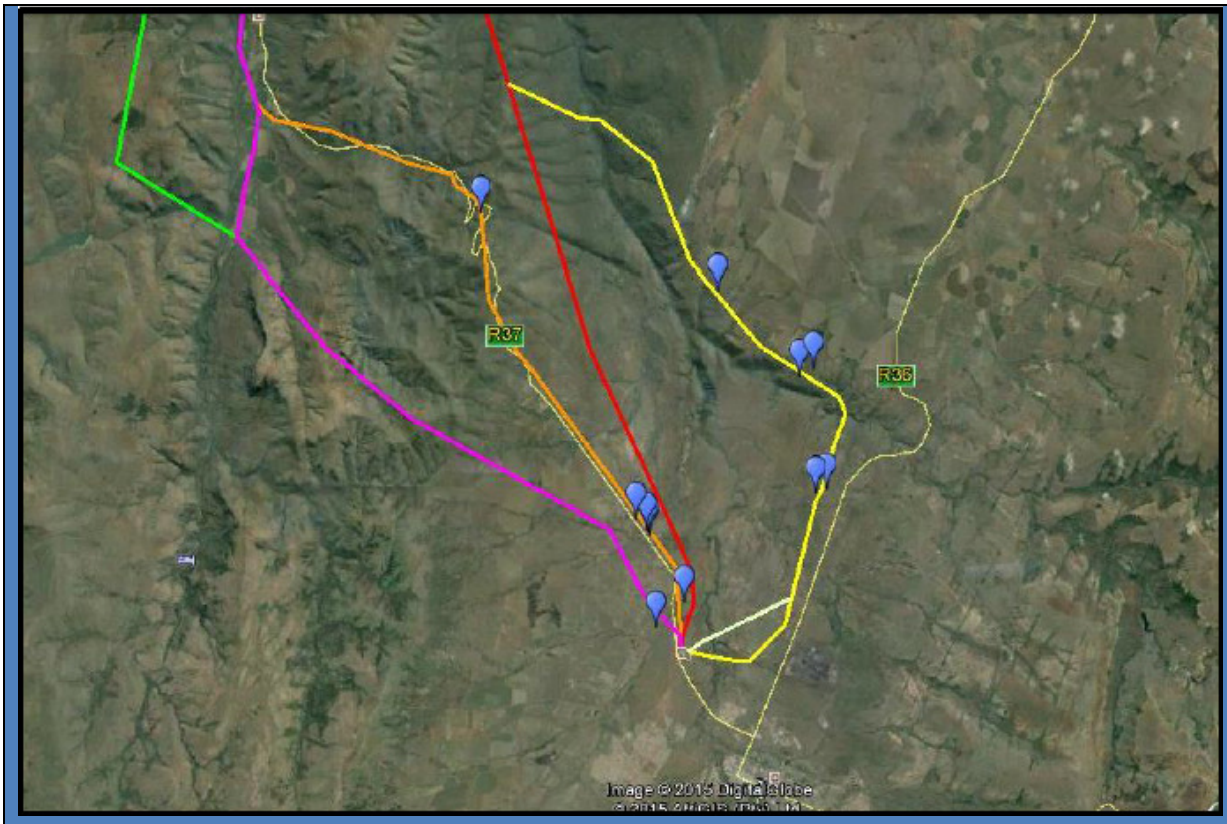


Figure 14: Heritage sites found along the routes

2.5. Palaeontology

2.5.1. Geological Outline of the Study Area

The geology of the Lydenburg – Merensky study region is outlined on the northern edge of 1: 250 000 sheet map 2530 Barberton / Nelspruit and the southern portion of sheet map 2430 Pilgrim's Rest (Refer to Figure 15) and comprises of the following:

- Transvaal Supergroup;
- Silverton Formation;
- Magaliesberg Formation;
- Bushveld Complex; and
- Late Caenozoic superficial sediments.

2.5.2. Geology Underlying the Various Route Options

A brief outline of the main rock units underlying each of the distribution line route options under consideration is described below:

- **Route Alternative 1**

The Lydenburg Substation as well as the southernmost sector of the Route Option 1 distribution line corridor are underlain by basinal mudrocks of the Silverton Formation that in this area are extensively intruded by dolerite dykes. Narrow outcrop areas of Machadodorp Member volcanics also crop out in the area north of Lydenburg. The long SSE-NNW trending eastern sector of Route 1 traverses the outcrop area of the Silverton Formation (Lydenburg Member) along the western side of the Spekboomrivier Valley. The northern, SE-NW sector through to Merensky Substation runs at low elevations and is almost entirely underlain by Late Caenozoic superficial sediments, with possible small stretches of Shelter Norite (Bushveld Complex basic igneous rocks) in Olifantspoortjie. The Merensky Substation is also underlain by superficial sediments.

- **Route Alternative 2**

The southern (SW-NE) and central (N-S) sectors of Route Option 2 traverse rocky mountain terrain built by quartzitic rocks of the Magaliesberg Formation, with the exception of a short stretch on superficial sediment towards the south. The SE-NW northern sector through Olifantspoortjie likewise overlies superficial sediments, with possible short stretches of Bushveld complex igneous rocks, as described earlier for Option 1.

- **Route Alternative 3**

The south-eastern sector of Route Option 3 crosses Silverton Formation mudrocks and several NNE-SSW dolerite intrusions in the lower-lying ground. The higher ground flanking the eastern side of the Watervalsrivier Valley is capped by resistant-weathering quartzites and related heterolithic rocks of the Magaliesberg Formation. Silverton mudrocks reappear on the lowermost western slopes of the ridge. The N-S sector of Route Option 2 is underlain by Late Caenozoic sediments (alluvium, soils etc) of the Watervalsrivier.

- **Route Alternative 4**

This route option, that essentially follows the R37 route through Watervalsrivier Pass, is almost entirely underlain by basinal mudrocks of the Silverton Formation with occasional Machadodorp volcanic horizons and dolerite intrusions. Small outcrop areas of superficial sediments are traversed towards the south.

- **Route Alternative 5**

To the east and northeast of Lydenburg this route option crosses the outcrop area of the Silverton Formation that here is extensively intruded by dolerite and mantled locally by superficial sediments. The SE-NW sector of the route is also largely underlain by Silverton basinal mudrocks with small outcrop areas of Machadodorp volcanics and intrusive dolerite. In geological / palaeontological terms there is no significant difference between the 5a and 5b route options.

2.5.3. Overview of Palaeontological Heritage within the Study Area

Fossil biotas recorded from each of the main rock units mapped along the Lydenburg – Merensky Distribution Power Line route options are briefly reviewed below and summarized in Table 1, where an indication of the palaeontological sensitivity of each rock unit is also given (Based on Almond, unpublished database). The quality of fossil preservation may be compromised in some areas due to near-surface weathering as well as baking by igneous intrusions. Note that the intrusive igneous rocks of the Rustenburg Layered Suite (Bushveld Complex) are completely unfossiliferous and therefore will not be considered further here.

- **Fossils in the Silverton Formation**

The carbon-rich mudrocks of the Silverton Formation are very likely to contain assemblages of organic-walled microfossils, while other microbial assemblages may be preserved within the chert horizons. However, the author is unaware of any formal studies on these microfossils. Domal stromatolites (microbial mounds) are recorded from shallow-water carbonates in the north-western sector of the Transvaal Basin (e.g. Bekker et al. 2008, p. 281) but not from the present study area in the eastern part of the basin. Walraven (1989a) does suggest, however, that thinly laminated carbonate facies within the Silverton Formation in the Barberton / Nelspruit sheet area may be or stromatolitic origin.

- **Fossils in the Magaliesberg Formation**

Abundant evidence for Early Proterozoic microbial mat structures, presumably generated in the photoc zone, has recently been reported within the shallow water arenites of the Magaliesberg Formation that crops out to the west of the study area (Parizot et al. 2005, Bosch & Eriksson 2008). Some of the sedimentary structures generated by the microbial mats have a complex structure that is very reminiscent of invertebrate burrows, and indeed they have occasionally been given fossil names elsewhere (e.g. Manchuriophycus / Rhysonetron) (See Eriksson et al. 2007, Seilacher 2007).

- **Fossils within the Late Caenozoic superficial sediments**

The diverse superficial deposits within the South African interior have been comparatively neglected in palaeontological terms. However,

sediments associated with ancient drainage systems, springs and pans in particular may occasionally contain important fossil biotas, notably the bones, teeth and horn cores of mammals as well as remains of reptiles like tortoises (e.g. Skead 1980, Klein 1984, Brink, J.S. 1987, Bousman et al. 1988, Bender & Brink 1992, Brink et al. 1995, MacRae 1999, Meadows & Watkeys 1999, Churchill et al. 2000, Partridge & Scott 2000, Brink & Rossouw 2000, Rossouw 2006). Other late Caenozoic fossil biotas that may occur within these superficial deposits include non-marine molluscs (bivalves, gastropods), ostrich egg shells, trace fossils (e.g. calcretised termitaria, coprolites, invertebrate burrows, rhizocretions), and plant material such as peats or palynomorphs (pollens) in organic-rich alluvial horizons (Scott 2000) and diatoms in pan sediments. In Quaternary deposits, fossil remains may be associated with human artefacts such as stone tools and are also of archaeological interest (e.g. Smith 1999 and refs. therein). Ancient solution hollows within extensive calcrete hardpans may have acted as animal traps in the past. As with coastal and interior limestones, they might occasionally contain mammalian bones and teeth (perhaps associated with hyaena dens) or invertebrate remains such as snail shells.

2.5.4. Comparison of Distribution Power Line Route Options in Terms of Palaeontological Sensitivity

- **Route Alternative 1** has the longest sector overlying the Silverton Formation outcrop area, along the western side of the Spekboomrivier Valley, where there is a (low) possibility of stromatolitic limestone horizons. There is likewise a slight possibility of Late Caenozoic mammalian remains or other fossils being encountered withn superficial sediments on the northern (SE-NW) sector through to Merensky Substation. The impact significance of this route option as far as palaeontological heritage resources are concerned is rated as LOW.
- **Route Alternative 2** has the longest sector overlying the Magaliesberg Formation outcrop area, on either side of the Watervalsrivier valley, where there is a possibility of microbial mat features being encountered in association with shallow water to littoral sandy sediments. There is a small possibility of stromatolitic carbonates in the southeast, near Lydenburg, and of Late Caenozoic mammalian remains or other fossils in the northernmost (SE-NW) sector through Olifantspoortjie. The impact significance of this route option as far as palaeontological heritage resources are concerned is also rated as LOW.
- **Route Alternative 3** has the longest sector overlying Late Caenozoic superficial sediments where there is a slight possibility of Late Caenozoic mammalian remains or other fossils being encountered. There is likewise a small possibility of stromatolitic carbonates in the southeast, near Lydenburg (Silverton Formation), and of microbial mat features within Magiesberg Formation quartzites on higher ground flanking the eastern side of the Watervalsrivier Valley. The impact significance of this route option as far as palaeontological heritage resources are concerned is also rated as LOW**.**
- **Route Alternative 4** largely overlies Silverton Formation bedrocks, where there is a small possibility of stromatolitic limestone horizons, but over a shorter distance that Alternative 1. The impact significance of this route option as far as palaeontological heritage resources are concerned is also rated as LOW.
- **Route Alternative 5** is also mainly underlain by Silverton Formation sedimented but their palaeontological sensitivity towards the south may have been compromised by extensive dolerite intrusion. There is a slight possibility of Late Caenozoic mammalian remains or other fossils being encountered within small patches of superficial sediment cover. The impact significance of this route option as far as palaeontological heritage resources are concerned is also rated as LOW. This assessment applies equally to the 5a and 5b route options.

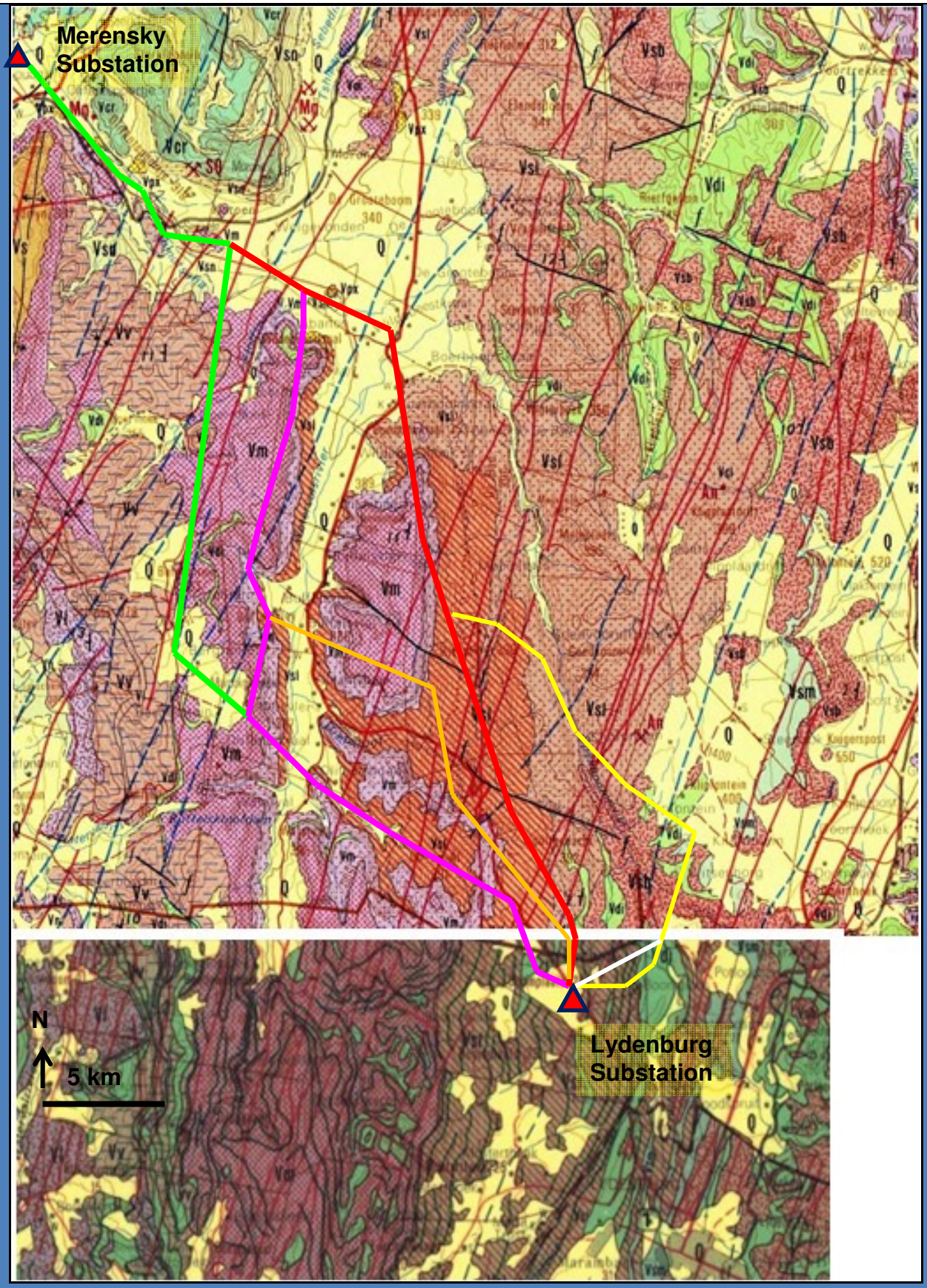


Figure 15: Geology of the study area

2.6. Surface Water

2.6.1. Surface Water Characteristics

2.6.1.1. Macro-drainage Characteristics

The linear nature of the project entails that the study area falls within a number of quaternary catchments. The Watervals River is the main drainage feature in the study area and its catchment covers most of the study area. This river is a tributary of the Spekboom River, which in turn is a tributary of the Steelpoort River. The Steelpoort River flows into the Olifants River west of the Abel Erasmus Pass. The entire study area thus falls within the Olifants North Primary Catchment. The eastern-most part of the Study Area (as traversed by Alternatives 1 & 5A) falls within the B24E quarternary catchment (the lower reaches of the Spekboom River). The southern-most part of the study area around the Lydenburg Substation falls within the B24C catchment (upper Spekboom and part of the Dorps River). Most of Alternative 3 and the southern part of Alternative 2 fall with the B24G catchment – that of the lower reaches of the Watervals River and the Rooiwalhoek se Loop Spruit. The northern-most parts of the study area fall with the B24H catchment (that of the lower reaches of the Spekboom River and one of its tributaries, the Eloff Spruit), as well as the B41J catchment closer to Steelpoort which is the one of the catchments in the lower reaches of the Steelpoort River. The study area drainage is indicated in the Figure 16 below.

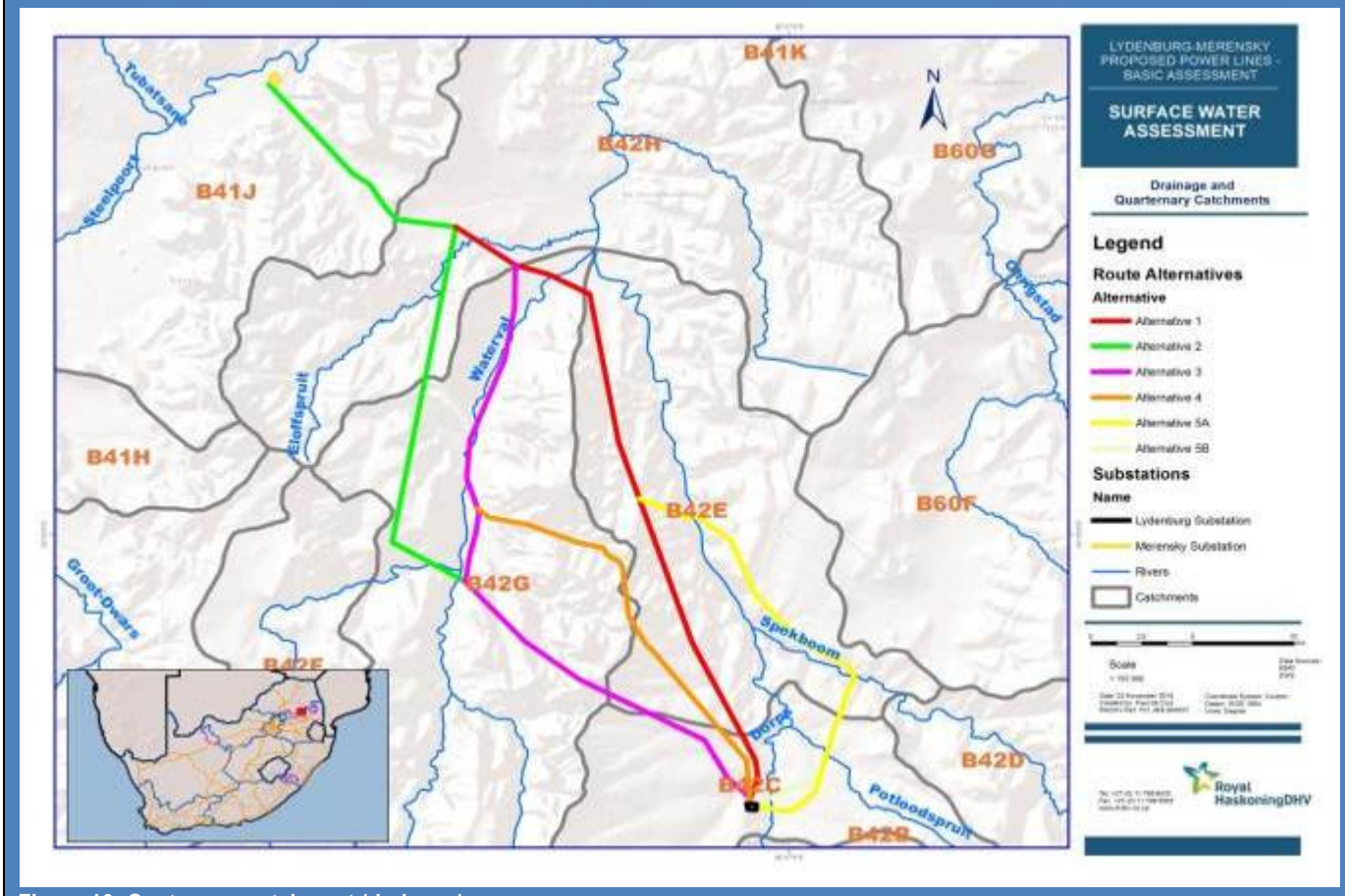


Figure 16: Quaternary catchment (drainage) map

- **Surface Water Typology**

Wetlands and other surface water features can be found all across a landscape. The landscape can be divided up into a number of units, each of which can contain wetlands. Wetlands occurring on these different terrain units typically differ in terms of their formative processes and hydrological inputs, and thus differ in terms of their functionality. In the context of the study area, it is important to note that surface water features do not only occur in valley bottoms where depositional processes typically lead to valley bottom wetland formation – the landscape setting in which wetlands are most often encountered. Wetlands are also encountered on sloping ground above the valley bottom on the surrounding footslopes and higher midslopes. These wetlands are rather characterised by colluvial processes and the input

of sub-surface water inputs.

The classification of wetland form has been based upon the most updated wetland classification system for South Africa – the Classification System for Wetlands and other Aquatic Ecosystems in South Africa (Ollis et al, 2013). The system uses a six-tiered approach for classifying inland aquatic systems, including wetlands. Levels 4 and 5 (hydrogeomorphic (HGM) unit and hydrological regime respectively) are the focal points of the classification system i.e. these describe the functional unit (Ollis et al, 2013). Table 13 below indicates the tiered classification for the different types of surface water features along the proposed alignment.

Table 13: Tiered classification for the different types of surface water features fund in the study area

	Seep Wetlands	Channelled Valley Bottom Wetlands	Rivers
Level 1 – System	Inland		
Level 2 – Regional Setting (NFEPA WetVeg Group)	Central Bushveld Group 1 (lower-lying areas) Mesic Highveld Grassland Group 6 & Group 7 (higher-lying areas)		
Level 3 – Landscape Unit	Slope	Valley Floor	
Level 4 – HGM Unit	Seep	Channelled valley bottom wetland	River
Level 4B – Seep outflow characteristic / River longitudinal zonation	***With*** channelled outflow		Mountain Stream Transitional Zone Upper Foothills stream
Level 5A – Period of inundation / Hydrological Regime	Seasonally Inundated Intermittently inundated		Perennial (main rivers) Seasonal (smaller drainage lines)
Level 5B – Period of Saturation	Permanently Saturated Seasonally Saturated		
Level 6 – Other descriptors	**Natural vs. Artificial** - Natural		
	Salinity - Fresh (non-saline)		
	Substratum Type – Generally sandy to loam soils (some bedrock)	**Substratum Type** –Generally sandy to loam soils (some bedrock)	**Substratum type –** Mainly bedrock dominated, with cobbles and pebbles / gravel and silt. Where soils present are generally silty loam and silty clay
	Geology – shales and quartzites of the Pretoria Group; – ultramafic intrusive rocks of the eastern Rustenburg layered suite of the Bushveld Igneous Complex		
	Vegetation Cover – -Vegetated – Herbaceous (Grasses, herbs / forbs dominant with geophytes present) -Un-vegetated (bedrock outcropping)	**Vegetation Cover** – Vegetated – Herbaceous (Grasses, rushes and reeds dominant with geophytes present) with some shrubs and trees -Un-vegetated (bedrock outcropping)	**Vegetation Cover** – -Vegetated – Mature riparian forest; trees and shrub-dominated riparian zone along smaller watercourses -Un-vegetated (bedrock outcropping)

- **Rivers and other Watercourses**

All of the larger streams and rivers in the area are perennial, with only the Eloff Spruit listed by the DWS 1:500 000 scale rivers dataset as being non-perennial. This was borne out by observations during the site visit, although the Eloff Spruit was noted to be flowing at the time of the site visit. The gradation of rainfall from relatively high levels of precipitation in the southern part of the study area to a much drier rainfall regime in the extreme north has an impact on the perennial nature of flow of the smaller drainage systems, with the seasonality or ephemeral nature of smaller drainage features being even more pronounced the further north one moves in the study area. Some of the smaller first order streams were noted to contain flow (even in the context of the timing of one of the site visits in mid-winter), fed by groundwater seepage at the head of these small systems.

Active fluvial processes are more defined in the larger streams and rivers in the study area. In geomorphological terms, most of the smaller streams and rivers were noted to have a simple channel structure, having a single channel which comprised of both the active channel and

the macro-channel bank. The active channel is typically the most dynamic part of the river system. The active channel beds of rivers and streams were thus characterised by alluvial material, primarily in the form of cobble beds (riffles), overlying bedrock, or by outcropping of bedrock along certain river reaches. The larger rivers were noted to have a more complex cross-sectional structure with the presence of flood terraces alongside the active channel and the presence of a rarely flooded / inundated macro channel bank. Within the larger Watervals River system, areas of deposition of finer alluvial material (silt) adjacent to the active channel bed were noted in many reaches of the river. Deposition of material is enhanced by the presence of riparian vegetation that stabilises the banks and which retards flow, as discussed below. As occurs naturally in all river systems, bank erosion was noted on outer beds. No evidence of extreme / accelerated anthropogenic erosion was noted in the study area's rivers. In spite of periodic flooding events, much of the vegetation within the riparian zones of the rivers and streams sampled appeared to be intact, thus indicating the critical importance of this vegetation in stabilising these systems and protecting them from further erosion (although subject to a high degree of invasion by alien invasive plant species). The vast majority of the surface water features that are crossed by the proposed power line routes are small episodic drainage lines. While a certain small number of these riverine systems are characterised by the presence of hydric soils, many of the rivers / drainage lines present within the study area cannot be considered 'true wetlands' in the sense that they do not contain hydric soils.

- **Valley Bottom Wetlands - Channelled**

There are two types of wetlands present within the study area, seep wetlands and channelled valley bottom wetlands. The latter are uncommon, due to the nature of terrain (mostly steeply sloping) and substrate (very rocky). In many valley bottom settings drainage is expressed as rivers and channels (with a bedrock substrate) as opposed to typical valley bottom wetlands. Only in certain parts of the study area the Boomplaats area to the north-west of the Lydenburg Substation were valley bottom wetlands encountered. The topography on this part of the study area is gently undulating with soils of reasonable depth thus being conducive to the formation of valley bottom wetlands. A few such valley bottom wetlands drain the higher ground to the west, forming tributaries of the Dorps River. In these channelled valley bottom wetlands, fluvial processes are the main hydrological drivers, with channelised baseflows sustaining a permanently inundated zone within the channel – i.e. an area of permanent hydrological activation. Spate flows that occur along the drainage system in the summer months are responsible for hydrologically activating the more elevated parts of the channel and surrounding terraces. Where valley bottom wetlands do occur their hydromorphology is slightly different to river or stream channels Valley bottom wetlands are characterised by deposition, where water is slowed down, flowing gently through the system. In spite of the differences, wetlands are similarly dynamic features of the natural environment, especially as they are associated with the movement of water which is a very important formative factor in a macro- or micro-landscape context. The valley bottom wetlands in this part of the study area are naturally channelled with a relatively narrow fringing area of hydric soils in between the active channel and the macro channel bank. However along upstream reaches of the same systems, the wetlands become wider due to the presence of groundwater seepage in a wider 'bowl-like' valley head, as indicated in the map in Figure 17 below.

Figure 17: Aerial view of the valley bottom wetlands on the Boomplaats property

- **Seeps**

Seepage of groundwater from the margins of the wetlands in small 'seepage compartments' on the surrounding slopes was noted to occur in certain sampled wetland areas along the alignment. These seepage compartments within the wider valley bottom system are similar in character to hillslope seepage wetlands which are characterised by groundwater input and colluvial, rather than depositional processes. It should be noted that hydric soils occur along certain of the larger rivers in the study area, in particular along the Watervals River. Along this river, regular flooding / inundation of the areas between the active channel and the macro channel bank is expected to result in conditions suitable for the development of hydromorphic soils within this part of the riparian zone.

In seep wetlands water inputs are primarily via subsurface flows from the upslope catchment of the wetland. In terms of the structural driver of water flow through the wetland and origin of the water in seepage wetlands the water emanates almost exclusively from groundwater inflows as opposed to valley bottom wetlands where the hydrological input emanates from the upstream surface water feature or from surface water inflows from the immediate catchment. Water movement through the seep is mainly in the form of interflow, with diffuse overland flow (known as sheetwash) often being significant during and after rainfall events (Ollis et al, 2013). The sloping terrain in the study area is conducive to the development of colluvial processes that are associated with seep wetlands. Movement of water down the slope, rather than the deposition of water within the wetland, is the predominant hydrological driver.

Under the level 4 descriptor, seep wetlands can be distinguished between those that have channelled outflows, and those which do not. The former sub-type is predominant in the study area, with certain seep wetlands feeding into a channelled outflow which typically becomes a watercourse or river. In the higher elevation parts of the study area, such as in the hilly terrain of the Thaba Tholo Wilderness, a number of a spring or groundwater discharge points occur. The groundwater discharge is fed into narrow seep wetlands that drain down the sloping ground into the surrounding valleys that are typically characterised by a very rocky substrate with limited wetland vegetation present. The nature of the substrate in mountainous areas in which these seeps are located typically prevents the formation of spatially extensive areas of hydric soils. The presence of moisture and the protection from fire offered by the rock outcropping has allowed the natural growth of shrubs and even trees along these narrow, linear seeps. Such seep wetlands in valleyhead terrain settings typically morph into valley bottom wetlands or more commonly watercourses where the terrain flattens out.

2.6.1.2. Riparian Characteristics of the Larger Rivers

A number of the larger rivers in study area were assessed in the field. Certain of the larger rivers were not assessed due to accessibility limitations, or as the river is located in a deep, incised valley, entailing that the riparian corridor would not be likely to be impacted by the development of a power line (in the case of the two crossings of the Spekboom River by Alternative 5A).

- **Eloff Spruit (Alternative 1)**

The Eloff Spruit was assessed where it would be crossed by Alternative 1 on the farm Wildebeestkraal. This location is relatively close to the point at which this river joins the Watervals River, and thus the Eloff Spruit has drained a relatively large catchment at this point. In spite of its terrain setting within a wider valley bottom, the macro-channel setting of this river was relatively incised within sloping terrain, with a high steep macro-channel bank (10m high). A relatively wide terrace occurred between the steep macro-channel bank and the active channel. A low depression within this terrace was noted before the drop down to the active channel. In terms of the VERGAI vegetative and hydromorphological classification of riparian zones, the riparian corridor for the river at this point thus consisted of a marginal zone restricted to the channel, a wide lower zone as comprised of the slightly more elevated terrace and depression, and the upper zone comprising the steep macro channel bank. The active channel was noted to be characterised by bedrock outcropping and the presence of large cobbles and boulders transported by fluvial processes down the system. The western bank of the active channel was noted to be (naturally) eroded, with the ground sloping steeply up to the west.

The riparian zone had been impacted through the clearing of much of the large woody vegetation within a servitude crossing the river as an existing power line crosses the river at this point. The vegetation composition and cover in the servitude did not reflect a natural or reference situation, but this altered state was useful in terms of understanding the impact of a power line on such a riparian zone. Vegetation within the power line servitude was thus compared with the vegetation outside of the servitude. The primary difference between the two areas was the cover of mature woody vegetation – within the un-impacted parts of the riparian zone with a complete coverage of mature woody vegetation in the form of large trees being noted in the un-impacted section. The entire width of the riparian zone outside of the cleared servitude displayed a complete coverage of woody vegetation as viewed from above, thus the reference state for this riparian area is tree-dominated, with a complete coverage, and recruitment structure being characterised by the dominance of mature trees. In terms of species diversity a few species were noted to be dominant, namely: Ziziphus mucronata, Pterocarpus rotundifolius, Ficus sycomorus, Senegalia (Acacia) erubescens, and Schotia brachypetala. Large specimens of Carissa bispinosa and Dichrostachys cinerea were noted below the canopy.

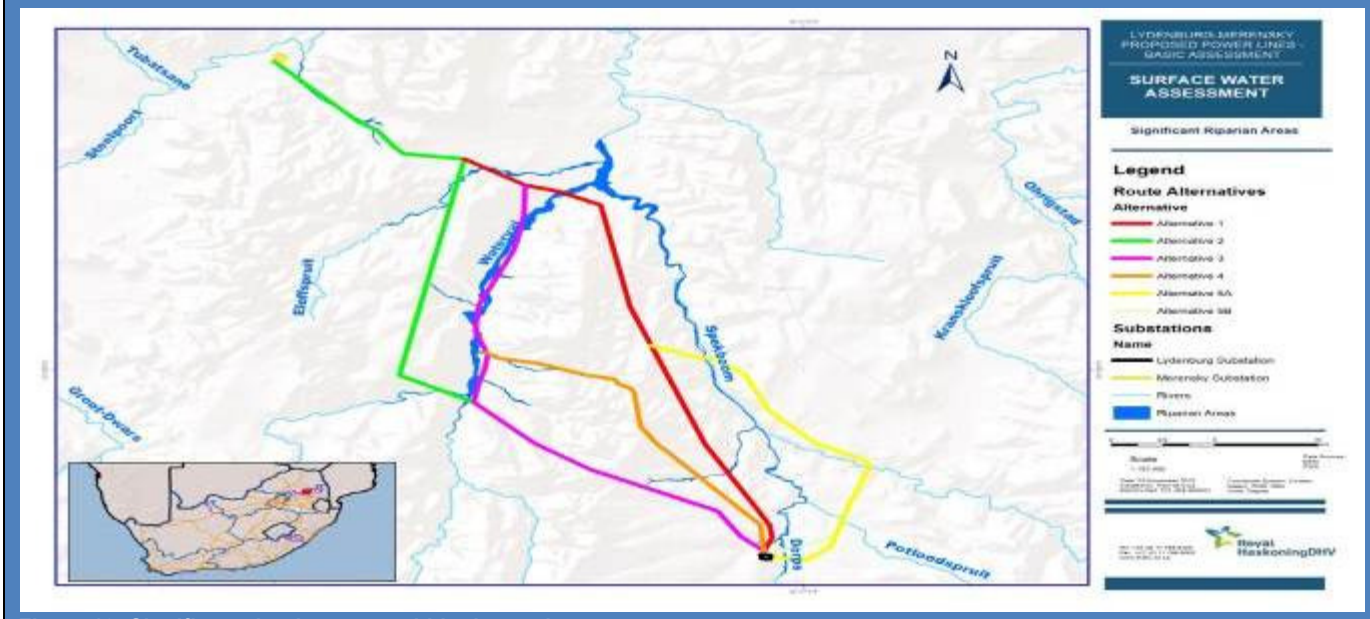


Figure 18: Significant riparian areas within the study area

- **Watervals River (Alternative 3)**

The Watervals is the largest river in the study area, draining a wide longitudinal valley, and draining a large catchment that originates on the eastern slopes of the Steenkampsberg hills to the south-west of Mashishing. As a mature river it displays a significant riparian zone, varying in width between 250m and 520m. Alternative 3 is aligned across the river in a number of places (traversing the riparian zone) and thus the riparian zone of the river was assessed in a number of locations along its length in the study area. Morphologically the riparian zone is characterised along its entire length by an active channel, about 10-20m in width. The channel substrate was noted to be mostly rocky with outcropping of bedrock and with the almost universal presence of cobbles and boulders that form a series of riffles along the length of the reaches of the river assessed.

Figure 19: The active channel of the Watervals River and flanking lower zone

- **Dorps River (Alternatives 5A and 5B)**

The Dorps River was assessed in two locations within a wider reach of the river to the east of the Lydenburg Substation where Alternatives 5A and 5B respectively would cross the river. The Dorps River drains a large catchment to the south that occupies the higher lying ground in the vicinity of Dullstroom to the south of Mashishing. After flowing through Mashishing the river runs through a shallow, partly confined valley before joining the Spekboom River on the Kudu Ranch Property to the north of the Lydenburg Waterfall. The reach of the Dorps River assessed in the vicinity of the two crossing points is characterised by a single active channel that comprises of a varied template of alternating riffles, rapids and pools, with frequent outcropping of bedrock along the reach. The marginal zone of the river is thus characterised predominantly as an 'open-dominated' (flowing channel) state with some bedrock. A typically narrow lower zone is present characterised by the presence of aquatic herbs such as Berula repanda as well as Phragmites mauritianus. The upper zone is not extensive in lateral extent (as compared to the Watervals River), typically being bounded by the top of the macro channel bank.

The upper zone of the reach of the river was noted to be extensively invaded by alien invasive vegetation, comprising mostly of large trees and some smaller shrubs. This factor that has been compounded by the felling (removal) of indigenous trees species has resulted in the upper zone of this reach being almost completely dominated by alien invasive species, the most common of which are mulberry (Morus

alba), Black Wattle (Acacia saligna), Grey Poplar (Populus x canescens), Eucalyptus spp. The only indigenous tree species present in the riparian zone was noted to be Combretum erythrophyllum, with only a handful of small to medium sized specimens being present, with many having been felled or partially felled. An intensive livestock presence in the area has led to the grasses, forbs and other herbs in the understorey of the upper zone being highly grazed, thus limiting the degree of cover and possibly the species composition in this part of the riparian zone.

The existing power line servitudes that run across the river (alongside which Alternative 5B) are also responsible for the impacting / alteration of vegetation composition and structure in the upper zone of the riparian corridor of the reach. Four power lines run in parallel across the river, and all woody vegetation has been removed from the riparian corridor. The knock-on impact of this alteration is visible within the reach, as the eastern bank of the river within the servitudes has been extensively invaded by grey poplars. The clearing of all woody vegetation under power line servitudes provides high suitable conditions for the invasion of the servitude by invasive alien vegetation, free of competition from existing woody species.

A wastewater discharge into the Dorps River upstream of the reach, emanating from the Lydenburg Water Treatment Works was noted. The treated wastewater from the plant is discharged into an artificial wetland before draining directly into the channel of the river. The quality of this discharge is not known, but if not treated to acceptable (DWS) standards would be lowering water quality.

Figure 20: Part of the reach of the Dorps River close to the alternative 5b crossing point

Figure 21: The part of the reach of the Dorps River that has been cleared of all woody vegetation

- **Potlood Spruit (Alternative 5A)**

The Potlood Spruit was assessed at the crossing point of the Alternative 5A to the west of the R36 road. This river drains a relatively small catchment to the east of Mashishing. The river drains a shallow, unconfined valley with a relatively natural catchment in the vicinity of the proposed crossing. The riparian corridor of the stream was noted to be relatively narrow. A narrow active channel was present, with the channel running over bedrock outcropping to form a series of shallow pools. The marginal zone of the riparian corridor was thus characterised as being a mix of open-dominated and rock-dominated state, with limited vegetation occurrence. The lower zone consisted primarily of wetland grasses, sedges and other aquatic herbs such as Berula erecta. On the northern side of the channel the ground was noted to slope a little more steeply up away from the channel than the southern side, with the presence of woody shrubs and a dense grassy understorey. On the southern side of the crossing point a gently sloping terrace was present on the southern side of the crossing beyond the thickets, consisting of hydrophytic grasses. The wider reach is characterised by such terraces located away from the channel in which wetland habitat (grasses and herbs) were present. These are important from an ecological perspective, not only due to habitat diversity, but as colonies of the declining aquatic herb Gunnera perpensa were encountered in one of these areas downstream of the crossing point. One specimen of this species was noted at the crossing point. One specimen of another declining species – Crinum macowanii was encountered at the crossing point.

It is important to note that a very low occurrence of alien species was noted at the crossing point, and along the wider reach. This factor, twinned with a very low livestock grazing and landuse-related footprint has resulted in the assessment of riparian vegetation state concluding that this reach of the Potlood Spruit is in a state that is close to reference conditions, being largely undisturbed. The natural state of the riparian corridor and the presence of a number of threatened species is likely to provide the reach with a high ecological importance and sensitivity value.

Figure 22: The Potlood Spruit at the alternative 5a crossing point

2.7. Visual

2.7.1. Visual Character of the Study Area

The visual character is influenced by the presence of built infrastructure such as buildings, roads and other objects such as electricity infrastructure. Visual character can be defined based on the level of change or transformation from a completely natural setting which would represent a natural baseline in which there is little evidence of human transformation of the landscape. Varying degrees of human transformation of a landscape would engender differing visual characteristics to that landscape, with a highly modified urban or industrial landscape being at the opposite end of the scale to a largely natural undisturbed landscape. The wider study area is largely rural in nature, and the mountainous terrain of the study area has limited for the transformative capacity of rural (agricultural) landuses, thus large parts of the study area have retained a natural visual character. Only in spatially limited areas do agricultural or other landuse engender a different visual character – i.e. in the Watervals River valley and in the Klipfontein / Krugerspos area where intensive irrigation and orchards have partially altered the visual character of the valley, the northern-most extent of the line where mining and urban infrastructure around Steelpoort is prominent, and in the area to the south of the Lydenburg Substation where the presence of smallholdings and electricity infrastructure has altered the visual baseline. The study area thus displays a largely natural character with small areas that display a stronger rural aspect to the visual character.

2.7.2. Visual Absorption Capacity (VAC)

Visual absorption capacity (VAC) is an important factor relating to the visual character of the area and relating to the potential visual impact resulting from a new development. The visual absorption capacity of an area / landscape refers to ability of that area / landscape to absorb development without noticeable intrusion or change to the visual character of the area. Visual absorption capacity can be measured on a scale from high (an area which has a high capacity to absorb new development) to low (an area in which a new development would be highly visible and would alter the visual character of the area). Visual absorption capacity is a function of a number of factors including topography (including slope and aspect) and the nature of landuse and land cover (such as vegetation cover and height), and most importantly the degree of human-induced transformation of the area). Urbanised or industrial areas typically have a high visual absorption

capacity in the context of the type of development that is proposed, especially where industrial-type structures already occur. Conversely highly natural or rural areas with a low human footprint would have a very low VAC for the development of a large structural component.

As described above, the wider study area is mostly highly natural in character, with limited existing anthropogenic influence in the landscape. There are relatively few power lines and other large structures – an existing Distribution Power Line runs between the Lydenburg and Merensky Substations (along which Alternative 1 is aligned) but it should be noted that large section of this power line traverse mountainous areas away from general public access. Another set of Distribution Power Lines occur in the area to the north-east of Mashishing (along which part of Alternative 5A is aligned). Along with some smaller reticulation power lines that occur in the Watervals River valley and along the R536 to the north-east of Mashishing, a few communication / cell phone towers on the ridge to the west of the Watervals River Valley and some mining infrastructure in the immediate vicinity of the Merensky Substation at Steelpoort, there is generally an absence of large-scale and prominent human infrastructure in the areas traversed by the power line alternatives. This factor and the largely natural character of most of the study area imbue the study area with a low visual absorption capacity. It should be noted that where existing infrastructure does exist, the VAC would be slightly higher, e.g. along the existing 132kV power lines mentioned above. The overall low VAC of the study area is an indication that the development of a large, visually-prominent structure such as a power line could be associated with a high degree of visual intrusion in terms of the landscape context.

Although visual absorption capacity has a strong bearing on the visual sensitivity of an area as discussed above, the presence of sensitive receptors of visual impact and the potential perception of a new power line development as a visual intrusion is not necessarily dependent on a landscape / area having a low VAC.

2.7.3. Visual Sensitivity

Visual Sensitivity is an important factor in gauging whether a new development would be perceived to be an impact or not. Visual sensitivity can be defined as the degree to which anthropogenic change within a landscape would be perceived negatively by the people that inhabit or frequent that area. The degree of visual sensitivity of an area is closely related to the aesthetic quality of the area, as well as to the value placed in the aesthetic quality of the landscape.

It is important to note that the presence of natural / perceived natural and rural elements or areas within the landscape as viewed from the surrounds of the site can engender perceptions of aesthetic quality or value to the landscape. Many studies of landscape conservation have highlighted the value placed by people in rural or natural landscapes. In this context it is worthwhile to briefly explore how landscape, and particularly natural and rural landscapes, are valued in order to contextualise and understand responses to the proposed development that stress the potential impact of the proposed development on the surrounding landscape and views of it. A rural landscape can be defined as an where an interaction between humans and nature over time has led to the development of a landscape that has its own characteristics, and which is a middle ground between an urban landscape and wilderness, consisting of human activities that are related to the natural environment, such as agriculture and pastoral activities (Mazehan et al, 2013). A natural landscape, as defined in this report is close in appearance to how the landscape would appear without human alteration – i.e. mimicking or closely resembling that of a wilderness.

Placing value in a landscape is a psychological and cultural practice; values and meanings are not intrinsic to the landscape, but rather they are phenomena created by humans through their cultural practices (Pun, 2004). It is thus important to note that perceptions of landscape may not be universally shared and different individuals or groups of people may perceive or treat the same landscape differently, in turn ascribing different values and meanings to it (Pun, 2004). Values and meanings ascribed by local people may not be evident to an outsider. Indeed, differing values may be in competition among themselves (Pun, 2004).

There are different types of values that can be placed on a landscape; i.e. economic values (e.g. the relevancy of the landscape for business enterprises, or the market possibility of products from landscape), amenity values (values related to the non-material benefits associated with it) and security values (Pun, 2004). Amenity values can be subdivided into different sub-categories; “intrinsic” ecological value, scientific and educational value, aesthetical and recreational value, and orientational and identity value. Landscapes and the viewing

of landscapes has also been shown to have positive psychological and health benefits; Velarde et al (2007), have shown through an examination of various environmental psychology studies that visual exposure to natural landscapes (e.g. by means of viewing natural landscapes during a walk, or viewing from a window) generally has a beneficial impact on human health (e.g. reduced stress, facilitating recovery from illness, and behavioural changes that improve mood and general well-being). Landscape as a source of beauty is prevalent within the arts and is strong draw card for recreational activities. In addition, landscape is an element in the ability of people to orient themselves, and is strongly related to people's cultural identity and sense of place. It is in this context that value is placed in natural or rural landscapes, and it follows that such value would be placed on views in an area such as the study area which is largely natural, and which has high aesthetic value by virtue of its scenic nature.

Figure 23: Highly natural, scenic landscape in the Thaba Tholo wilderness reserve

In the context of the present study, the responses of certain Interested and Affected Parties to the initial public participation process being undertaken for the BA studies indicate that there are individuals across the study area who place value in the natural landscape elements that are present within the study area. These values are predominantly amenity values, but have an economic element in that commercial ecotourism activities are practiced in certain parts of the study area. The amenity values appear to be based to a significant degree on the aesthetic quality of the landscape; the study area is particularly mountainous and scenic quality or visual quality of a landscape typically increases with greater relief, as well as with increasing complexity of visual elements; as stated by Porteous, (1996), the greater the topographical variation, the greater the scenic quality (see also the references quoted in Wu et al, 2006). The natural characteristics of the landscapes in the wider study area and the aesthetic quality has allowed the relatively recent development of ecotourism as an important landuse in the area, and the development of low density 'eco-estates' in certain localities within the area. Although the study area is not located within the traditional and longer-established ecotourism nodes nearby such as the Mpumalanga Lowveld and escarpment (Panorama route) or the Mpumalanga Highlands (Dullstroom area), the study area is increasingly being marketed as an area for ecotourism, with landuse on a number of properties changing to reflect such activities.

It is in this context of the existence of amenity and economic values associated with landscapes within the study area that the visual sensitivity of the study area can be defined. The feedback expressed by a number of property owners indicates that value is placed in the natural elements of the landscape, indicating a sensitivity to change within the landscape that may be caused by a development such as a

power line (as proposed).

A similar aspect of visual sensitivity of parts of the study area that is based on such amenity values is related to the concept of 'wilderness'. This concept has been stressed by certain Interested and Affected Parties, particularly by the owners and management of the Lapolosa Wilderness Reserve. Although many differing definitions of 'wilderness' exist, wilderness can essentially be defined as place with a very limited, or an absence of human influence or footprint, where natural processes are predominant. Values associated with wilderness are a human construct and can be either negative or positive, but in a positive realm wilderness values are associated with the ability of the wilderness to improve physical and mental well-being, the protection of a natural environment, and spiritual aspects. Such wilderness areas are valued for the opportunity for people to escape from densely populated, built-up and transformed urban environments in which many people live. The concept of wilderness is closely linked to the establishment of protected areas, with the Wilderness Movement having assisted in the creation of the first formally protected areas in the world in the late Nineteenth Century (Kalamandeen and Gillson, 2007), a concept which is still present today, and which has been a factor in the establishment of certain of the (informal) protected areas in the study area. The concept of wilderness, and the protection and enjoyment of it has a strong visual element to it, in that the landscape of the wilderness is one without visible human influence and into which anthropogenic landscape change cannot be tolerated if the essence of the wilderness is to be preserved. The presence of certain parts of the study area from which little human infrastructure is present or can be viewed has led to these parts of the area being classified as wilderness areas by their owners and the cultivation of wilderness values by these parties, as well as the management of such properties to preserve their wilderness characteristics. The definition of such areas as wilderness by their owners is the core of the visual sensitivity of these parts of the study area.

This degree of visual sensitivity may not be universally shared by all inhabitants; nonetheless this aspect of the visual sensitivity of the area needs to be taken into account in this visual impact assessment study.

2.7.4. Location of Visual Receptors and Key Observation Locations

Visual Impact is related to the presence of human receptors / viewers, thus visual impact is typically experienced from locations inhabited by humans. Accordingly an understanding of the areas inhabited / occupied by humans (even transiently) is important in the classification of potential visual impacts. Sites of human habitation (e.g. residential areas, farmsteads and homesteads) typically make up the bulk of the receptor locations within an area. However lodges and other accommodation facilities, as well as recreational sites are other static locations that are typically considered receptor locations. However not only 'static' locations can be termed as receptor areas; areas or routes of human movement such as roads can also be considered to be receptor locations, as well as wider areas in which certain activities that would be considered visually sensitive are practiced. This could include areas where tourism activities such as hiking trails or 4X4 routes, or hunting are practiced.

Due to the size of the area traversed by the five power line alternatives there are a number of receptor locations. From these receptor locations a number of sensitive receptor locations can be identified. These locations are those where viewers are most likely to perceive a visual impact due to the nature of landuse practiced or activities practiced at that location. The receptor types included as key observations include (inter alia) game lodges and other ecotourism facilities, homesteads within eco-estates, farmsteads as well as viewpoints or scenic picnic sites. It should be noted that only receptor locations within 5km of each of the alternatives have been included as sensitive receptor locations. The table below lists the sensitive receptor locations within the study area and other receptors are provided by the below figures (24, 25, 26, 27, and 28).

Table 14: Sensitive receptor locations in the study area

Receptor Name	Type	Closest Line Alternative
Olifantspoortjie Lodge	Accommodation Facility	Alternative 2
Lapeng Lodge	Accommodation Facility	Alternative 1
Buffelvley Guest Farm	Accommodation Facility	Alternative 3

Buffelsvlei Farm - River Cottage	Private Accommodation Facility	Alternative 3
Ithaba Falls Guest Farm	Accommodation Facility	Alternative 3
Valencia Lodge	Accommodation Facility	Alternative 3
Sharalumbi Estate - Phase One Housing Units	Private Homestead	Alternative 3
Sharalumbi Estate - Phase Two Housing Unit	Private Homestead	Alternative 3
Sharalumbi Farmstead	Private Homestead	Alternative 3
Thaba Tholo Stakeholders Lodge	Private Homestead	Alternative 3
Thaba Tholo Game Drive Lookout Point (Dam)	Lookout Point / Sundowner Location	Alternative 3
Thaba Tholo - Blesbok Ridge Viewpoint (North)	Lookout Point / Sundowner Location	Alternative 3
Thaba Tholo - Blesbok Ridge Viewpoint (South)	Lookout Point / Sundowner Location	Alternative 3
Thaba Tholo Game Drive Eastern Lookout Point	Lookout Point / Sundowner Location	Alternative 3
Black Leopard Camp	Accommodation Facility	Alternative 3
Lapolosa – Volunteer Accommodation Units	Accommodation Facility	Alternative 2
Lapolosa – Volunteer Eating House	Accommodation Facility	Alternative 2
Lapolosa Ranger's Household	Private Homestead	Alternative 2
Kudu Ranch Residential Homesteads	Private Homestead	Alternative 1 / Alternative 5A
Spekboom River Lodge	Accommodation Facility	Alternative 1
Kudu Ranch Lydenburg Waterfall Lookout	Lookout Point	Alternative 1
George's View	Lookout Point and Picnic Site	Alternative 1 (Alternative 4)
Oppiberg Restaurant	Restaurant and Accommodation Facility	Alternative 4
Impangele Inn	Restaurant and Accommodation Facility	Alternative 5A
Potloodspruit Smallholdings	Private Homestead	Alternative 5A
Klipfontein Farmsteads	Private Farmsteads	Alternative 5A

It should be noted that not all receptor locations are static – i.e. fixed locations such as a household or other structures. Visual impacts can be experienced from other areas in which certain types of activities take place. As many of the properties in the study area have been set aside for conservation or the practicing of ecotourism activities, the parts of properties in which such activities take place can also be considered to be visually sensitive. This includes game drive routes, cycle trails, hiking routes and 4X4 routes. Due to the amenity values placed in the landscape in this area and the emphasis on aesthetic value, these areas can be considered to be transient receptor locations.

Figure 24: Lattice tower of the existing 132kv line in the Kudu Ranch Reserve

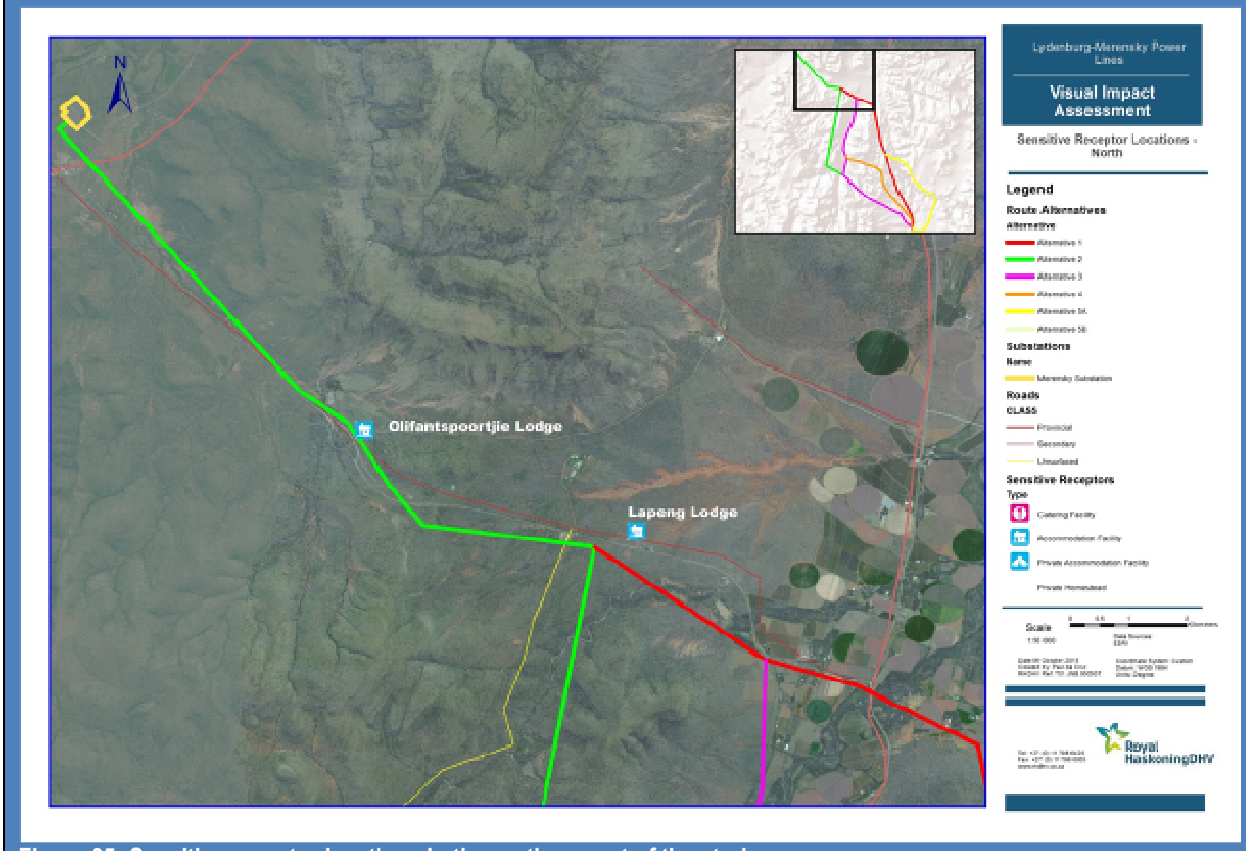


Figure 25: Sensitive receptor locations in the northern part of the study area

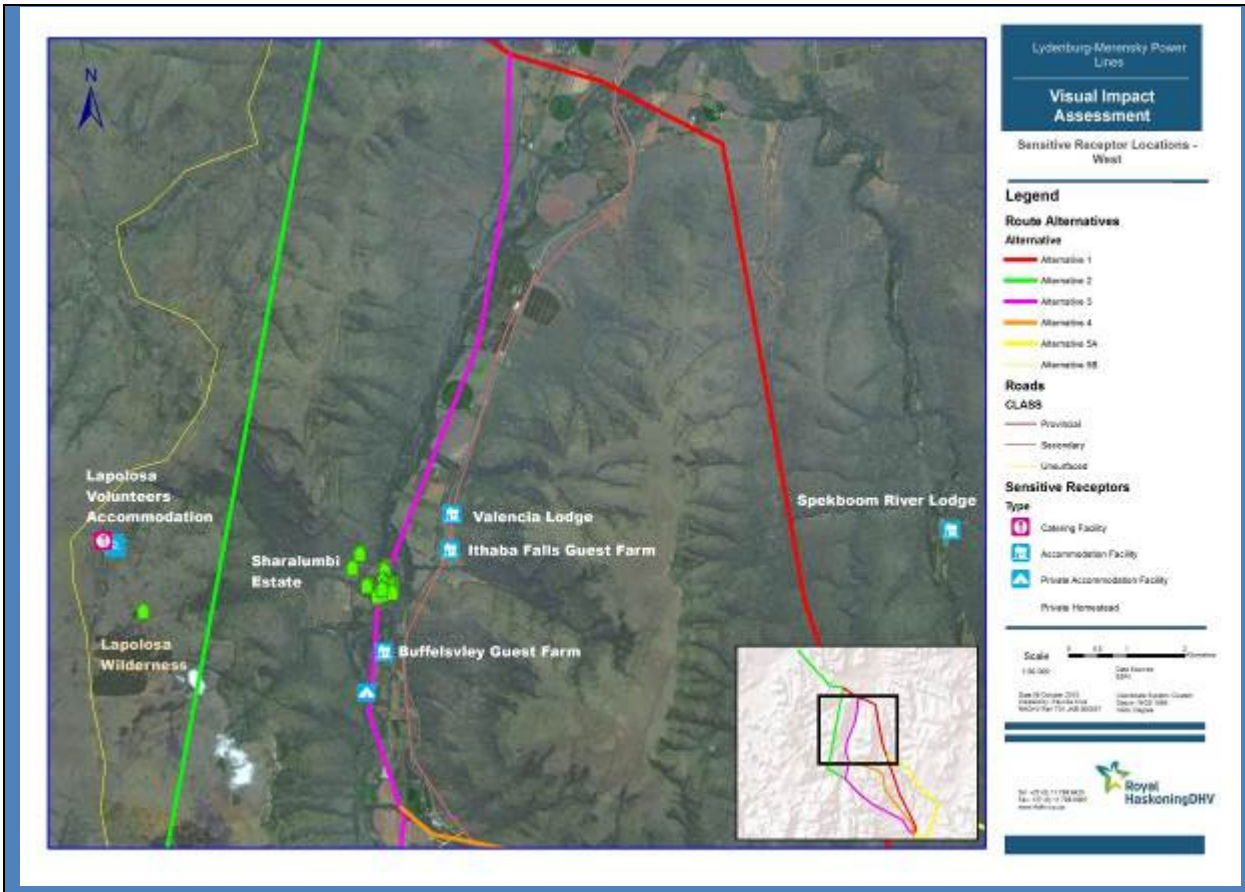


Figure 26: Sensitive receptor locations in the western part of the study area

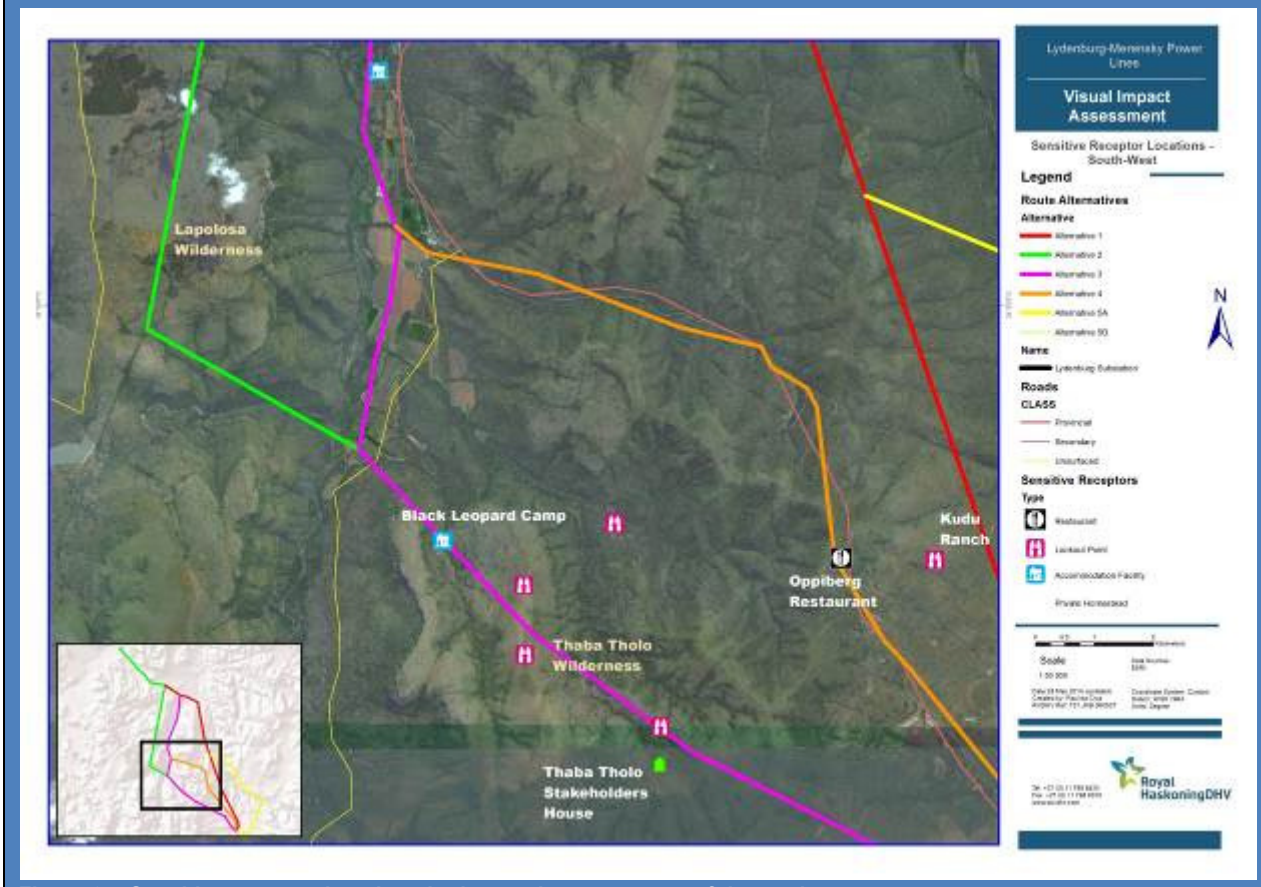


Figure 27: Sensitive receptor locations in the south western part of the study area

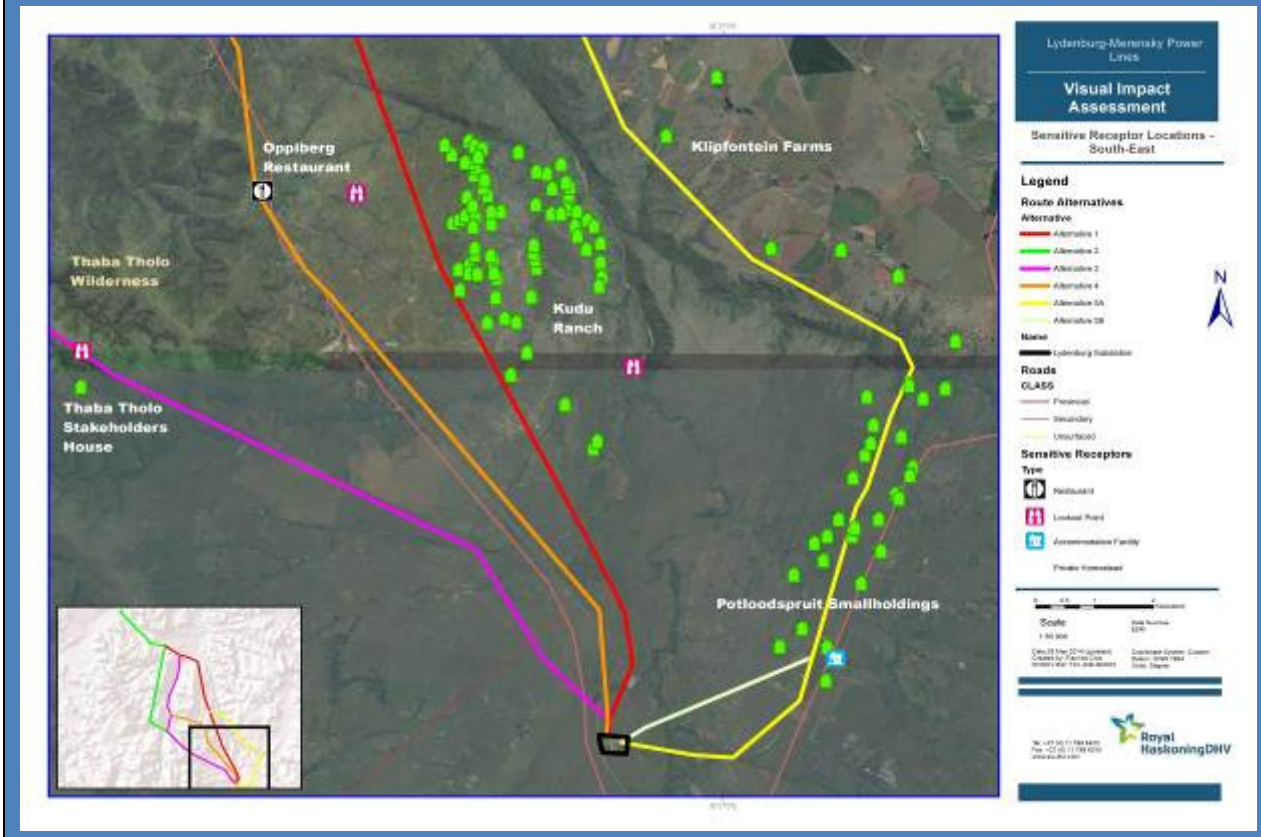


Figure 28: Sensitive receptor locations in the south-eastern part of the study area.

b) Provide a detailed description of the listed activities associated with the project as applied for

Listed activity as described in GN R 983, 984 and 985.	Description of project activity that triggers listed activity.
No R 983 Item 11: The development of facilities or infrastructure for the transmission and distribution of electricity (i) Outside an urban area or industrial complexes with a capacity of more than 33 but less than 275 kilovolts	Eskom proposes to construct a 132kV power line outside an urban (between Lydenburg and Steelpoort) area.

2. FEASIBLE AND REASONABLE ALTERNATIVES

"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Appendix 1 (3)(h), Regulation 2014. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the, competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives include different locations and lay-outs, the co-ordinates of the different alternatives must be provided. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

a) Site alternatives

In the case of linear activities:

Alternative:	**Latitude (S):**	**Longitude (E):**
Alternative S1		
• Starting point of the activity	24°43'13.91"	30°13'14.81"
• Middle/Additional point of the activity	24°51'26.25"	30°22'5.12"
• End point of the activity	25°03'36.09"	30°25'56.71"
Alternative S2		
• Starting point of the activity	24°43'13.91"	30°13'14.81"
• Middle/Additional point of the activity	24°54'17.00"	30°16'51.33"
• End point of the activity	25°03'36.09"	30°25'56.71"
Alternative S3		
• Starting point of the activity	24°43'13.91"	30°13'14.81"
• Middle/Additional point of the activity	24°53'18.57"	30°18'34.11"
• End point of the activity	25°03'36.09"	30°25'56.71"
Alternative S4		
• Starting point of the activity	24°43'13.91"	30°13'14.81"
• Middle/Additional point of the activity	24°51'56.04"	30°25'10.25"
• End point of the activity	25°03'36.09"	30°25'56.71"
Alternative S5 (a)		
• Starting point of the activity	24°43'13.91"	30°13'14.81"
• Middle/Additional point of the activity	24°50'02.25"	30°19'59.38"
• End point of the activity	25°03'36.09"	30°25'56.71"
Alternative S5 (b)		
• Starting point of the activity	24°43'13.91"	30°13'14.81"
• Middle/Additional point of the activity	25°03'14.42"	30°26'58.53"
• End point of the activity	25°03'36.09"	30°25'56.71"

DESCRIPTION OF THE DISTRIBUTION POWER LINE ALTERNATIVE ROUTES

Line Option 1 (Marked in Red on Figure 29):

This is the most northerly of the line options from the Lydenburg substation and heads in a north-easterly direction and follows an existing power line. The proposed new line bisects the Marambana River at approximately 1 km from the substation. The proposed line bisects the Jood Se Loop watercourse at 3.1 km. The proposed line bisects non-perennial drainage lines as well as running within a river valley of a tributary of the Spekboom River consisting of Lydenburg Thornveld and Ohrigstad Mountain Bushveld. No formal access roads bisect the mountainous areas as well as the river valley. Informal (4x4) tracks occur within the hill slopes and summit of the mountains. The alignment follows the single alternative towards the Merensky substation to the west.

Line Option 2 (Marked in Green on Figure 29)

From the Lydenburg substation this alternative is proposed for the alternatives 2 and 3 and runs to the north of the substation for 300m and then deviates towards the north-west for 3.99 km. It bisects the Manamfana River and tributary as well as Jood se Loop. The alignment then runs in a north-westerly direction for approximately 3.35 km. Several existing informal tracks occur within the slopes and summits of the mountains. The alignment only bisects small non-perennial drainage lines. The alternative alignment 1 heads towards the west of alignment 3.

Line Option 3 (Marked in Pink on Figure 29)

This option follows alternative 2 from the Lydenburg substation for approximately 18 km and then heads in a northerly direction along the Waterval River. Large areas adjacent to the proposed alignment have been historically transformed into centre-pivot irrigated lands and citrus orchards. The alignment bisects several seasonal tributaries of the Waterval River. The remnant riparian zones are however extremely narrow (<150m) and can easily be spanned by towers. Large areas of the riparian zones have already been cleared or are heavily invaded with alien invasive vegetation.

Line Option 4 (Marked in Orange on Figure 29)

Alternative 4: Starts at Lydenburg substation heads east for approximately 3km and it turns towards the northerly direction along the R36 Road for approximately 5km. The Distribution Power Line then heads towards the north westerly direction passing small streams, Blydel River, R37 and R555 Roads until it connects to the Merensky substation.

Line Option 5(a) (Marked in Yellow on **Figure 29)**

Alternative 5(a): Starts at Lydenburg substation and runs along the R36 Roads moving towards the north westerly direction. It crosses the R555 Roads until it connects to the Merensky substation.

Line Option 5(b) (Marked in Olive Green on Figure 29)

Alternative 5(b): Starts at Lydenburg substation and follows the same direction as option 5(b) until it connects to the Merensky substation.

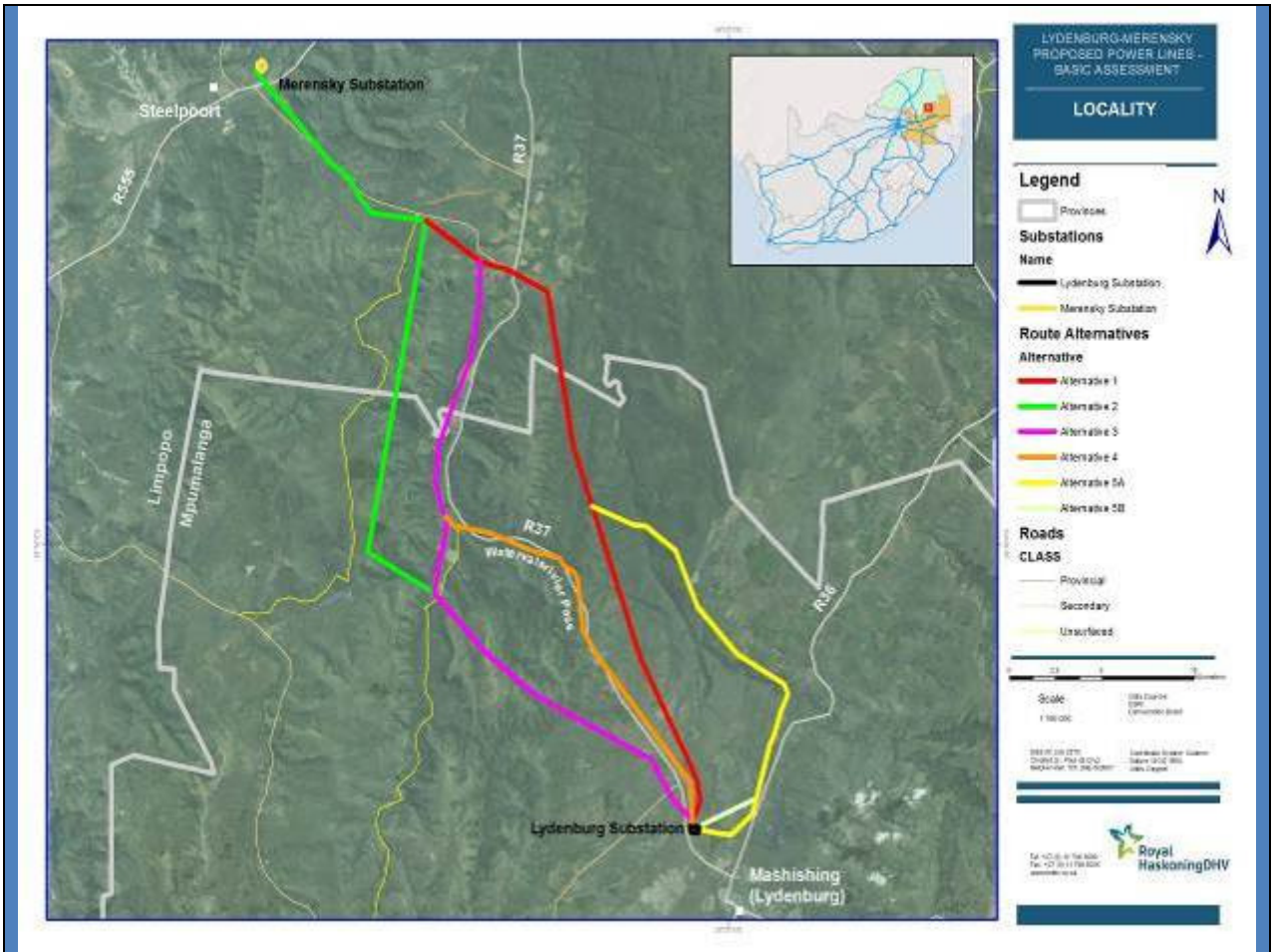


Figure 29: Project Alternatives.

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A of this form.

e) No-go alternative

The ***no go*** *option* would be, not to construct the additional Power line. If the proposed project does not proceed as planned then the status quo will remain the same. At present **low voltages are experienced during peak hours** and various complaints have been received from customers. In addition, **new customers cannot be connected** to the existing networks. Power cuts would be prevalent and therefore the No Go option is not preferred.

Paragraphs 3 – 13 below should be completed for each alternative.

3. PHYSICAL SIZE OF THE ACTIVITY

a) Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:	Length of the activity:
Alternative A1	46 507 m
Alternative A2	49 526 m
Alternative A3	49 264 m
Alternative A4	47 980 m
Alternative A5(a)	45 960 m
Alternative A5(b)	3300 m

b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:	Size of the site/servitude:
Alternative A1	1 488 224.00 m^2
Alternative A2	1 584 832.00 m^2
Alternative A3	1 576 448.00 m^2
Alternative A4	1 500 200 00m^2
Alternative A5(a)	1 469 989 00m^2
Alternative A5(b)	13200m^2

4. SITE ACCESS

Does ready access to the site exist?	YES
If NO, what is the distance over which a new access road will be built	

Describe the type of access road planned:

The site can be accessed using R37, R36 and R555. However should additional access be required the access roads will be less than 8 meters wide, linking to the existing roads and will be gravel roads.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

5. LOCALITY MAP

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;

- closest town(s;)
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection).

See attached Appendix A

6. LAYOUT/ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

See attached Appendix A

7. SENSITIVITY MAP

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- the 1:100 year flood line (where available or where it is required by DWS);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A.

See Attached Appendix A

8. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report**.** It must be supplemented with additional photographs of relevant features on the site, if applicable.

See attached Appendix B

9. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of at least 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

See attached Appendix C

10. ACTIVITY MOTIVATION

Motivate and explain the need and desirability of the activity (including demand for the activity):

1 Is the activity permitted in terms of the property's existing land use rights?	YES		Please explain
The proposed Distribution Power Line will connect to the existing Merensky and Lydenburg Substations.			
2 Will the activity be in line with the following?			
a) Provincial Spatial Development Framework (PSDF)	YES		Please explain
Based on the PSDF for Tubaste Local Municipality and Thaba Chweu Local Municipality, service delivery is a high priority. Lydenburg in particular has been identified as a key priority. In addition, one of the services that need to be provided by the municipality to the local communities is electricity.			
b) Urban edge / Edge of Built environment for the area		NO	
c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).		NO	Please explain
Based on the Integrate Development Plan electricity upgrades for Lydenburg and Merensky have been identified as areas in need of development improvements. Thus, more power is required to sustain the current and new developments.			
d) Approved Structure Plan of the Municipality	YES		
e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in	YES	NO	Please explain

	terms of sustainability considerations?)		
Based on the EMF for the area, the proposed activity will not compromise or negatively impact on the environmental management priorities for the area. Any negative impacts can be mitigated to acceptable levels. In addition the positive impacts would outweigh the negative impacts.			
	Any other Plans (e.g. Guide Plan)		NO	Please explain
3	**Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?**	YES		
Providing a stable power supply is in keeping with the SDF and IDP objectives for the area. The power lines will stimulate development and that will in turn be in line with the projects and programmes mentioned in the IDP.				
4	**Does the community / area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)**	YES		
5	**Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)**	YES		
6	**Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication is on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)**	YES		
7	**Is this project part of a national programme to address an issue of national concern or importance?**	YES		Please explain
The objective of the national development plan 2030 is for all South Africans to have social equity through expanded excess to energy services with affordable tariffs and well-targeted and sustainable subsidies for needy households. Thus, the proposed is aimed at fulfilling this objective by providing power to local communities and future developments.				
8	**Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)**	YES		

9 Is the development the best practicable environmental option for this land / site?	YES		Please explain
The Basic Assessment study undertaken has assessed all the alternatives proposed and recommended alternatives which will result in fewer impacts.			
10 Will the benefits of the proposed land use / development outweigh the negative impacts of it?	YES		Please explain
The reliable electricity source will open opportunities for new industries and increase sustainability of existing industries, within the general area, in turn contributing to an increase in the local GDP.			
11 Will the proposed land use / development set a precedent for similar activities in the area (local municipality)?	YES		Please explain
Eskom would determine the need for additional lines and similar activities based on demand within the area. Should additional power be required in future, new Distribution Power Line and substations will be built.			
12 Will any person's rights be negatively affected by the proposed activity/ies?		NO	
13 Will the proposed activity / is compromise the "urban edge" as defined by the local municipality?		NO	
14 Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	YES		Please explain
Eskom is part of SIP 10: Electricity transmission and distribution for all Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.			
15 What will the benefits be to society in general and to the local communities?			Please explain
Electricity shortages will decrease and the area will have a more stable and sustainable supply of electricity. The sustainable power supply will encourage investors to contribute to local economic development.			
16 Any other need and desirability considerations related to the proposed activity?			Please explain
The affected areas in Limpopo and Mpumalanga area experiencing electricity supply problems as a result of local overloading of the electrical network. The proposed Eskom project will strengthen the local network through the installation of additional Distribution Power Lines. Local people could be employed during the construction of the Distribution Power Line for manual labour (e.g. for bush clearing and the digging of foundations).			
17 How does the project fit into the National Development Plan for 2030?			Please explain
One of the objectives of the national development plan 2030 is for all South Africans to have social equity through expanded excess to energy services with affordable tariffs and well-targeted and sustainable subsidies for needy households. Thus, the proposed project is aimed at fulfilling this objective by providing power to the residents and industries of Lydenburg and Steelpoort areas.			
18 Please describe how the general objectives of Integrated Environmental Management as set out in			

section 23 of NEMA have been taken into account.

The following table describes how the objectives of IEM have been taken into account:

The general objectives of IEM is to:	
a) Promote the integration of the principles of environmental management set out in section 2 into the making of all decisions which may have a significant effect on the environment;	Alignment with NEMA principles described below (Also refer Section 19 assessment below).
b) Identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage. The risks and consequences and alternatives and options for mitigation of activities, with a view to minimizing negative impacts, maximising benefits and promoting compliance with the principles of environmental management set out in section 2;	Incorporated in the current Basic Environmental Assessment process. Environmental (Biophysical and Socio-economic) impacts have been identified in Section D: Impact Assessment. Mitigation measures for minimising negative impacts and enhancing positive impacts are detailed in the Environmental Management Programme (EMPr)
c) Ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them;	Incorporated in the current Basic Environmental Assessment process. The effect of the proposed project on the environment is detailed in the Impact Assessment section, which identifies potential impacts and ranks their significance before and after mitigation measures are implemented.
d) Ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment;	The Basic Assessment Process has included a comprehensive PP process, including: ▪ Posters along the route; ▪ Newspaper adverts; ▪ Background Information Documents; ▪ Engagement with stakeholders; ▪ Public meeting; and ▪ Comments and response report as part of final BAR.
e) Ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment; and	Comprehensive Impact Assessment has been undertaken as part of BAR
f) Identify and employ the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in section 2.	Refer to Section 19 below which details how the principles of environmental management have been taken into account.

19 Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.

All efforts are being made to ensure that the project achieves sustainability, environmental justice and that the environmental rights of Interested and Affected Parties (local stakeholders, communities and the construction employees) are protected. This will be achieved by Eskom Holdings and its' appointed Contractors through the implementation of the recommendations provided by the Basic Assessment Report, the project's Environmental Management Programme and Environmental Authorisation, once issued by the Department of Environmental Affairs.

11. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
The Constitution of South Africa (Act No 108 of 1996)	Protection of human rights and environment of the study area.	National & Provincial	1996
National Environmental Management Act (Act No 107 0f 1998)(as amended)	Protection of the environment of the study area and surroundings.	National & Provincial	1998
National Environmental Management: Waste Act (Act 59 of 2008) (as amended)	Protection of the surrounding environment through efficient waste management by the appointed Contractor.	National & Provincial	2008
National Environmental Management : Air Quality Act (Act No 39 of 2004)	Protection of air quality of the study through dust minimisation and the application of dust suppression measures.	National & Provincial	2004
National Heritage Resources Act (No 25 of 1999)	Protection of heritage resources surrounding the study area and those uncovered during the development phase by reporting to the nearest heritage authority.	National & Provincial	1999
National Environmental Management: Biodiversity Act (10 of 2004)	Protection of biodiversity features and where not possible relevant permits will need to sort by the Contractor.	National & Provincial	2004
National Water Act (Act No 36 of 1998)	Protection of water resources and where not possible relevant permits/licences will need to sort by the Contractor.	National & Provincial	1998
National Road Traffic Act (No 93 of 1996)	The Contractor will obey traffic laws by driving at minimal speed approved by local authorities.	National & Provincial	1996
Occupational Health and Safety Act (No 85 of 1993)	Protection of workers on site through provision of Personal Protective Equipment's; Training and other health and safety amenities.	National & Provincial	1993
All relevant Provincial regulations and Municipal bylaws	The Contractor will obey and abide by provincial and municipal bylaws which are related to the proposed project.	Provincial and Local	

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

Will the activity produce solid construction waste during the construction / initiation phase? YES

If YES, what estimated quantity will be produced per month? It is not known at this stage.

How will the construction solid waste be disposed of (describe)?

Waste will be disposed of at a registered appropriate landfill site.

Where will the construction solid waste be disposed of (describe)?

Waste will be extracted using a back actor, and transported to a registered landfill site using a construction vehicle. The two closest landfill sites are located in Burgersfort and Lydenburg.

Will the activity produce solid waste during its operational phase? NO

If YES, what estimated quantity will be produced per month?

How will the solid waste be disposed of (describe)?

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the NEM: WA? NO

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM: WA must also be submitted with this application.

Is the activity that is being applied for a solid waste handling or treatment facility? NO

If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM: WA must also be submitted with this application.

b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system? NO

If YES, what estimated quantity will be produced per month?

Will the activity produce any effluent that will be treated and/or disposed of on site? NO

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility? NO

If YES, provide the particulars of the facility:

Facility name:

Contact person:

Postal address:

Postal code:

Telephone: **Cell:**

E-mail: **Fax:**

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:
None

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other than exhaust emissions and dust associated with construction phase activities? NO

If YES, is it controlled by any legislation of any sphere of government?

If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If NO, describe the emissions in terms of type and concentration:

During the construction phase, dust and vehicular emissions will be released as a result of earth moving machinery and trucks transporting construction material. The emissions will however, have short term impacts on the immediate surrounding areas which can be easily mitigated and thus the authorisation of such emissions will not be required.

d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM: WA? NO

If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

e) Generation of noise

Will the activity generate noise? YES

If YES, is it controlled by any legislation of any sphere of government? NO

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If NO, describe the noise in terms of type and level:

The movements of construction trucks, machinery and other construction activities will generate noise on site and surrounding communities. However, the noise will be of short term, localised and will last during the construction phase of the project. The noise level is anticipated to be less than 50dBA as required by SANS 10103 and thus authorisation will not be required for the noise.

13 WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box (es):

Municipal				

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:

Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?

NO

If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

14 ENERGY EFFICIENCY

Describe the design measures, if any that have been taken to ensure that the activity is energy efficient:

Not Applicable.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

Not Applicable.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A): 6

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section? YES

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

Property description / physical address:

Province	Limpopo and Mpumalanga Provinces
District Municipality	Sekhukhune District Municipality and Ehlanzeni District Municipality.
Local Municipality	Thaba Chweu and Greater Tubatse Local Municipalities
Ward Number(s)	N/A
Farm name and number	Refer to below Table
Portion number	Refer to below Table
SG Code	Refer to below Table

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

T	O	K	T	0	0	0	0	0	0	0	0	0	3	1	9	0	0	0	0	0	Olifantspoortje 319KT
T	O	K	T	0	0	0	0	0	0	0	0	0	3	5	4	0	0	0	1	6	Wildebeestkraal 354-KT Portion 16
T	O	K	T	0	0	0	0	0	0	0	0	0	3	5	4	0	0	0	1	8	Wildebeestkraal 354-KT Portion 18
T	O	K	T	0	0	0	0	0	0	0	0	0	3	5	4	0	0	0	1	9	Wildebeestkraal 354-KT Portion 19
T	O	K	T	0	0	0	0	0	0	0	0	0	3	5	4	0	0	0	2	1	Wildebeestkraal 354-KT Portion 21
T	O	K	T	0	0	0	0	0	0	0	0	0	3	5	3	0	0	0	0	0	Boerboomkraal 353KT
T	O	K	T	0	0	0	0	0	0	0	0	0	3	5	6	0	0	0	0	0	Doornhoek 356KT
T	O	K	T	0	0	0	0	0	0	0	0	0	3	8	9	0	0	0	0	0	Wildebeeshoek 389 KT
T	O	K	T	0	0	0	0	0	0	0	0	0	3	8	8	0	0	0	0	0	Buffelsvlei 388KT
T	O	K	T	0	0	0	0	0	0	0	0	0	3	9	0	0	0	0	0	0	Rietvaley 390 KT
T	O	K	T	0	0	0	0	0	0	0	0	0	3	8	7	0	0	0	0	0	Olifantshoek 387 KT
T	O	K	T	0	0	0	0	0	0	0	0	0	3	8	7	0	0	0	0	4	Olifantshoek 387 KT, Portion 4
T	O	K	T	0	0	0	0	0	0	0	0	0	3	8	5	0	0	0	0	0	Waterval 385 KT
T	O	J	T	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	Vroeggeloeg 22JT
T	O	K	T	0	0	0	0	0	0	0	0	0	3	9	2	0	0	0	0	0	Nooitgedacht 392 KT

T	O	J	T	0	0	0	0	0	0	0	0	0	2	9	0	0	0	0	0	Boomplaats 29JT
T	O	J	T	0	0	0	0	0	0	0	0	0	2	8	0	0	0	0	0	Leidenburg 28 JT
T	O	J	T	0	0	0	0	0	0	0	0	0	2	6	0	0	0	0	2	Kleinplaats 26-JT, Portion 2
T	O	J	T	0	0	0	0	0	0	0	0	0	2	6	0	0	0	0	3	Kleinplaats 26-JT, Portion 3

Current land-use zoning as per local municipality IDP / records: Agriculture, Nature Reserve

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required? NO

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1

1:15 – 1:10 | 1:10 – 1:7,5 | 1:7,5 – 1:5

Alternative S2

1:15 – 1:10 | 1:10 – 1:7,5 | 1:7,5 – 1:5

Alternative S3

1:15 – 1:10 | 1:10 – 1:7,5 | 1:7,5 – 1:5

Alternative S4

1:15 – 1:10 | 1:10 – 1:7,5 | 1:7,5 – 1:5

Alternative S5 (a)

1:15 – 1:10 | 1:10 – 1:7,5

Alternative S5 (b)

1:15 – 1:10 | 1:10 – 1:7,5

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

Alternative S1:

2.1 Ridgeline	X	2.4 Closed valley		X	2.7 Undulating plain / low hills	X
2.2 Plateau		2.5 Open valley			2.8 Dune	
2.3 Side slope of hill/mountain	X	2.6 Plain			2.9 Seafront	

Alternative S2:

2.1 Ridgeline	X	2.4 Closed valley		X	2.7 Undulating plain / low hills	X
2.2 Plateau		2.5 Open valley			2.8 Dune	
2.3 Side slope of hill/mountain	X	2.6 Plain			2.9 Seafront	

Alternative S3:

2.1 Ridgeline	X	2.4 Closed valley		X	2.7 Undulating plain / low hills	X
2.2 Plateau		2.5 Open valley			2.8 Dune	

2.3 Side slope of hill/mountain	X	2.6 Plain		2.9 Seafront	

Alternative S4:

2.1 Ridgeline	X	2.4 Closed valley	X	2.7 Undulating plain / low hills	X
2.2 Plateau		2.5 Open valley		2.8 Dune	
2.3 Side slope of hill/mountain	X	2.6 Plain		2.9 Seafront	

Alternative S5 (a):

2.1 Ridgeline		2.4 Closed valley	X	2.7 Undulating plain / low hills	X
2.2 Plateau		2.5 Open valley		2.8 Dune	
2.3 Side slope of hill/mountain		2.6 Plain		2.9 Seafront	

Alternative S5 (b):

2.1 Ridgeline		2.4 Closed valley	X	2.7 Undulating plain / low hills	X
2.2 Plateau		2.5 Open valley		2.8 Dune	
2.3 Side slope of hill/mountain		2.6 Plain		2.9 Seafront	

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following?

	Alternative S1:	Alternative S2:	Alternative S3:
Shallow water table (less than 1.5m deep)	YES	YES	YES
Dolomite, sinkhole or doline areas	NO	NO	NO
Seasonally wet soils (often close to water bodies)	YES	YES	YES
Unstable rocky slopes or steep slopes with loose soil	NO	NO	NO
Dispersive soils (soils that dissolve in water)	NO	NO	NO
Soils with high clay content (clay fraction more than 40%)	NO	NO	NO
Any other unstable soil or geological feature	NO	NO	NO
An area sensitive to erosion	NO	NO	NO

	Alternative S4:	Alternative S5(a):	Alternative S5(b):
Shallow water table (less than 1.5m deep)	YES	YES	YES
Dolomite, sinkhole or doline areas	NO	NO	NO
Seasonally wet soils (often close to water bodies)	YES	YES	YES
Unstable rocky slopes or steep slopes with loose soil	NO	NO	NO
Dispersive soils (soils that dissolve in water)	NO	NO	NO
Soils with high clay content (clay fraction more than 40%)	NO	NO	NO
Any other unstable soil or geological feature	NO	NO	NO
An area sensitive to erosion	NO	NO	NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the

project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

4. GROUNDCOVER

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Alternative S1:

Natural veld - good conditionE	Natural veld with scattered aliensE				

Alternative S2:

Natural veld - good conditionE	Natural veld with scattered aliensE				

Alternative S3:

Natural veld - good conditionE	Natural veld with scattered aliensE				

Alternative S4:

Natural veld - good conditionE	Natural veld with scattered aliensE				

Alternative S5:

Natural veld - good conditionE	Natural veld with scattered aliensE				

Alternative S5 (a):

Natural veld - good conditionE	Natural veld with scattered aliensE				

If any of the boxes marked with an "E "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Alternative S1:

Perennial River	YES	
Non-Perennial River		
Permanent Wetland		NO
Seasonal Wetland	YES	
Artificial Wetland		NO
Estuarine / Lagoonal wetland		NO

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

The project is of linear in nature and falls within a number of quaternary catchments which include rivers and wetlands. These water resources are briefly described below:

Eloff Spruit (Alternative 1)

The Eloff Spruit was assessed where it would be crossed by Alternative 1 on the farm Wildebeestkraal.

Watervals River (Alternative 3)

The Watervals is the largest river in the study area, draining a wide longitudinal valley, and draining a large catchment that originates on the eastern slopes of the Steenkampsberg hills to the south-west of Mashishing.

Dorps River (Alternatives 5A and 5B)

The Dorps River was assessed in two locations within a wider reach of the river to the east of the Lydenburg Substation where Alternatives 5A and 5B respectively would cross the river. The Dorps River drains a large catchment to the south that occupies the higher lying ground in the vicinity of Dullstroom to the south of Mashishing.

Potlood Spruit (Alternative 5A)

The Potlood Spruit was assessed at the crossing point of the Alternative 5A to the west of the R36 road. This river drains a relatively small catchment to the east of Mashishing.

Wetlands

The wetlands types found in the study area are Valley bottom wetlands channelled and seep wetland.

Alternative S2:

Perennial River	YES	
Non-Perennial River		NO
Permanent Wetland		NO
Seasonal Wetland	YES	
Artificial Wetland		NO
Estuarine / Lagoonal wetland		NO

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

The project is of linear in nature and falls within a number of quaternary catchments which include rivers and wetlands. These water resources are briefly described below:

Eloff Spruit (Alternative 1)

The Eloff Spruit was assessed where it would be crossed by Alternative 1 on the farm Wildebeestkraal.

Watervals River (Alternative 3)

The Watervals is the largest river in the study area, draining a wide longitudinal valley, and draining a large catchment that originates on the eastern slopes of the Steenkampsberg hills to the south-west of Mashishing.

Dorps River (Alternatives 5A and 5B)

The Dorps River was assessed in two locations within a wider reach of the river to the east of the Lydenburg Substation where Alternatives 5A and 5B respectively would cross the river. The Dorps River drains a large catchment to the south that occupies the higher lying ground in the vicinity of Dullstroom to the south of Mashishing.

Potlood Spruit (Alternative 5A)

The Potlood Spruit was assessed at the crossing point of the Alternative 5A to the west of the R36 road. This river drains a relatively small catchment to the east of Mashishing.

Wetlands

The wetlands types found in the study area are Valley bottom wetlands channelled and seep wetland.

Alternative S3:

Perennial River	YES	
Non-Perennial River		NO
Permanent Wetland		NO
Seasonal Wetland	YES	
Artificial Wetland		NO
Estuarine / Lagoonal wetland		NO

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

The project is of linear in nature and falls within a number of quaternary catchments which include rivers and wetlands. These water resources are briefly described below:

Eloff Spruit (Alternative 1)

The Eloff Spruit was assessed where it would be crossed by Alternative 1 on the farm Wildebeestkraal.

Watervals River (Alternative 3)

The Watervals is the largest river in the study area, draining a wide longitudinal valley, and draining a large catchment that originates on the eastern slopes of the Steenkampsberg hills to the south-west of Mashishing.

Dorps River (Alternatives 5A and 5B)

The Dorps River was assessed in two locations within a wider reach of the river to the east of the Lydenburg Substation where Alternatives 5A and 5B respectively would cross the river. The Dorps River drains a large catchment to the south that occupies the higher lying ground in the vicinity of Dullstroom to the south of Mashishing.

Potlood Spruit (Alternative 5A)

The Potlood Spruit was assessed at the crossing point of the Alternative 5A to the west of the R36 road. This river drains a relatively small catchment to the east of Mashishing.

Wetlands

The wetlands types found in the study area are Valley bottom wetlands channelled and seep wetland.

Alternative S4:

Perennial River	YES	
Non-Perennial River		NO
Permanent Wetland		NO
Seasonal Wetland	YES	
Artificial Wetland		NO
Estuarine / Lagoonal wetland		NO

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

The project is of linear in nature and falls within a number of quaternary catchments which include rivers and wetlands. These watercourses are briefly described below:

Eloff Spruit (Alternative 1)
The Eloff Spruit was assessed where it would be crossed by Alternative 1 on the farm Wildebeestkraal.
Watervals River (Alternative 3)
The Watervals is the largest river in the study area, draining a wide longitudinal valley, and draining a large catchment that originates on the eastern slopes of the Steenkampsberg hills to the south-west of Mashishing.
Dorps River (Alternatives 5A and 5B)
The Dorps River was assessed in two locations within a wider reach of the river to the east of the Lydenburg Substation where Alternatives 5A and 5B respectively would cross the river. The Dorps River drains a large catchment to the south that occupies the higher lying ground in the vicinity of Dullstroom to the south of Mashishing.
Potlood Spruit (Alternative 5A)
The Potlood Spruit was assessed at the crossing point of the Alternative 5A to the west of the R36 road. This river drains a relatively small catchment to the east of Mashishing.
Wetlands
The wetlands types found in the study area are Valley bottom wetlands channelled and seep wetland.

Alternative S5:

Perennial River	YES	
Non-Perennial River		NO
Permanent Wetland		NO
Seasonal Wetland	YES	
Artificial Wetland		NO
Estuarine / Lagoonal wetland		NO

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

The project is of linear in nature and falls within a number of quaternary catchments which include rivers and wetlands. These water resources are briefly described below:

Eloff Spruit (Alternative 1)
The Eloff Spruit was assessed where it would be crossed by Alternative 1 on the farm Wildebeestkraal.

Watervals River (Alternative 3)

The Watervals is the largest river in the study area, draining a wide longitudinal valley, and draining a large catchment that originates on the eastern slopes of the Steenkampsberg hills to the south-west of Mashishing.

Dorps River (Alternatives 5A and 5B)

The Dorps River was assessed in two locations within a wider reach of the river to the east of the Lydenburg Substation where Alternatives 5A and 5B respectively would cross the river. The Dorps River drains a large catchment to the south that occupies the higher lying ground in the vicinity of Dullstroom to the south of Mashishing.

Potlood Spruit (Alternative 5A)

The Potlood Spruit was assessed at the crossing point of the Alternative 5A to the west of the R36 road. This river drains a relatively small catchment to the east of Mashishing.

Wetlands

The wetlands types found in the study area are Valley bottom wetlands channelled and seep wetland.

Alternative S5 (a):

Perennial River	YES	
Non-Perennial River		NO
Permanent Wetland		NO
Seasonal Wetland	YES	
Artificial Wetland		NO
Estuarine / Lagoonal wetland		NO

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

The project is of linear in nature and falls within a number of quaternary catchments which include rivers and wetlands. These water resources are briefly described below:

Eloff Spruit (Alternative 1)

The Eloff Spruit was assessed where it would be crossed by Alternative 1 on the farm Wildebeestkraal.

Watervals River (Alternative 3)

The Watervals is the largest river in the study area, draining a wide longitudinal valley, and draining a large catchment that originates on the eastern slopes of the Steenkampsberg hills to the south-west of Mashishing.

Dorps River (Alternatives 5A and 5B)

The Dorps River was assessed in two locations within a wider reach of the river to the east of the Lydenburg Substation where Alternatives 5A and 5B respectively would cross the river. The Dorps River drains a large catchment to the south that occupies the higher lying ground in the vicinity of Dullstroom to the south of Mashishing.

Potlood Spruit (Alternative 5A)

The Potlood Spruit was assessed at the crossing point of the Alternative 5A to the west of the R36 road. This river drains a relatively small catchment to the east of Mashishing.

Wetlands

The wetlands types found in the study area are Valley bottom wetlands channelled and seep wetland.

6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

Alternative S1

If any of the boxes marked with an "N "are ticked, how this impact will / be impacted upon by the proposed activity?

There is a railway line adjacent to the proposed project. However, it will not be impacted by the proposed development

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

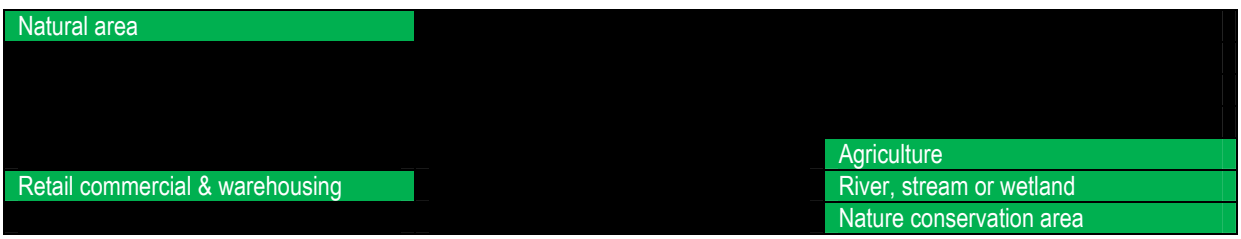
If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Does the proposed site (including any alternative sites) fall within any of the following :

Critical Biodiversity Area (as per provincial conservation plan)	YES
Core area of a protected area?	NO
Buffer area of a protected area?	NO
Planned expansion area of an existing protected area?	NO
Existing offset area associated with a previous Environmental Authorisation?	NO
Buffer area of the SKA?	NO

If the answer to any of these questions was YES, a map indicating the affected area must be included in **Appendix A.**

Alternative S2



If any of the boxes marked with an "$_N$ "are ticked, how this impact will / be impacted upon by the proposed activity?

There is a railway line adjacent to the proposed project. However, it will not be impacted by the proposed development

If any of the boxes marked with an "$_{An}$" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

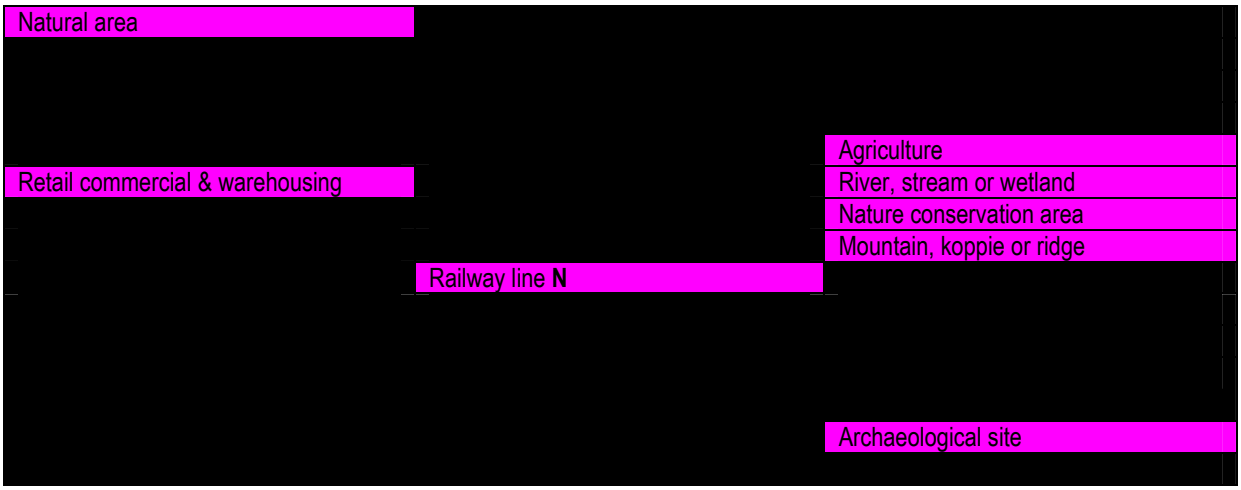
If any of the boxes marked with an "$_H$" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	YES
Core area of a protected area?	NO
Buffer area of a protected area?	NO
Planned expansion area of an existing protected area?	NO
Existing offset area associated with a previous Environmental Authorisation?	NO
Buffer area of the SKA?	NO

If the answer to any of these questions was YES, a map indicating the affected area must be included in **Appendix A.**

Alternative S3



If any of the boxes marked with an "$_N$ "are ticked, how this impact will / be impacted upon by the proposed activity?

There is a railway line adjacent to the proposed project. However, it will not be impacted by the proposed development.

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	YES
Core area of a protected area?	NO
Buffer area of a protected area?	NO
Planned expansion area of an existing protected area?	NO
Existing offset area associated with a previous Environmental Authorisation?	NO
Buffer area of the SKA?	NO

If the answer to any of these questions was YES, a map indicating the affected area must be included in **Appendix A.**

Alternative S4

If any of the boxes marked with an "N "are ticked, how this impact will / be impacted upon by the proposed activity?

There is a railway line adjacent to the proposed project. However, it will not be impacted by the proposed development

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	YES
Core area of a protected area?	NO
Buffer area of a protected area?	NO

Planned expansion area of an existing protected area?	NO
Existing offset area associated with a previous Environmental Authorisation?	NO
Buffer area of the SKA?	NO

If the answer to any of these questions was YES, a map indicating the affected area must be included in **Appendix A.**

Alternative S5

Natural area

Agriculture

Retail commercial & warehousing

River, stream or wetland

Nature conservation area

Mountain, koppie or ridge

Railway line **N**

Archaeological site

If any of the boxes marked with an "N "are ticked, how this impact will / be impacted upon by the proposed activity?

There is a railway line adjacent to the proposed project. However, it will not be impacted by the proposed development

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	YES
Core area of a protected area?	NO
Buffer area of a protected area?	NO
Planned expansion area of an existing protected area?	NO
Existing offset area associated with a previous Environmental Authorisation?	NO
Buffer area of the SKA?	NO

If the answer to any of these questions was YES, a map indicating the affected area must be included in **Appendix A.**

Alternative S5 (a)

Natural area

Retail commercial & warehousing	Agriculture
	River, stream or wetland
	Nature conservation area
	Mountain, koppie or ridge
Railway line **N**	
	Archaeological site

If any of the boxes marked with an "N "are ticked, how this impact will / be impacted upon by the proposed activity?

There is a railway line adjacent to the proposed project. However, it will not be impacted by the proposed development

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Does the proposed site (including any alternative sites) fall within any of the following :

Critical Biodiversity Area (as per provincial conservation plan)	YES
Core area of a protected area?	NO
Buffer area of a protected area?	NIO
Planned expansion area of an existing protected area?	NO
Existing offset area associated with a previous Environmental Authorisation?	NO
Buffer area of the SKA?	NO

If the answer to any of these questions was YES, a map indicating the affected area must be included in **Appendix A.**

7. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:

YES

According to the Palaeontological study, there is low palaeontological sensitivity of the rock units represented within the study area as well as less significant impacts on all five Distribution Power Line route options under consideration. Thus there are no further specialist palaeontological heritage studies or mitigation recommended for this project, pending the discovery of substantial new fossil material during construction. According to the Heritage study, Late Iron Age walled sites and Historical features such as farm houses were found in the study area.

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:

Not Applicable.

Will any building or structure older than 60 years be affected in any way?	NO
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	NO

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

8. SOCIO-ECONOMIC CHARACTER

a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:

Greater Tubatse Local Municipality

As estimated 68.1 % of the population with the Greater Tubatse Local Municipality is considered to be unemployed (Census 2011 Municipal Fact Sheet, published by Statistics South Africa).

Taba Chweu Local Municipality

Recent studies indicate that the unemployment rate in TCLM increased from 15.2% to 16.8% between 2001 and 2005 (Development Bank of South Africa 2005). It illustrates that in total 49% of households had a monthly income of R1 500 or less, that 34.9% of households earned between R1 501 and R3 500, that 7.4% of households earned between R3 501 and R5 000, whilst only 8.7% of households had a monthly income in excess of R5 000 per month (IDP 2010: Taba Chweu Local municipality).

Economic profile of local municipality:

Greater Tubatse local Municipality

The estimated population within the local municipality is estimated to be 270 124. Approximately 42.1% of the population do not receive an income. The economic profile is considered low since majority of the population are dependent on other for survival (Census 2011 Municipal Fact Sheet, published by Statistics South Africa).

Taba Chweu Local Municipality

The Lydenburg area is entering an era of accelerated growth due to the mining developments in the Steelpoort/Dwarsrivier areas. Growth in real economic terms is primarily concentrated in the agriculture and forestry sector (24.3%), the manufacturing sector (23.6%), the community, social and personal services sector (15.5%), the wholesale and retail trade sector (12.4%) and mining and quarrying sector (10.1%). most businesses are located in Lydenburg with 58.7% which is the main hub of economic activity in the area (Source IDP 2010: Taba Chweu Local municipality).

Level of education:

Greater Tubatse Local Municipality About 10.9 % of the population are not educated whilst 41.4 % have received a high school level education and 0.1 % have received a tertiary education ***Source:* Census 2001 Municipal Fact Sheet, published by Statistics South Africa** Taba Chweu Local Municipality 35.3% of the population completed Grade 12 (secondary schooling) as their highest level of education, 32.4% completed Grade 7 (primary schooling) and 5.1% completed tertiary education. More than a quarter of the population (26.8%) did not complete Grade 7 and thus do not have any formal educational qualification: Taba Chweu Local municipality IDP 2010).

e) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	It is not known at this stage.
What is the expected yearly income that will be generated by or as a result of the activity?	It is not known at this stage.
Will the activity contribute to service infrastructure?	YES
Is the activity a public amenity?	YES
How many new employment opportunities will be created in the development and construction phase of the activity/is?	It is not known at this stage.
What is the expected value of the employment opportunities during the development and construction phase?	It is not known at this stage.
What percentage of this will accrue to previously disadvantaged individuals?	It is not known at this stage.
How many permanent new employment opportunities will be created during the operational phase of the activity?	It is not known at this stage.
What is the expected current value of the employment opportunities during the first 10 years?	It is not known at this stage.
What percentage of this will accrue to previously disadvantaged individuals?	It is not known at this stage.

9. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult http://bgis.sanbi.org or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)

Systematic Biodiversity Planning Category				If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan
Critical Biodiversity Area (CBA)		Other Natural Area (ONA)		Vegetation of the study areas which includes: ▪ Lydenburg Montane Grassland (Gm 18), ▪ Lydenburg Thornveld (Gm 21), ▪ Ohrigstad Mountain Bushveld (SVcb 26), ▪ Sekhukhune Mountain Grassland (Gm 19), ▪ Sekhukhune Mountain Bushveld (SVcb 28), ▪ Sekhukhune Plains Bushveld (SVcb 27); and ▪ Subtropical Freshwater Wetlands (AZ f6) is listed as vulnerable in the Mpumalanga Biodiversity Plan. A total of 22% of this vegetation has been transformed mainly by dry-land and irrigated cultivation. Rainfall is generally too low for afforestation or plantations.

b) Indicate and describe the habitat condition on site

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	20 %	Large sections of alignment 1 comprise of fallow lands or secondary succession Hyparrhenia hirta, H. tamba, Eragrostis curvula and Cymbopogon excavates grasslands. Other species that are prominent locally include the grasses *Heteropogon contortus, Hyparrhenia filipendula*, and the forbs *Nidorella hottentotica, Solanum panduriforme, Vernonia oligocephala, Zornea milneana*, and *Senecio inornatus*. The geophytic herb *Hypoxis rigidula* var. *polossisima* was locally abundant.
Near Natural (includes areas with low to moderate level of alien invasive plants)	20 %	The alien vegetation found on site were as follows: *Acacia mearnsii*, Opuntia ficus-indica*, Cotoneaster pannosus*, Cotoneaster franchetii*, Populus x canescens, Eucalyptus grandis*, Ipomoea alba*, Ipomoea indica*, Ipomoea purpurea*, Lantana camara*, Melia azedarach*, Jacaranda mimosifolia*, Morus alba*, Ricinus communis*, Robinia pseudoacacia*, Solanum mauritianum**
Degraded (includes areas heavily invaded by alien plants)	20%	A very small portion of the study area has been degraded and heavily invaded by alien vegetation. These areas are located around the boundary of the cultivated lands.
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	40 %	Certain areas around the alignment have been used as Agricultural lands or for Livestock (Cattle) grazing activities.

c) Complete the table to indicate:

(i) the type of vegetation, including its ecosystem status, present on the site; and
(ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		Aquatic Ecosystems					
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Critical	Wetland (including rivers, depressions, channelled and unchanneled wetlands, flats, seeps pans, and artificial wetlands)		Estuary		Coastline	
	Vulnerable	YES		NO		NO	

d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

The Lydenburg Montane Grassland, Lydenburg Thornveld, Ohrigstad Mountain Bushveld, Sekhukhune Mountain Grassland, Sekhukhune Mountain Bushveld, Sekhukhune Plains Bushveld and Subtropical Freshwater Wetlands are classified as **Vulnerable**. The conservation target is 27%, with 2.4% formally protected within reserves as well as in a number of private and public conservation areas. However, the level of transformation in the study area is relatively high at 23% with mostly alien plantations (20%) and cultivated lands (2%).

Wetlands (seeps and channelled valley bottom wetlands) and other surface water features (Spekboom River, Potlood Spruit, Dorps River, Watervals River and Eloff Spruit) were found in the study area. Particularly along alternatives 1, 3 and 5.

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICE

Publication name	This information will be provided in the final report.	
Date published	This information will be provided in the final report.	
Site notice position	**Latitude**	**Longitude**
Date placed	This information will be provided in the final report.	

Include proof of the placement of the relevant advertisements and notices in Appendix E1.

2. DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN 733.

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 733

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP
No issues have been raised yet.	No response has been provided yet.

4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to the Final BAR as Appendix E3.

5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	Robyn Lyt	013 759 4078		rluyt@mpg.gov.za	No 18 Jones Street Nelspruit 1200
South African Heritage Resources Agency	Ms Nokukhanya Khumalo	021 462 4502	021 462 4509	nkhumalo@sahra.org.za	P.O. Box 4637 CAPE TOWN 8000
Mpumalanga Tourism and Parks Authority (MTPA)	Mr Johan Eksteen	013 759 5300	013 755 3928	johan@mtpa.co.za	Private Bag X 11338. Nelspruit. 1200
Limpopo Department of Economic Development, Environment and Tourism	Mr. Solly Kgopong	(015) 293 8648	015 293 8319	MolotoR@ledet.gov.za	Private Bag X9484 Polokwane 0700

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

6. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs must be included as appendix E5.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014 and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A (2) of this report.

IMPACT ASSESSMENT DESCRIPTIVE CRITERIA		
Nature	Include a descriptive sentence	
Probability	Categories 1 – 5	
	1	Improbable (less than 24% chance of occurring)
	2	Probable (25 – 49%)
	3	Likely (50 – 69%)
	4	Very likely (70 – 89%)
	5	Definite (90 – 100%)
Frequency	Categories 1 – 5	
	1	Very rare to remote (once or twice a decade)
	2	Unusual to occasional (once or twice every 5 years)
	3	Frequent (a few times a month)
	4	Very frequent (a few times a week, to daily)
	5	Continuous (daily to a significant percentage of every day)
Extent	Categories 1 – 5	
	1	Footprint / site
	2	Local
	3	Regional
	4	National
	5	International (trans-boundary)
Duration	Categories 1 – 5	
	1	Short (few days to a few months, less than a phase)
	2	Short (few months, or less than a phase in total)
	3	Medium (a few years, significant part of a phase)
	4	Long (lifespan of development (i.e. all of operation))
	5	Permanent
Intensity	Categories 1 – 5	
	1	Very low – natural processes not affected
	2	Low – natural processes slightly affected
	3	Medium – natural processes continue but in a modified manner
	4	Medium-high – natural processes are modified significantly
	5	High – natural processes disturbed significantly so that they cease to occur (temporarily / permanently)
Significance	**Significance = P + F + E + D + I** Minimum value of 5, maximum of 25 Status determines if positive / negative	

IMPACT ASSESSMENT DESCRIPTIVE CRITERIA		
	Any positive value	**No impact** **1.** High to low consequence, probability not an issue as positive, **no mitigation required**
	1– 5	**Low** **2.** Low consequence, probably, **minimal mitigation may be required**
	6 to 10	**Medium** **3.** Medium consequence, probably, **mitigation is advised / preferred**
	11 to 15	**Medium–high** **4.** Medium to high consequence, probably to very probable, **mitigation is necessary**
	16 to 20	**High** **5.** High consequence, probably / definite, **mitigation is essential**
	21 to 25	**Extreme** **6.** Very high consequence, definite, **fatal flaw!**

1 (A).POTENTIAL IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN PHASE

ALTERNATIVE 1 – PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation**	**Significance rating of impacts after mitigation:**
DIRECT IMPACTS			
1. Flora: Placement of footprints near areas of high sensitivity (natural vegetation, protected tree species, riparian areas, areas of high slopes, rocky outcrops, etc.) may impact these sensitive communities.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Very Frequent (4) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (14)** **Medium–High**	• General mitigation measures would include the avoidance of any physical damage to natural vegetation on the periphery of the proposed servitude and is of particular importance in all riparian areas and areas of steep slopes. • Conduct a pre-construction walk down of the approved corridor in order to mark and geo reference all protected tree species within the servitudes and development areas. • Submit relevant applications for impacts on these individual specimens.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Improbable (1) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
2. Wetlands: Placement of pylons within drainage lines and water courses will impact on ecosystem.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Very Frequent (4) **Probability:** Very Likely (4) **Intensity:** Low (2) **Significance Rating: (15)** **Medium–High**	• A walkthrough of the corridor selected as the preferred corridor alternative must be undertaken prior to construction to avoid all sensitive areas. • Pylons must be relocated if within a watercourse or drainage line or wetland area.	**Duration** Short (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Improbable (1) **Intensity:** Low (2) **Significance Rating: (8)** **Medium**
3. Heritage: Late Stone Age artefacts were found along all three corridor alternatives. Local and private	**Duration:** Long (4) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Very Likely (4)	• No mitigation measures are expected but it is recommended that final tower positions in key locales should be inspected before the need for mitigation	**Duration:** Long (4) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Improbable (1)

ALTERNATIVE 1 – PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation**	**Significance rating of impacts after mitigation:**
cemeteries were found on site.	**Intensity:** Low (2) **Significance Rating: (15)** **Medium - High**	is ruled out. • All cemeteries are to be surrounded by a minimum of a 20 m buffer.	**Intensity:** Low (2) **Significance Rating: (10)** **Medium**
4. **Access Roads**: New access roads and haulage routes could impact on areas of high sensitivity (natural vegetation, protected tree species, riparian areas, areas of high slopes, rocky outcrops, etc.).	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Improbable (1) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**	• Temporary access and haulage routes must be designed prior to construction commencing to ensure that the most preferable access and haulage routes for each tower site has been identified. • Use should be made of existing roads as far as possible. • All road networks must be planned with care to minimize dissection or fragmentation of important avifaunal habitat types.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Improbable (1) **Intensity:** Very Low (1) **Significance Rating: (8)** **Medium**
5. **Avifauna:** Impact on bird habitats.	**Duration:** Long (4) **Extent:** International (5) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (16)** **High**	• A walk-through" of the chosen corridor alternative should be conducted prior to the construction phase. Such a "walk-through" will aim to identify areas where marking of lines by means of "deterrent devices" is considered to be beneficial; • A natural buffer zone should be allowed between the line servitude and any drainage line.	**Duration:** Long (4) **Extent:** International (5) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (14)** **Medium- High**
6. **Visual:** The existing distribution power lines and towers are visible through vegetation, but are indistinct.	**Duration:** Long (4) **Extent:** Regional (3) **Frequency:** Continuous (5) **Probability:** Likely (3) **Intensity:** Low (2)	• In order to mitigate the visual impacts, route realignment is proposed in areas where there are sensitive receptors.	**Duration:** Long (4) **Extent:** Local (2) **Frequency:** Very Rare (1) **Probability:** Probably (2) **Intensity:** Low (2)

ALTERNATIVE 1 – PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation**	**Significance rating of impacts after mitigation:**
	Significance Rating: (17) **High**		**Significance Rating: (11)** **High**
INDIRECT IMPACTS			
NONE			
CUMULATIVE IMPACTS			
NONE			

ALTERNATIVE 2 – PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
DIRECT IMPACTS			
1. **Flora:** Placement of footprints near areas of high sensitivity (natural vegetation, protected tree species, riparian areas, areas of high slopes, rocky outcrops, etc.) may impact these sensitive communities.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating:(13)** **Medium- High**	• General mitigation measures would include the avoidance of any physical damage to natural vegetation on the periphery of the proposed servitude and is of particular importance in all riparian areas and areas of steep slopes. • Conduct a pre-construction walk down of the approved corridor in order to mark and geo-reference all protected tree species within the servitudes and development areas. • Submit relevant applications for impacts on these individuals.	**Duration:** Medium (3) **Extent:** Unusual (2) **Frequency:** Very rare (1) **Probability:** Improbable (1) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
2. **Wetlands:** Placement of pylons within drainage lines and water courses will impact on ecosystem.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (13)** **Medium- High**	• A walkthrough of the selected alternative must be undertaken prior to construction to avoid all sensitive areas. • Pylons must be relocated if within a watercourse or drainage line.	**Duration:** Short (2) **Extent:** Localised (2) **Frequency:** Low (1) **Probability:** Unlikely to occur (1) **Intensity:** Possible (2) **Significance Rating: (8)** **Medium**
3. **Heritage:** Late Stone Age artefacts were found along all three corridor alternatives. Local and private cemeteries were found on site.	**Duration:** Long (4) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Improbable (1) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**	• During the planning and design phase, a full Phase II archaeological survey of the final corridor in accordance with the requirements of Section 38(3) of the National Heritage Resources Act (Act No. 25 of 1999) should be completed.	**Duration:** Long (4) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Improbable (1) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**

ALTERNATIVE 2 – PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		• The developer must ensure that an archaeologist inspects the total route of the selected corridor. • If a particular pole structure impacts on a heritage site but cannot be shifted, mitigation measures, i.e. the controlled excavation of the site prior to development, can be implemented. This can only be done by a qualified archaeologist after obtaining a valid permit from the PHRA (Provincial Heritage Resources Agency) (or SAHRA, if it is a Category 1 site).	
4. Access Roads: New access roads and haulage routes could impact on areas of high sensitivity (natural vegetation, protected tree species, riparian areas, areas of high slopes, rocky outcrops, etc.).	**Duration:** Long (4) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (14)** **Medium-high**	• Temporary access and haulage routes must be designed prior to construction commencing to ensure that the most preferable access and haulage routes once each tower site has been identified. • Use should be made of existing roads as far as possible. • All road networks must be planned with care to minimize dissection or fragmentation of important avifaunal habitat types.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Unusual (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (11)** **Medium- high**
5. Avifauna: The proposed towers could impact on rare and endangered species.	**Duration:** Long (4) **Extent:** International (5) **Frequency:** Unusual (2) **Probability:** Likely (3)	• A "walk-through" of the chosen route should be conducted prior to the construction phase. Such a walk-through will aim to identify areas where marking	**Duration:** Long (4) **Extent:** International (5) **Frequency:** Very rare (1) **Probability:** Probable (2)

ALTERNATIVE 2 – PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
	Intensity: Low (2) **Significance Rating: (16)** **High**	of lines by means of "deterrent devices" is considered to be beneficial. • A natural buffer zone should be allowed between the line servitude and any drainage line.	**Intensity:** Low (2) **Significance Rating: (14)** **Medium - High**
INDIRECT IMPACTS			
NONE			
CUMULATIVE IMPACTS			
NONE			

ALTERNATIVE 3 – PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
DIRECT IMPACTS			
1. **Flora:** Placement of footprints near areas of high sensitivity (natural vegetation, protected tree species, riparian areas, areas of high slopes, rocky outcrops, etc.) may impact these sensitive communities.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (13)** **Medium – High**	• General mitigation measures would include the avoidance of any physical damage to natural vegetation on the periphery of the proposed servitude and is of particular importance in all riparian areas and areas of steep slopes. • Conduct a pre-construction walk down of the approved corridor in order to mark and georeference all protected tree species within the servitudes and development areas. • Submit relevant applications for impacts on these individuals.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Improbable (1) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
2. **Wetlands**: Placement of pylons within drainage lines and water courses will impact on ecosystem**.**	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (13)** **Medium-High**	• A walkthrough of the selected alternative must be undertaken prior to construction to avoid all sensitive areas. • Pylons must be relocated if with a watercourse or drainage line.	**Duration** Short term (2) **Extent:** Localised (2) **Frequency:** Low (1) **Probability:** Unlikely to occur (1) **Intensity:** Possible (2) **Significance Rating: (8)** **Medium**
3. **Heritage:** A number of late Stone Age artefacts were found along all three routes.	**Duration:** Long (4) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Probable (2) **Intensity:** Low (2)	• During the planning and design phase, a full Phase II archaeological survey of the final corridor in accordance with the requirements of Section 38(3) of the	**Duration:** Long (4) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Probable (2) **Intensity:** Low (2)

ALTERNATIVE 3 – PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
	Significance Rating: (11) **Medium -High**	National Heritage Resources Act (Act 25 of 1999) should be completed. • The developer must ensure that an archaeologist inspects the total route of the selected corridor. • If a particular pole structure impacts on a heritage site but cannot be shifted, mitigation measures, i.e. the controlled excavation of the site prior to development, can be implemented. This can only be done by a qualified archaeologist after obtaining a valid permit from the PHRA (Provincial Heritage Resources Agency) (or SAHRA, if it is a Category 1 site).	**Significance Rating: (11)** **Medium High**
4. **Access Roads:** New access roads and haulage routes could impact on areas of high sensitivity (natural vegetation, protected tree species, riparian areas, areas of high slopes, rocky outcrops, etc.).	**Duration:** Medium(3) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (11)** **Medium -high**	• Temporary access and haulage routes must be designed prior to construction commencing to ensure that the most preferable access and haulage routes for each tower site has been identified. Use should be made of existing roads as far as possible. • All road networks must be planned with care to minimize dissection or fragmentation of important avifaunal habitat types.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Very Low (1) **Significance Rating: (10)** **Medium**
5. **Avifauna:** Possibility of line coinciding	**Duration:** Long (4) **Extent:** Localised (2)	• A "walk-through" of the chosen route should be conducted prior to the	**Duration:** Long (4) **Extent**: Localised (2)

ALTERNATIVE 3 – PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
with endangered species.	**Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (13)** **Medium-high**	construction phase. Such a "walk-through" will aim to identify areas where marking of lines by means of "deterrent devices" is considered to be beneficial; • A natural buffer zone should be allowed between the line servitude and any drainage line.	**Frequency:** Moderate (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (13)** **Medium-high**
INDIRECT IMPACTS			
NONE			
CUMULATIVE IMPACTS			
NONE			

ALTERNATIVE 4-PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
DIRECT IMPACTS			
1. **Flora:** Placement of footprints near areas of high sensitivity (natural vegetation, protected tree species, riparian areas, areas of high slopes, rocky outcrops, etc.) may impact these sensitive communities.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (13)** **Medium – High**	• General mitigation measures would include the avoidance of any physical damage to natural vegetation on the periphery of the proposed servitude and is of particular importance in all riparian areas and areas of steep slopes. • Conduct a pre-construction walk down of the approved corridor in order to mark and georeference all protected tree species within the servitudes and development areas. • Submit relevant applications for impacts on these individuals.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Improbable (1) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
2. **Wetlands**: Placement of pylons within drainage lines and water courses will impact on ecosystem**.**	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (13)** **Medium-High**	• A walkthrough of the selected alternative must be undertaken prior to construction to avoid all sensitive areas. • Pylons must be relocated if with a watercourse or drainage line.	**Duration** Short term (2) **Extent:** Localised (2) **Frequency:** Low (1) **Probability:** Unlikely to occur (1) **Intensity:** Possible (2) **Significance Rating: (8)** **Medium**
3. **Heritage:** A number of late Stone Age artefacts were found along all routes.	**Duration:** Long (4) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Probable (2) **Intensity:** Low (2)	• During the planning and design phase, a full Phase II archaeological survey of the final corridor in accordance with the requirements of Section 38(3) of the	**Duration:** Long (4) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Probable (2) **Intensity:** Low (2)

ALTERNATIVE 4-PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
	Significance Rating: (11) **Medium -High**	National Heritage Resources Act (Act 25 of 1999) should be completed. • The developer must ensure that an archaeologist inspects the total route of the selected corridor. • If a particular pole structure impacts on a heritage site but cannot be shifted, mitigation measures, i.e. the controlled excavation of the site prior to development, can be implemented. This can only be done by a qualified archaeologist after obtaining a valid permit from the PHRA (Provincial Heritage Resources Agency) (or SAHRA, if it is a Category 1 site).	**Significance Rating: (11)** **Medium High**
4. Access Roads: New access roads and haulage routes could impact on areas of high sensitivity (natural vegetation, protected tree species, riparian areas, areas of high slopes, rocky outcrops, etc.).	**Duration:** Medium(3) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (11)** **Medium -high**	• Temporary access and haulage routes must be designed prior to construction commencing to ensure that the most preferable access and haulage routes for each tower site has been identified. Use should be made of existing roads as far as possible. • All road networks must be planned with care to minimize dissection or fragmentation of important avifaunal habitat types.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Very Low (1) **Significance Rating: (10)** **Medium**
INDIRECT IMPACTS			

ALTERNATIVE 4-PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
None			
CUMULATIVE IMPACTS			
None			

ALTERNATIVE 5(a)-PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
DIRECT IMPACTS			
1. **Flora:** Placement of footprints near areas of high sensitivity (natural vegetation, protected tree species, riparian areas, areas of high slopes, rocky outcrops, etc.) may impact these sensitive communities.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (13)** **Medium – High**	• General mitigation measures would include the avoidance of any physical damage to natural vegetation on the periphery of the proposed servitude and is of particular importance in all riparian areas and areas of steep slopes. • Conduct a pre-construction walk down of the approved corridor in order to mark and georeference all protected tree species within the servitudes and development areas. • Submit relevant applications for impacts on these individuals.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Improbable (1) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
2. **Wetlands**: Placement of pylons within drainage lines and water courses will impact on ecosystem**.**	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (13)** **Medium-High**	• A walkthrough of the selected alternative must be undertaken prior to construction to avoid all sensitive areas. • Pylons must be relocated if with a watercourse or drainage line.	**Duration** Short term (2) **Extent:** Localised (2) **Frequency:** Low (1) **Probability:** Unlikely to occur (1) **Intensity:** Possible (2) **Significance Rating: (8)** **Medium**
3. **Heritage:** A number of late Stone Age artefacts were found along all three routes.	**Duration:** Long (4) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Probable (2) **Intensity:** Low (2)	• During the planning and design phase, a full Phase II archaeological survey of the final corridor in accordance with the requirements of Section 38(3) of the	**Duration:** Long (4) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Probable (2) **Intensity:** Low (2)

ALTERNATIVE 5(a)-PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
	Significance Rating: (11) **Medium -High**	National Heritage Resources Act (Act 25 of 1999) should be completed. • The developer must ensure that an archaeologist inspects the total route of the selected corridor. • If a particular pole structure impacts on a heritage site but cannot be shifted, mitigation measures, i.e. the controlled excavation of the site prior to development, can be implemented. This can only be done by a qualified archaeologist after obtaining a valid permit from the PHRA (Provincial Heritage Resources Agency) (or SAHRA, if it is a Category 1 site).	**Significance Rating: (11)** **Medium High**
4. **Access Roads:** New access roads and haulage routes could impact on areas of high sensitivity (natural vegetation, protected tree species, riparian areas, areas of high slopes, rocky outcrops, etc.).	**Duration:** Medium(3) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (11)** **Medium -high**	• Temporary access and haulage routes must be designed prior to construction commencing to ensure that the most preferable access and haulage routes for each tower site has been identified. Use should be made of existing roads as far as possible. • All road networks must be planned with care to minimize dissection or fragmentation of important avifaunal habitat types.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Very Low (1) **Significance Rating: (10)** **Medium**
INDIRECT IMPACTS			

ALTERNATIVE 5(a)-PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
None			
CUMULATIVE IMPACTS			
None			

ALTERNATIVE 5(b)-PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
DIRECT IMPACTS			
1. **Flora:** Placement of footprints near areas of high sensitivity (natural vegetation, protected tree species, riparian areas, areas of high slopes, rocky outcrops, etc.) may impact these sensitive communities.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (13)** **Medium – High**	• General mitigation measures would include the avoidance of any physical damage to natural vegetation on the periphery of the proposed servitude and is of particular importance in all riparian areas and areas of steep slopes. • Conduct a pre-construction walk down of the approved corridor in order to mark and georeference all protected tree species within the servitudes and development areas. • Submit relevant applications for impacts on these individuals.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Improbable (1) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
2. **Wetlands**: Placement of pylons within drainage lines and water courses will impact on ecosystem**.**	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (13)** **Medium-High**	• A walkthrough of the selected alternative must be undertaken prior to construction to avoid all sensitive areas. • Pylons must be relocated if with a watercourse or drainage line.	**Duration** Short term (2) **Extent:** Localised (2) **Frequency:** Low (1) **Probability:** Unlikely to occur (1) **Intensity:** Possible (2) **Significance Rating: (8)** **Medium**
3. **Heritage:** A number of late Stone Age artefacts were found along all the routes.	**Duration:** Long (4) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Probable (2) **Intensity:** Low (2)	• During the planning and design phase, a full Phase II archaeological survey of the final corridor in accordance with the requirements of Section 38(3) of the	**Duration:** Long (4) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Probable (2) **Intensity:** Low (2)

ALTERNATIVE 5(b)-PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
	Significance Rating: (11) **Medium -High**	National Heritage Resources Act (Act 25 of 1999) should be completed. • The developer must ensure that an archaeologist inspects the total route of the selected corridor. • If a particular pole structure impacts on a heritage site but cannot be shifted, mitigation measures, i.e. the controlled excavation of the site prior to development, can be implemented. This can only be done by a qualified archaeologist after obtaining a valid permit from the PHRA (Provincial Heritage Resources Agency) (or SAHRA, if it is a Category 1 site).	**Significance Rating: (11)** **Medium High**
4. **Access Roads:** New access roads and haulage routes could impact on areas of high sensitivity (natural vegetation, protected tree species, riparian areas, areas of high slopes, rocky outcrops, etc.).	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (11)** **Medium -high**	• Temporary access and haulage routes must be designed prior to construction commencing to ensure that the most preferable access and haulage routes for each tower site has been identified. Use should be made of existing roads as far as possible. • All road networks must be planned with care to minimize dissection or fragmentation of important avifaunal habitat types.	**Duration:** Medium (3) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Very Low (1) **Significance Rating: (10)** **Medium**
INDIRECT IMPACTS			

ALTERNATIVE 5(b)-PLANNING AND DESIGN PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
None			
CUMULATIVE IMPACTS			
None			

SUMMARY OF IMPACTS AND AVERAGE POINTS ALLOCATED TO EACH DISTRIBUTION POWER LINE ALTERNATIVE DURING THE PLANNING AND DESIGN PHASE

IMPACTS	Alternative 1 Without Mitigation	Alternative 1 With Mitigation	Alternative 2 Without Mitigation	Alternative 2 With Mitigation	Alternative 3 Without Mitigation	Alternative 3 With Mitigation	Alternative 4 Without Mitigation	Alternative 4 With Mitigation	Alternative 5(a) With Mitigation	Alternative 5(a) Without Mitigation	Alternative 5(b) With Mitigation	Alternative 5(b) Without Mitigation
DIRECT												
1. Flora	14	9	13	9	13	9	13	9	13	9	13	9
2. Wetlands	15	8	13	8	13	8	13	8	13	8	13	8
3. Heritage	15	10	10	10	11	11	11	11	11	11	11	11
4. Access Roads	9	8	14	11	11	10	11	10	11	10	11	10
5. Avifauna	16	14	16	14	13	13	13	13	13	13	13	13
6. Visual	17	11	-	-	-	-	-	-	-	-	-	-
TOTAL	**86**	**60**	**66**	**52**	**61**	**51**	**61**	**51**	**61**	**51**	**61**	**51**
INDIRECT												
None												
CUMULATIVE												
None												

1 (B).POTENTIAL IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE

ALTERNATIVE 1 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
DIRECT IMPACTS			
1. Construction Related Impacts: • Movements of trucks, delivery of construction material, oil leakages from machinery and vehicles, disposal of construction waste, excessive noise etc. will constitute the main impacts during construction.	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Very Frequent (4) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (14)** **Medium–High**	• Construction related (solid & hazardous) and general waste must be collected regularly from the site and disposed of at an appropriate registered landfill site. • Management of oil and other spillages and leakages must be minimized. • Construction waste must not be stored more than 30 days on site. • Dust suppression measures must be implemented by the appointed Contract to minimise dust nuisance in the surrounding communities. • Construction activities must be undertaken during normal working hours (07H00 to 17H00) to minimise noise and disturbance of neighbouring landowners.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Improbable (1) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**

ALTERNATIVE 1 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
2. Topography and Soils: The direct impact on landforms with the establishment of distribution power lines is mainly one of disruption of surface soils. Potential erosion impacts are anticipated to be limited to the construction phase during site clearing activities.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**	• Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately to prevent soil erosion. • Limit construction-, maintenance- and inspection activities to dry periods in order to curb occurrence/ augmentation of erosion in areas of existing erosion. • No vehicles should be allowed to cross rivers or streams in any area other than an approved crossing, taking care to prevent any impact (particularly erosion) in surrounding habitat. • Remove and store topsoil separately in areas where excavation/degradation takes place. Topsoil should be used for rehabilitation purposes in order to facilitate re-growth of species that occur naturally in the area.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Low (1) **Significance Rating: (7)** **Medium**
3. Wetlands: Irresponsible construction practices could lead to the pollution of wetlands and rivers (e.g. faecal contamination, or pollution of surface water through hydrocarbons) • Poor storm water management could lead to the siltation (pollution) of surface waters. • Temporary accesses across wetlands /	**Duration:** Medium Term (3) **Extent :** Local (2) **Frequency :** Unusual (2) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (11)** **Medium-high**	• Construction to be guided by Eskom guidelines for construction • Construction to be monitored by an ECO according to the stipulations of the EMPr • No batching or chemical / fuel storage areas to be located within any surface water feature or within 100m of a wetland or other surface water feature. • A construction storm water management plan to be devised to prevent silt ingress	**Duration:** Short Term (1) **Extent:** Site specific (1) **Frequency:** Very rare (1) **Probability:** Probable (2) **Intensity :** Low (2) **Significance Rating: (7)** **Medium**

ALTERNATIVE 1 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
rivers could cause hydrological and morphological impacts and degrade the resource quality • Construction of towers in wetlands could cause significant damage to the wetland in which the tower(s) is constructed. This would relate primarily to the access of machinery into the wetland to construct the tower – heavy vehicles and other machinery.		into surface water features • No temporary construction accesses to be constructed through any surface water feature and no machinery to enter any wetland unless authorised under the EMPr by the ECO as part of a construction activity	
4. Riparian zones • Construction of the power line within riparian corridors • Construction of the power line across riparian corridors would constitute an impact on the riparian zone and transforms a part of the riparian zone, and increases In Towers and spans constructed in any riparian habitat (i.e. creation of a power line servitude through a riparian area) without permission / authorisation from the relevant authorities would be illegal in terms of the National Water Act	**Duration:** Medium Term (2) **Extent:** Local (2) **Frequency:** Unusual (2) **Intensity:** Moderate (2) **Probability:** Highly Probable (3) **Significance: (11)** **Medium- High**	• Line planning should be done in such a manner that the power line avoids crossing / traversing riparian areas unnecessarily. • All power line spans and towers placed within a riparian zone must be subject to the acquisition of a Water Use Licence from the DWA. • The stipulations of the WUL technical report, and any licence conditions as stipulated in the WUL must be adhered to. • Construction of towers and spans within riparian areas must be carefully monitored by the ECO and any construction team environmental officers.	**Duration:** Medium Term (2) **Extent:** Local (2) **Frequency:** Very rare (1) **Intensity:** Moderate (2) **Probability:** Probable (2) **Significance: (9)** **Medium**

ALTERNATIVE 1 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
5. Water Resources: • Pollution of groundwater and surface water resources.	**Duration:** Short Term (1) **Extent:** Regional (3) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (11)** **Medium-high**	• Waste water should be directed into the proper systems. • Sewage water should not be channelled through surface water bodies or be allowed to flow freely or stagnate on the soil surface. • Adequate sanitary facilities and ablutions must be provided for construction workers. • Use and or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled. • Further detailed mitigation measures are included in the EMPr (Appendix F).	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Very low (1) **Significance Rating: (7)** **Medium**
6. Flora: Impacts include: • Destruction of threatened and protected flora species – physical damage or destruction of Red Data or Protected species or areas that is suitable for these species, representing a significant impact on the biodiversity of a region. • Destruction of sensitive pristine habitat types – The loss of pristine habitat types or habitat that are regarded sensitive as a result of restricted presence in the larger region (atypical habitat) represents a potential loss of habitat and	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (12)** **Medium- High**	• All individuals / stands of protected trees must be clearly and visibly marked prior to the start of construction or maintenance procedures. It is recommended that a walk-through of the approved servitude be conducted prior to construction activities commencing. • No painting or marking of rocks or vegetation to identify locality or other information shall be allowed as it will disfigure the natural setting. • Marking shall be done by steel stakes with tags, if required Demarcate construction areas by semi-permanent	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**

ALTERNATIVE 1 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
biodiversity on a regional scale.		means in order to control movement of personnel, vehicles, providing boundaries for construction sites in order to prevent spread of impacts; • Construction sites/camps need a detailed ecological assessment prior to construction; • Disturbance of vegetation must be limited to areas of construction. • Removal of vegetation / plants shall be avoided until such time as soil stripping is required and similarly exposed surfaces must be re-vegetated or stabilised as soon as is practically possible. • The establishment and re-growth of alien vegetation must be controlled after the removal of grass. All declared aliens must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).	
7. Avifauna: • Construction Activities in sensitive avifaunal habitats could lead to disturbance of sensitive / threatened species that could result in them moving	**Duration :** Medium Term (3) **Extent :** Regional (3) **Frequency:** Frequent (3) **Probability:** Probable (2) **Intensity :** Low (2) **Significance Rating (13)**	• Construction to be guided by Eskom guidelines for construction. • The ECO and Contractor's EO must be made aware and trained in recognition of certain key species, especially those species that nest in non-wetland	**Duration :** Short Term (1) **Extent:** Site (1) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (7)**

ALTERNATIVE 1 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
away from the area thus adversely affecting natural foraging habits. • Terrestrial nesting species could be disturbed by construction activities, potentially resulting in the death of fledglings or destruction of the nest, and the failure of the breeding attempt. For threatened species, this could be significant at the regional population level.	**Medium -high**	grasslands. • If there is a period of time in between the pre-construction walk-down by the avifaunal specialist and the onset of construction in a certain area, the ECO / EO must walk the line in order to identify the presence of any nests. • Construction workers must also be trained in awareness of priority species in the event that a ground-based nest is discovered. • Should an active nest of a priority species be discovered in or near the servitude, construction activities should be halted until such time as the young have successfully fledged as far as possible. • Construction activities must be restricted to the servitude, and the footprint of the construction area must not be expanded unnecessarily. • In pre-determined sensitive areas (as identified by the pre-construction walk-down), a construction vehicle access right of way must be identified and demarcated, from which vehicles must not deviate. • Vehicles must not enter / cross any	**Medium**

ALTERNATIVE 1 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		wetland / seepage grassland area. • Extreme care must be taken when stringing across wetland areas. Care must be taken to disturb the wetland habitat as far as possible.	
8. Heritage: • A number of late Stone Age artefacts and Historical features were found along all corridors alternatives.	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Very low (1) **Significance Rating: (11)** **Medium-high**	• If anything is noticed, work in that area should be stopped and the occurrence should immediately be reported to a museum, preferably one at which an archaeologist is available. The archaeologist should then investigate and evaluate the find. • Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits must be obtained from the South African Heritage Resources Agency. • Any mitigation measures applied by an archaeologist, in the sense of excavation and documentation, should be published in order to bring this information into the public domain.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Very Low (1) **Significant Rating: (9)** **Medium**
9. Visual: • Site clearing and removal of vegetation could alter the landscape as viewed	**Duration:** Medium Term (3) **Extent:** Local (2) **Frequency:** Local (2) **Probability:** Possible (2)	• Vegetation should be cleared in a phased manner on site and should be limited to the servitude.	**Duration:** Short Term (1) **Extent:** Local (2) **Frequency:** Local (2) **Probability:** Improbable (1)

ALTERNATIVE 1 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
from the surroundings of the site. • Construction equipment such as cranes could be visually intrusive.	**Intensity:** Low (2) **Significance Rating: (11)** **Medium High**		**Intensity:** Very Low (1) **Significance Rating: (7)** **Medium**
10. Social: • Loss of grazing land and impact on landowner's sense of place.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency :** Very rare(1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (9)** **Medium**	• Compensation for the temporary loss of grazing land should be included in the negotiation process with the landowner. • The area should be rehabilitated upon completion of the construction activities to ensure that the land is returned in the same condition as prior to the construction activities. • Mitigation measures should be implemented to avoid any negative impact on animals (e.g. fencing off the construction area). • Eskom or its appointed contractor(s) should assist with the temporary relocation of livestock during construction, as well as relocating cattle back to their original grazing area once construction in an area is completed. • Grazing areas should be rehabilitated to their original grazing conditions to ensure that cattle can continue to graze in the area once they are returned to that area.	**Duration:** Short Term (1) **Extent:** Site (1) **Frequency :** Very rare (1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (8)** **Medium**

ALTERNATIVE 1 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		• Where the area cannot be rehabilitated to its original condition within a reasonable period of time, Eskom or its appointed contractor(s) should provide funding to obtain alternative food sources to the farmer for the time period required for natural rehabilitation to occur within the grazing area.	
INDIRECT IMPACTS			
1. Flora: • Floristic species changes subsequent to development. • Impacts on surrounding habitat / species.	**Duration:** Short Term (2) **Extent:** Localised (2) **Frequency:** Unusual (1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (10)** **Medium**	• Exotic weeds and invaders that might establish on the re-vegetated areas should be controlled to allow the grasses to properly establish. • Monitoring the potential spread of declared weeds and invasive alien vegetation to neighbouring land and protecting the agricultural resources and soil conservation works are regulated by the Conservation of Agricultural Resources Act, No. 43 of 1983 and should be addressed on a continual basis.	**Duration:** Short Term (2) **Extent:** Localised (2) **Frequency:** Unusual (1) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
2. Wetlands: • The erosion and/or sedimentation of the wetland downslope of the tower location and the access roads during the construction phase as a result of poor	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2)	• Provision of adequate storm water measures and controls during construction. • The establishment and re-growth of alien vegetation must be controlled after the removal of grass. All declared aliens	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2)

ALTERNATIVE 1 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
storm water management and/or poor tower and/or access road location. • Alien vegetation encroachment associated with the above mentioned disturbances.	**Significant Rating: (13)** **Medium High**	must be identified and managed in accordance with the National Environmental Management Biodiversity (Act 10 of 2004).	**Significance Rating: (10)** **Medium**
3. Social: • Limited opportunities do, however, exist for manual labour for unskilled tasks, where the appointed contractor would be required to make use of local workers (e.g. for bush clearing and the digging of foundations).	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**	• In order to minimise the potential for influx of workers, however, it is recommended that local labour be utilised as far as possible.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
CUMULATIVE IMPACTS			
1. Flora: • Increase in local and regional fragmentation / isolation of habitat.	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**	• Cumulative impacts associated with this type of development will lead to initial, incremental or augmentation of existing types of environmental degradation, including impacts on the air, soil and water present within available habitat. Pollution of these elements might not always be immediately visible or readily quantifiable, but incremental or fractional increases might rise to levels where biological attributes could be affected adversely on a local or regional	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**

ALTERNATIVE 1 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		scale. In most cases are these effects are not bound and is dispersed, or diluted over an area that is much larger than the actual footprint of the causal factor.	

ALTERNATIVE 2 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
DIRECT IMPACTS			
1. Construction Related Impacts: • Movements of trucks, delivery of construction material, oil leakages from machinery and vehicles, disposal of construction waste, excessive noise etc. will constitute the main impacts during construction.	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Very Frequent (4) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (14)** **Medium–High**	• Construction related (solid & hazardous) and general waste must be collected regularly from the site and disposed of at an appropriate registered landfill site. • Management of oil and other spillages and leakages must be minimized. • Construction waste must not be stored more than 30 days on site. • Dust suppression measures must be implemented by the appointed Contract to minimise dust nuisance in the surrounding communities. • Construction activities must be undertaken during normal working hours (07H00 to 17H00) to minimise noise and disturbance of neighbouring landowners.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Improbable (1) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**

ALTERNATIVE 2 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
2. Topography and Soils: The direct impact on landforms with the establishment of distribution power lines is mainly one of disruption of surface soils. Potential erosion impacts are anticipated to be limited to the construction phase during site clearing activities.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**	• Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately to prevent soil erosion. • Limit construction-, maintenance- and inspection activities to dry periods in order to curb occurrence/ augmentation of erosion in areas of existing erosion. • No vehicles should be allowed to cross rivers or streams in any area other than an approved crossing, taking care to prevent any impact (particularly erosion) in surrounding habitat. • Remove and store topsoil separately in areas where excavation/degradation takes place. Topsoil should be used for rehabilitation purposes in order to facilitate re-growth of species that occur naturally in the area.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Low (1) **Significance Rating: (7)** **Medium**
3. Wetlands: Irresponsible construction practices could lead to the pollution of wetlands and rivers (e.g. faecal contamination, or pollution of surface water through hydrocarbons) • Poor storm water management could lead to the siltation (pollution) of surface waters. • Temporary accesses across wetlands /	**Duration:** Medium Term (3) **Extent :** Local (2) **Frequency :** Unusual (2) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (11)** **Medium-high**	• Construction to be guided by Eskom guidelines for construction • Construction to be monitored by an ECO according to the stipulations of the EMPr • No batching or chemical / fuel storage areas to be located within any surface water feature or within 100m of a wetland or other surface water feature. • A construction storm water management plan to be devised to prevent silt ingress	**Duration:** Short Term (1) **Extent:** Site specific (1) **Frequency:** Very rare (1) **Probability:** Probable (2) **Intensity :** Low (2) **Significance Rating: (7)** **Medium**

ALTERNATIVE 2 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
rivers could cause hydrological and morphological impacts and degrade the resource quality • Construction of towers in wetlands could cause significant damage to the wetland in which the tower(s) is constructed. This would relate primarily to the access of machinery into the wetland to construct the tower – heavy vehicles and other machinery.		into surface water features • No temporary construction accesses to be constructed through any surface water feature and no machinery to enter any wetland unless authorised under the EMPr by the ECO as part of a construction activity	
4. Riparian zones • Construction of the power line within riparian corridors • Construction of the power line across riparian corridors would constitute an impact on the riparian zone and transforms a part of the riparian zone, and increases In Towers and spans constructed in any riparian habitat (i.e. creation of a power line servitude through a riparian area) without permission / authorisation from the relevant authorities would be illegal in terms of the National Water Act	**Duration:** Medium Term (2) **Extent:** Local (2) **Frequency:** Unusual (2) **Intensity:** Moderate (2) **Probability:** Highly Probable (3) **Significance: (11)** **Medium- High**	• Line planning should be done in such a manner that the power line avoids crossing / traversing riparian areas unnecessarily. • All power line spans and towers placed within a riparian zone must be subject to the acquisition of a Water Use Licence from the DWA. • The stipulations of the WUL technical report, and any licence conditions as stipulated in the WUL must be adhered to. • Construction of towers and spans within riparian areas must be carefully monitored by the ECO and any construction team environmental officers.	**Duration:** Medium Term (2) **Extent:** Local (2) **Frequency:** Very rare (1) **Intensity:** Moderate (2) **Probability:** Probable (2) **Significance: (9)** **Medium**

ALTERNATIVE 2 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
5. Water Resources: • Pollution of groundwater and surface water resources.	**Duration:** Short Term (1) **Extent:** Regional (3) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (11)** **Medium-high**	• Waste water should be directed into the proper systems. • Sewage water should not be channelled through surface water bodies or be allowed to flow freely or stagnate on the soil surface. • Adequate sanitary facilities and ablutions must be provided for construction workers. • Use and or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled. • Further detailed mitigation measures are included in the EMPr (Appendix F).	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Very low (1) **Significance Rating: (7)** **Medium**
6. Flora: Impacts include: • Destruction of threatened and protected flora species – physical damage or destruction of Red Data or Protected species or areas that is suitable for these species, representing a significant impact on the biodiversity of a region. • Destruction of sensitive pristine habitat types – The loss of pristine habitat types or habitat that are regarded sensitive as a result of restricted presence in the larger region (atypical habitat) represents a potential loss of habitat and	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (12)** **Medium- High**	• All individuals / stands of protected trees must be clearly and visibly marked prior to the start of construction or maintenance procedures. It is recommended that a walk-through of the approved servitude be conducted prior to construction activities commencing. • No painting or marking of rocks or vegetation to identify locality or other information shall be allowed as it will disfigure the natural setting. • Marking shall be done by steel stakes with tags, if required Demarcate construction areas by semi-permanent	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**

ALTERNATIVE 2 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
biodiversity on a regional scale.		means in order to control movement of personnel, vehicles, providing boundaries for construction sites in order to prevent spread of impacts; • Construction sites/camps need a detailed ecological assessment prior to construction; • Disturbance of vegetation must be limited to areas of construction. • Removal of vegetation / plants shall be avoided until such time as soil stripping is required and similarly exposed surfaces must be re-vegetated or stabilised as soon as is practically possible. • The establishment and re-growth of alien vegetation must be controlled after the removal of grass. All declared aliens must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).	
7. Avifauna: • Construction Activities in sensitive avifaunal habitats could lead to disturbance of sensitive / threatened species that could result in them moving	**Duration :** Medium Term (3) **Extent :** Regional (3) **Frequency:** Frequent (3) **Probability:** Probable (2) **Intensity :** Low (2) **Significance Rating (13)**	• Construction to be guided by Eskom guidelines for construction. • The ECO and Contractor's EO must be made aware and trained in recognition of certain key species, especially those species that nest in non-wetland	**Duration :** Short Term (1) **Extent:** Site (1) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (7)**

ALTERNATIVE 2 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
away from the area thus adversely affecting natural foraging habits. • Terrestrial nesting species could be disturbed by construction activities, potentially resulting in the death of fledglings or destruction of the nest, and the failure of the breeding attempt. For threatened species, this could be significant at the regional population level.	**Medium -high**	grasslands. • If there is a period of time in between the pre-construction walk-down by the avifaunal specialist and the onset of construction in a certain area, the ECO / EO must walk the line in order to identify the presence of any nests. • Construction workers must also be trained in awareness of priority species in the event that a ground-based nest is discovered. • Should an active nest of a priority species be discovered in or near the servitude, construction activities should be halted until such time as the young have successfully fledged as far as possible. • Construction activities must be restricted to the servitude, and the footprint of the construction area must not be expanded unnecessarily. • In pre-determined sensitive areas (as identified by the pre-construction walk-down), a construction vehicle access right of way must be identified and demarcated, from which vehicles must not deviate. • Vehicles must not enter / cross any	**Medium**

ALTERNATIVE 2 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		wetland / seepage grassland area. • Extreme care must be taken when stringing across wetland areas. Care must be taken to disturb the wetland habitat as far as possible.	
8. Heritage: • A number of late Stone Age artefacts and Historical features were found along all corridors alternatives.	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Very low (1) **Significance Rating: (11)** **Medium-high**	• If anything is noticed, work in that area should be stopped and the occurrence should immediately be reported to a museum, preferably one at which an archaeologist is available. The archaeologist should then investigate and evaluate the find. • Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits must be obtained from the South African Heritage Resources Agency. • Any mitigation measures applied by an archaeologist, in the sense of excavation and documentation, should be published in order to bring this information into the public domain.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Very Low (1) **Significant Rating: (9)** **Medium**
9. Visual: • Site clearing and removal of vegetation could alter the landscape as viewed	**Duration:** Medium Term (3) **Extent:** Local (2) **Frequency:** Local (2) **Probability:** Possible (2)	• Vegetation should be cleared in a phased manner on site and should be limited to the servitude.	**Duration:** Short Term (1) **Extent:** Local (2) **Frequency:** Local (2) **Probability:** Improbable (1)

ALTERNATIVE 2 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
from the surroundings of the site. • Construction equipment such as cranes could be visually intrusive.	**Intensity:** Low (2) **Significance Rating: (11)** **Medium High**		**Intensity:** Very Low (1) **Significance Rating: (7)** **Medium**
10. Social: • Loss of grazing land and impact on landowner's sense of place.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency :** Very rare(1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (9)** **Medium**	• Compensation for the temporary loss of grazing land should be included in the negotiation process with the landowner. • The area should be rehabilitated upon completion of the construction activities to ensure that the land is returned in the same condition as prior to the construction activities. • Mitigation measures should be implemented to avoid any negative impact on animals (e.g. fencing off the construction area). • Eskom or its appointed contractor(s) should assist with the temporary relocation of livestock during construction, as well as relocating cattle back to their original grazing area once construction in an area is completed. • Grazing areas should be rehabilitated to their original grazing conditions to ensure that cattle can continue to graze in the area once they are returned to that area.	**Duration:** Short Term (1) **Extent:** Site (1) **Frequency :** Very rare (1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (8)** **Medium**

ALTERNATIVE 2 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		• Where the area cannot be rehabilitated to its original condition within a reasonable period of time, Eskom or its appointed contractor(s) should provide funding to obtain alternative food sources to the farmer for the time period required for natural rehabilitation to occur within the grazing area.	
INDIRECT IMPACTS			
4. Flora: • Floristic species changes subsequent to development. • Impacts on surrounding habitat / species.	**Duration:** Short Term (2) **Extent:** Localised (2) **Frequency:** Unusual (1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (10)** **Medium**	• Exotic weeds and invaders that might establish on the re-vegetated areas should be controlled to allow the grasses to properly establish. • Monitoring the potential spread of declared weeds and invasive alien vegetation to neighbouring land and protecting the agricultural resources and soil conservation works are regulated by the Conservation of Agricultural Resources Act, No. 43 of 1983 and should be addressed on a continual basis.	**Duration:** Short Term (2) **Extent:** Localised (2) **Frequency:** Unusual (1) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
5. Wetlands: • The erosion and/or sedimentation of the wetland downslope of the tower location and the access roads during the construction phase as a result of poor	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2)	• Provision of adequate storm water measures and controls during construction. • The establishment and re-growth of alien vegetation must be controlled after the removal of grass. All declared aliens	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2)

ALTERNATIVE 2 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
storm water management and/or poor tower and/or access road location. • Alien vegetation encroachment associated with the above mentioned disturbances.	**Significant Rating: (13)** **Medium High**	must be identified and managed in accordance with the National Environmental Management Biodiversity (Act 10 of 2004).	**Significance Rating: (10)** **Medium**
6. Social: • Limited opportunities do, however, exist for manual labour for unskilled tasks, where the appointed contractor would be required to make use of local workers (e.g. for bush clearing and the digging of foundations).	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**	• In order to minimise the potential for influx of workers, however, it is recommended that local labour be utilised as far as possible.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
CUMULATIVE IMPACTS			
1. Flora: • Increase in local and regional fragmentation / isolation of habitat.	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**	• Cumulative impacts associated with this type of development will lead to initial, incremental or augmentation of existing types of environmental degradation, including impacts on the air, soil and water present within available habitat. Pollution of these elements might not always be immediately visible or readily quantifiable, but incremental or fractional increases might rise to levels where biological attributes could be affected adversely on a local or regional	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**

ALTERNATIVE 2 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		scale. In most cases are these effects are not bound and is dispersed, or diluted over an area that is much larger than the actual footprint of the causal factor.	

ALTERNATIVE 3 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
DIRECT IMPACTS			
1. Construction Related Impacts: • Movements of trucks, delivery of construction material, oil leakages from machinery and vehicles, disposal of construction waste, excessive noise etc. will constitute the main impacts during construction.	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Very Frequent (4) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (14)** **Medium–High**	• Construction related (solid & hazardous) and general waste must be collected regularly from the site and disposed of at an appropriate registered landfill site. • Management of oil and other spillages and leakages must be minimized. • Construction waste must not be stored more than 30 days on site. • Dust suppression measures must be implemented by the appointed Contract to minimise dust nuisance in the surrounding communities. • Construction activities must be undertaken during normal working hours (07H00 to 17H00) to minimise noise and disturbance of neighbouring landowners.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Improbable (1) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**

ALTERNATIVE 3 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
2. Topography and Soils: The direct impact on landforms with the establishment of distribution power lines is mainly one of disruption of surface soils. Potential erosion impacts are anticipated to be limited to the construction phase during site clearing activities.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**	• Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately to prevent soil erosion. • Limit construction-, maintenance- and inspection activities to dry periods in order to curb occurrence/ augmentation of erosion in areas of existing erosion. • No vehicles should be allowed to cross rivers or streams in any area other than an approved crossing, taking care to prevent any impact (particularly erosion) in surrounding habitat. • Remove and store topsoil separately in areas where excavation/degradation takes place. Topsoil should be used for rehabilitation purposes in order to facilitate re-growth of species that occur naturally in the area.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Low (1) **Significance Rating: (7)** **Medium**
3. Wetlands: Irresponsible construction practices could lead to the pollution of wetlands and rivers (e.g. faecal contamination, or pollution of surface water through hydrocarbons) • Poor storm water management could lead to the siltation (pollution) of surface waters. • Temporary accesses across wetlands /	**Duration:** Medium Term (3) **Extent :** Local (2) **Frequency :** Unusual (2) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (11)** **Medium-high**	• Construction to be guided by Eskom guidelines for construction • Construction to be monitored by an ECO according to the stipulations of the EMPr • No batching or chemical / fuel storage areas to be located within any surface water feature or within 100m of a wetland or other surface water feature. • A construction storm water management plan to be devised to prevent silt ingress	**Duration:** Short Term (1) **Extent:** Site specific (1) **Frequency:** Very rare (1) **Probability:** Probable (2) **Intensity :** Low (2) **Significance Rating: (7)** **Medium**

ALTERNATIVE 3 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
rivers could cause hydrological and morphological impacts and degrade the resource quality • Construction of towers in wetlands could cause significant damage to the wetland in which the tower(s) is constructed. This would relate primarily to the access of machinery into the wetland to construct the tower – heavy vehicles and other machinery.		into surface water features • No temporary construction accesses to be constructed through any surface water feature and no machinery to enter any wetland unless authorised under the EMPr by the ECO as part of a construction activity	
4. Riparian zones • Construction of the power line within riparian corridors • Construction of the power line across riparian corridors would constitute an impact on the riparian zone and transforms a part of the riparian zone, and increases In Towers and spans constructed in any riparian habitat (i.e. creation of a power line servitude through a riparian area) without permission / authorisation from the relevant authorities would be illegal in terms of the National Water Act	**Duration:** Medium Term (2) **Extent:** Local (2) **Frequency:** Unusual (2) **Intensity:** Moderate (2) **Probability:** Highly Probable (3) **Significance: (11)** **Medium- High**	• Line planning should be done in such a manner that the power line avoids crossing / traversing riparian areas unnecessarily. • All power line spans and towers placed within a riparian zone must be subject to the acquisition of a Water Use Licence from the DWA. • The stipulations of the WUL technical report, and any licence conditions as stipulated in the WUL must be adhered to. • Construction of towers and spans within riparian areas must be carefully monitored by the ECO and any construction team environmental officers.	**Duration:** Medium Term (2) **Extent:** Local (2) **Frequency:** Very rare (1) **Intensity:** Moderate (2) **Probability:** Probable (2) **Significance: (9)** **Medium**

ALTERNATIVE 3 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
5. Water Resources: • Pollution of groundwater and surface water resources.	**Duration:** Short Term (1) **Extent:** Regional (3) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (11)** **Medium-high**	• Waste water should be directed into the proper systems. • Sewage water should not be channelled through surface water bodies or be allowed to flow freely or stagnate on the soil surface. • Adequate sanitary facilities and ablutions must be provided for construction workers. • Use and or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled. • Further detailed mitigation measures are included in the EMPr (Appendix F).	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Very low (1) **Significance Rating: (7)** **Medium**
6. Flora: Impacts include: • Destruction of threatened and protected flora species – physical damage or destruction of Red Data or Protected species or areas that is suitable for these species, representing a significant impact on the biodiversity of a region. • Destruction of sensitive pristine habitat types – The loss of pristine habitat types or habitat that are regarded sensitive as a result of restricted presence in the larger region (atypical habitat) represents a potential loss of habitat and	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (12)** **Medium- High**	• All individuals / stands of protected trees must be clearly and visibly marked prior to the start of construction or maintenance procedures. It is recommended that a walk-through of the approved servitude be conducted prior to construction activities commencing. • No painting or marking of rocks or vegetation to identify locality or other information shall be allowed as it will disfigure the natural setting. • Marking shall be done by steel stakes with tags, if required Demarcate construction areas by semi-permanent	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**

ALTERNATIVE 3 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
biodiversity on a regional scale.		means in order to control movement of personnel, vehicles, providing boundaries for construction sites in order to prevent spread of impacts; • Construction sites/camps need a detailed ecological assessment prior to construction; • Disturbance of vegetation must be limited to areas of construction. • Removal of vegetation / plants shall be avoided until such time as soil stripping is required and similarly exposed surfaces must be re-vegetated or stabilised as soon as is practically possible. • The establishment and re-growth of alien vegetation must be controlled after the removal of grass. All declared aliens must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).	
7. Avifauna: • Construction Activities in sensitive avifaunal habitats could lead to disturbance of sensitive / threatened species that could result in them moving	**Duration :** Medium Term (3) **Extent :** Regional (3) **Frequency:** Frequent (3) **Probability:** Probable (2) **Intensity :** Low (2) **Significance Rating (13)**	• Construction to be guided by Eskom guidelines for construction. • The ECO and Contractor's EO must be made aware and trained in recognition of certain key species, especially those species that nest in non-wetland	**Duration :** Short Term (1) **Extent:** Site (1) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (7)**

ALTERNATIVE 3 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
away from the area thus adversely affecting natural foraging habits. • Terrestrial nesting species could be disturbed by construction activities, potentially resulting in the death of fledglings or destruction of the nest, and the failure of the breeding attempt. For threatened species, this could be significant at the regional population level.	**Medium -high**	grasslands. • If there is a period of time in between the pre-construction walk-down by the avifaunal specialist and the onset of construction in a certain area, the ECO / EO must walk the line in order to identify the presence of any nests. • Construction workers must also be trained in awareness of priority species in the event that a ground-based nest is discovered. • Should an active nest of a priority species be discovered in or near the servitude, construction activities should be halted until such time as the young have successfully fledged as far as possible. • Construction activities must be restricted to the servitude, and the footprint of the construction area must not be expanded unnecessarily. • In pre-determined sensitive areas (as identified by the pre-construction walk-down), a construction vehicle access right of way must be identified and demarcated, from which vehicles must not deviate. • Vehicles must not enter / cross any	**Medium**

ALTERNATIVE 3 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		wetland / seepage grassland area. • Extreme care must be taken when stringing across wetland areas. Care must be taken to disturb the wetland habitat as far as possible.	
8. Heritage: • A number of late Stone Age artefacts and Historical features were found along all corridors alternatives.	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Very low (1) **Significance Rating: (11)** **Medium-high**	• If anything is noticed, work in that area should be stopped and the occurrence should immediately be reported to a museum, preferably one at which an archaeologist is available. The archaeologist should then investigate and evaluate the find. • Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits must be obtained from the South African Heritage Resources Agency. • Any mitigation measures applied by an archaeologist, in the sense of excavation and documentation, should be published in order to bring this information into the public domain.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Very Low (1) **Significant Rating: (9)** **Medium**
9. Visual: • Site clearing and removal of vegetation could alter the landscape as viewed	**Duration:** Medium Term (3) **Extent:** Local (2) **Frequency:** Local (2) **Probability:** Possible (2)	• Vegetation should be cleared in a phased manner on site and should be limited to the servitude.	**Duration:** Short Term (1) **Extent:** Local (2) **Frequency:** Local (2) **Probability:** Improbable (1)

ALTERNATIVE 3 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
from the surroundings of the site. • Construction equipment such as cranes could be visually intrusive.	**Intensity:** Low (2) **Significance Rating: (11)** **Medium High**		**Intensity:** Very Low (1) **Significance Rating: (7)** **Medium**
10. Social: • Loss of grazing land and impact on landowner's sense of place.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency :** Very rare(1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (9)** **Medium**	• Compensation for the temporary loss of grazing land should be included in the negotiation process with the landowner. • The area should be rehabilitated upon completion of the construction activities to ensure that the land is returned in the same condition as prior to the construction activities. • Mitigation measures should be implemented to avoid any negative impact on animals (e.g. fencing off the construction area). • Eskom or its appointed contractor(s) should assist with the temporary relocation of livestock during construction, as well as relocating cattle back to their original grazing area once construction in an area is completed. • Grazing areas should be rehabilitated to their original grazing conditions to ensure that cattle can continue to graze in the area once they are returned to that area.	**Duration:** Short Term (1) **Extent:** Site (1) **Frequency :** Very rare (1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (8)** **Medium**

ALTERNATIVE 3 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		• Where the area cannot be rehabilitated to its original condition within a reasonable period of time, Eskom or its appointed contractor(s) should provide funding to obtain alternative food sources to the farmer for the time period required for natural rehabilitation to occur within the grazing area.	
INDIRECT IMPACTS			
7. Flora: • Floristic species changes subsequent to development. • Impacts on surrounding habitat / species.	**Duration:** Short Term (2) **Extent:** Localised (2) **Frequency:** Unusual (1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (10)** **Medium**	• Exotic weeds and invaders that might establish on the re-vegetated areas should be controlled to allow the grasses to properly establish. • Monitoring the potential spread of declared weeds and invasive alien vegetation to neighbouring land and protecting the agricultural resources and soil conservation works are regulated by the Conservation of Agricultural Resources Act, No. 43 of 1983 and should be addressed on a continual basis.	**Duration:** Short Term (2) **Extent:** Localised (2) **Frequency:** Unusual (1) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
8. Wetlands: • The erosion and/or sedimentation of the wetland downslope of the tower location and the access roads during the construction phase as a result of poor	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2)	• Provision of adequate storm water measures and controls during construction. • The establishment and re-growth of alien vegetation must be controlled after the removal of grass. All declared aliens	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2)

ALTERNATIVE 3 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
storm water management and/or poor tower and/or access road location. • Alien vegetation encroachment associated with the above mentioned disturbances.	**Significant Rating: (13)** **Medium High**	must be identified and managed in accordance with the National Environmental Management Biodiversity (Act 10 of 2004).	**Significance Rating: (10)** **Medium**
9. Social: • Limited opportunities do, however, exist for manual labour for unskilled tasks, where the appointed contractor would be required to make use of local workers (e.g. for bush clearing and the digging of foundations).	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**	• In order to minimise the potential for influx of workers, however, it is recommended that local labour be utilised as far as possible.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
CUMULATIVE IMPACTS			
2. Flora: • Increase in local and regional fragmentation / isolation of habitat.	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**	• Cumulative impacts associated with this type of development will lead to initial, incremental or augmentation of existing types of environmental degradation, including impacts on the air, soil and water present within available habitat. Pollution of these elements might not always be immediately visible or readily quantifiable, but incremental or fractional increases might rise to levels where biological attributes could be affected adversely on a local or regional	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**

ALTERNATIVE 3 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		scale. In most cases are these effects are not bound and is dispersed, or diluted over an area that is much larger than the actual footprint of the causal factor.	

ALTERNATIVE 4 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
DIRECT IMPACTS			
1. Construction Related Impacts: • Movements of trucks, delivery of construction material, oil leakages from machinery and vehicles, disposal of construction waste, excessive noise etc. will constitute the main impacts during construction.	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Very Frequent (4) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (14)** **Medium–High**	• Construction related (solid & hazardous) and general waste must be collected regularly from the site and disposed of at an appropriate registered landfill site. • Management of oil and other spillages and leakages must be minimized. • Construction waste must not be stored more than 30 days on site. • Dust suppression measures must be implemented by the appointed Contract to minimise dust nuisance in the surrounding communities. • Construction activities must be undertaken during normal working hours (07H00 to 17H00) to minimise noise and disturbance of neighbouring landowners.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Improbable (1) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**

ALTERNATIVE 4 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
2. Topography and Soils: The direct impact on landforms with the establishment of distribution power lines is mainly one of disruption of surface soils. Potential erosion impacts are anticipated to be limited to the construction phase during site clearing activities.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**	• Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately to prevent soil erosion. • Limit construction-, maintenance- and inspection activities to dry periods in order to curb occurrence/ augmentation of erosion in areas of existing erosion. • No vehicles should be allowed to cross rivers or streams in any area other than an approved crossing, taking care to prevent any impact (particularly erosion) in surrounding habitat. • Remove and store topsoil separately in areas where excavation/degradation takes place. Topsoil should be used for rehabilitation purposes in order to facilitate re-growth of species that occur naturally in the area.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Low (1) **Significance Rating: (7)** **Medium**
3. Wetlands: Irresponsible construction practices could lead to the pollution of wetlands and rivers (e.g. faecal contamination, or pollution of surface water through hydrocarbons) • Poor storm water management could lead to the siltation (pollution) of surface waters. • Temporary accesses across wetlands /	**Duration:** Medium Term (3) **Extent :** Local (2) **Frequency :** Unusual (2) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (11)** **Medium-high**	• Construction to be guided by Eskom guidelines for construction • Construction to be monitored by an ECO according to the stipulations of the EMPr • No batching or chemical / fuel storage areas to be located within any surface water feature or within 100m of a wetland or other surface water feature. • A construction storm water management plan to be devised to prevent silt ingress	**Duration:** Short Term (1) **Extent:** Site specific (1) **Frequency:** Very rare (1) **Probability:** Probable (2) **Intensity :** Low (2) **Significance Rating: (7)** **Medium**

ALTERNATIVE 4 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
rivers could cause hydrological and morphological impacts and degrade the resource quality • Construction of towers in wetlands could cause significant damage to the wetland in which the tower(s) is constructed. This would relate primarily to the access of machinery into the wetland to construct the tower – heavy vehicles and other machinery.		into surface water features • No temporary construction accesses to be constructed through any surface water feature and no machinery to enter any wetland unless authorised under the EMPr by the ECO as part of a construction activity	
4. Riparian zones • Construction of the power line within riparian corridors • Construction of the power line across riparian corridors would constitute an impact on the riparian zone and transforms a part of the riparian zone, and increases In Towers and spans constructed in any riparian habitat (i.e. creation of a power line servitude through a riparian area) without permission / authorisation from the relevant authorities would be illegal in terms of the National Water Act	**Duration:** Medium Term (2) **Extent:** Local (2) **Frequency:** Unusual (2) **Intensity:** Moderate (2) **Probability:** Highly Probable (3) **Significance: (11)** **Medium- High**	• Line planning should be done in such a manner that the power line avoids crossing / traversing riparian areas unnecessarily. • All power line spans and towers placed within a riparian zone must be subject to the acquisition of a Water Use Licence from the DWA. • The stipulations of the WUL technical report, and any licence conditions as stipulated in the WUL must be adhered to. • Construction of towers and spans within riparian areas must be carefully monitored by the ECO and any construction team environmental officers.	**Duration:** Medium Term (2) **Extent:** Local (2) **Frequency:** Very rare (1) **Intensity:** Moderate (2) **Probability:** Probable (2) **Significance: (9)** **Medium**

ALTERNATIVE 4 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
5. Water Resources: • Pollution of groundwater and surface water resources.	**Duration:** Short Term (1) **Extent:** Regional (3) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (11)** **Medium-high**	• Waste water should be directed into the proper systems. • Sewage water should not be channelled through surface water bodies or be allowed to flow freely or stagnate on the soil surface. • Adequate sanitary facilities and ablutions must be provided for construction workers. • Use and or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled. • Further detailed mitigation measures are included in the EMPr (Appendix F).	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Very low (1) **Significance Rating: (7)** **Medium**
6. Flora: Impacts include: • Destruction of threatened and protected flora species – physical damage or destruction of Red Data or Protected species or areas that is suitable for these species, representing a significant impact on the biodiversity of a region. • Destruction of sensitive pristine habitat types – The loss of pristine habitat types or habitat that are regarded sensitive as a result of restricted presence in the larger region (atypical habitat) represents a potential loss of habitat and	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (12)** **Medium- High**	• All individuals / stands of protected trees must be clearly and visibly marked prior to the start of construction or maintenance procedures. It is recommended that a walk-through of the approved servitude be conducted prior to construction activities commencing. • No painting or marking of rocks or vegetation to identify locality or other information shall be allowed as it will disfigure the natural setting. • Marking shall be done by steel stakes with tags, if required Demarcate construction areas by semi-permanent	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**

ALTERNATIVE 4 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
biodiversity on a regional scale.		means in order to control movement of personnel, vehicles, providing boundaries for construction sites in order to prevent spread of impacts; • Construction sites/camps need a detailed ecological assessment prior to construction; • Disturbance of vegetation must be limited to areas of construction. • Removal of vegetation / plants shall be avoided until such time as soil stripping is required and similarly exposed surfaces must be re-vegetated or stabilised as soon as is practically possible. • The establishment and re-growth of alien vegetation must be controlled after the removal of grass. All declared aliens must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).	
7. Avifauna: • Construction Activities in sensitive avifaunal habitats could lead to disturbance of sensitive / threatened species that could result in them moving	**Duration :** Medium Term (3) **Extent :** Regional (3) **Frequency:** Frequent (3) **Probability:** Probable (2) **Intensity :** Low (2) **Significance Rating (13)**	• Construction to be guided by Eskom guidelines for construction. • The ECO and Contractor's EO must be made aware and trained in recognition of certain key species, especially those species that nest in non-wetland	**Duration :** Short Term (1) **Extent:** Site (1) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (7)**

ALTERNATIVE 4 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
away from the area thus adversely affecting natural foraging habits. • Terrestrial nesting species could be disturbed by construction activities, potentially resulting in the death of fledglings or destruction of the nest, and the failure of the breeding attempt. For threatened species, this could be significant at the regional population level.	**Medium -high**	grasslands. • If there is a period of time in between the pre-construction walk-down by the avifaunal specialist and the onset of construction in a certain area, the ECO / EO must walk the line in order to identify the presence of any nests. • Construction workers must also be trained in awareness of priority species in the event that a ground-based nest is discovered. • Should an active nest of a priority species be discovered in or near the servitude, construction activities should be halted until such time as the young have successfully fledged as far as possible. • Construction activities must be restricted to the servitude, and the footprint of the construction area must not be expanded unnecessarily. • In pre-determined sensitive areas (as identified by the pre-construction walk-down), a construction vehicle access right of way must be identified and demarcated, from which vehicles must not deviate. • Vehicles must not enter / cross any	**Medium**

ALTERNATIVE 4 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		wetland / seepage grassland area. • Extreme care must be taken when stringing across wetland areas. Care must be taken to disturb the wetland habitat as far as possible.	
8. Heritage: • A number of late Stone Age artefacts and Historical features were found along all corridors alternatives.	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Very low (1) **Significance Rating: (11)** **Medium-high**	• If anything is noticed, work in that area should be stopped and the occurrence should immediately be reported to a museum, preferably one at which an archaeologist is available. The archaeologist should then investigate and evaluate the find. • Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits must be obtained from the South African Heritage Resources Agency. • Any mitigation measures applied by an archaeologist, in the sense of excavation and documentation, should be published in order to bring this information into the public domain.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Very Low (1) **Significant Rating: (9)** **Medium**
9. Visual: • Site clearing and removal of vegetation could alter the landscape as viewed	**Duration:** Medium Term (3) **Extent:** Local (2) **Frequency:** Local (2) **Probability:** Possible (2)	• Vegetation should be cleared in a phased manner on site and should be limited to the servitude.	**Duration:** Short Term (1) **Extent:** Local (2) **Frequency:** Local (2) **Probability:** Improbable (1)

ALTERNATIVE 4 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
from the surroundings of the site. • Construction equipment such as cranes could be visually intrusive.	**Intensity:** Low (2) **Significance Rating: (11)** **Medium High**		**Intensity:** Very Low (1) **Significance Rating: (7)** **Medium**
10. Social: • Loss of grazing land and impact on landowner's sense of place.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency :** Very rare(1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (9)** **Medium**	• Compensation for the temporary loss of grazing land should be included in the negotiation process with the landowner. • The area should be rehabilitated upon completion of the construction activities to ensure that the land is returned in the same condition as prior to the construction activities. • Mitigation measures should be implemented to avoid any negative impact on animals (e.g. fencing off the construction area). • Eskom or its appointed contractor(s) should assist with the temporary relocation of livestock during construction, as well as relocating cattle back to their original grazing area once construction in an area is completed. • Grazing areas should be rehabilitated to their original grazing conditions to ensure that cattle can continue to graze in the area once they are returned to that area.	**Duration:** Short Term (1) **Extent:** Site (1) **Frequency :** Very rare (1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (8)** **Medium**

ALTERNATIVE 4 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		• Where the area cannot be rehabilitated to its original condition within a reasonable period of time, Eskom or its appointed contractor(s) should provide funding to obtain alternative food sources to the farmer for the time period required for natural rehabilitation to occur within the grazing area.	
INDIRECT IMPACTS			
10. Flora: • Floristic species changes subsequent to development. • Impacts on surrounding habitat / species.	**Duration:** Short Term (2) **Extent:** Localised (2) **Frequency:** Unusual (1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (10)** **Medium**	• Exotic weeds and invaders that might establish on the re-vegetated areas should be controlled to allow the grasses to properly establish. • Monitoring the potential spread of declared weeds and invasive alien vegetation to neighbouring land and protecting the agricultural resources and soil conservation works are regulated by the Conservation of Agricultural Resources Act, No. 43 of 1983 and should be addressed on a continual basis.	**Duration:** Short Term (2) **Extent:** Localised (2) **Frequency:** Unusual (1) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
11. Wetlands: • The erosion and/or sedimentation of the wetland downslope of the tower location and the access roads during the construction phase as a result of poor	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2)	• Provision of adequate storm water measures and controls during construction. • The establishment and re-growth of alien vegetation must be controlled after the removal of grass. All declared aliens	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2)

ALTERNATIVE 4 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
storm water management and/or poor tower and/or access road location. • Alien vegetation encroachment associated with the above mentioned disturbances.	**Significant Rating: (13)** **Medium High**	must be identified and managed in accordance with the National Environmental Management Biodiversity (Act 10 of 2004).	**Significance Rating: (10)** **Medium**
12. Social: • Limited opportunities do, however, exist for manual labour for unskilled tasks, where the appointed contractor would be required to make use of local workers (e.g. for bush clearing and the digging of foundations).	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**	• In order to minimise the potential for influx of workers, however, it is recommended that local labour be utilised as far as possible.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
CUMULATIVE IMPACTS			
3. Flora: • Increase in local and regional fragmentation / isolation of habitat.	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**	• Cumulative impacts associated with this type of development will lead to initial, incremental or augmentation of existing types of environmental degradation, including impacts on the air, soil and water present within available habitat. Pollution of these elements might not always be immediately visible or readily quantifiable, but incremental or fractional increases might rise to levels where biological attributes could be affected adversely on a local or regional	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**

ALTERNATIVE 4 – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		scale. In most cases are these effects are not bound and is dispersed, or diluted over an area that is much larger than the actual footprint of the causal factor.	

ALTERNATIVE 5(A) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
DIRECT IMPACTS			
1. Construction Related Impacts: • Movements of trucks, delivery of construction material, oil leakages from machinery and vehicles, disposal of construction waste, excessive noise etc. will constitute the main impacts during construction.	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Very Frequent (4) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (14)** **Medium–High**	• Construction related (solid & hazardous) and general waste must be collected regularly from the site and disposed of at an appropriate registered landfill site. • Management of oil and other spillages and leakages must be minimized. • Construction waste must not be stored more than 30 days on site. • Dust suppression measures must be implemented by the appointed Contract to minimise dust nuisance in the surrounding communities. • Construction activities must be undertaken during normal working hours (07H00 to 17H00) to minimise noise and disturbance of neighbouring landowners.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Improbable (1) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**

ALTERNATIVE 5(A) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
2. Topography and Soils: The direct impact on landforms with the establishment of distribution power lines is mainly one of disruption of surface soils. Potential erosion impacts are anticipated to be limited to the construction phase during site clearing activities.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**	• Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately to prevent soil erosion. • Limit construction-, maintenance- and inspection activities to dry periods in order to curb occurrence/ augmentation of erosion in areas of existing erosion. • No vehicles should be allowed to cross rivers or streams in any area other than an approved crossing, taking care to prevent any impact (particularly erosion) in surrounding habitat. • Remove and store topsoil separately in areas where excavation/degradation takes place. Topsoil should be used for rehabilitation purposes in order to facilitate re-growth of species that occur naturally in the area.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Low (1) **Significance Rating: (7)** **Medium**
3. Wetlands: Irresponsible construction practices could lead to the pollution of wetlands and rivers (e.g. faecal contamination, or pollution of surface water through hydrocarbons) • Poor storm water management could lead to the siltation (pollution) of surface waters. • Temporary accesses across wetlands /	**Duration:** Medium Term (3) **Extent :** Local (2) **Frequency :** Unusual (2) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (11)** **Medium-high**	• Construction to be guided by Eskom guidelines for construction • Construction to be monitored by an ECO according to the stipulations of the EMPr • No batching or chemical / fuel storage areas to be located within any surface water feature or within 100m of a wetland or other surface water feature. • A construction storm water management plan to be devised to prevent silt ingress	**Duration:** Short Term (1) **Extent:** Site specific (1) **Frequency:** Very rare (1) **Probability:** Probable (2) **Intensity :** Low (2) **Significance Rating: (7)** **Medium**

ALTERNATIVE 5(A) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
rivers could cause hydrological and morphological impacts and degrade the resource quality • Construction of towers in wetlands could cause significant damage to the wetland in which the tower(s) is constructed. This would relate primarily to the access of machinery into the wetland to construct the tower – heavy vehicles and other machinery.		into surface water features • No temporary construction accesses to be constructed through any surface water feature and no machinery to enter any wetland unless authorised under the EMPr by the ECO as part of a construction activity	
4. Riparian zones • Construction of the power line within riparian corridors • Construction of the power line across riparian corridors would constitute an impact on the riparian zone and transforms a part of the riparian zone, and increases In Towers and spans constructed in any riparian habitat (i.e. creation of a power line servitude through a riparian area) without permission / authorisation from the relevant authorities would be illegal in terms of the National Water Act	**Duration:** Medium Term (2) **Extent:** Local (2) **Frequency:** Unusual (2) **Intensity:** Moderate (2) **Probability:** Highly Probable (3) **Significance: (11)** **Medium- High**	• Line planning should be done in such a manner that the power line avoids crossing / traversing riparian areas unnecessarily. • All power line spans and towers placed within a riparian zone must be subject to the acquisition of a Water Use Licence from the DWA. • The stipulations of the WUL technical report and any licence conditions as stipulated in the WUL must be adhered to. • Construction of towers and spans within riparian areas must be carefully monitored by the ECO and any construction team environmental officers.	**Duration:** Medium Term (2) **Extent:** Local (2) **Frequency:** Very rare (1) **Intensity:** Moderate (2) **Probability:** Probable (2) **Significance: (9)** **Medium**

ALTERNATIVE 5(A) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
5. Water Resources: • Pollution of groundwater and surface water resources.	**Duration:** Short Term (1) **Extent:** Regional (3) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (11)** **Medium-high**	• Waste water should be directed into the proper systems. • Sewage water should not be channelled through surface water bodies or be allowed to flow freely or stagnate on the soil surface. • Adequate sanitary facilities and ablutions must be provided for construction workers. • Use and or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled. • Further detailed mitigation measures are included in the EMPr (Appendix F).	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Very low (1) **Significance Rating: (7)** **Medium**
6. Flora: Impacts include: • Destruction of threatened and protected flora species – physical damage or destruction of Red Data or Protected species or areas that is suitable for these species, representing a significant impact on the biodiversity of a region. • Destruction of sensitive pristine habitat types – The loss of pristine habitat types or habitat that are regarded sensitive as a result of restricted presence in the larger region (atypical habitat) represents a potential loss of habitat and	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (12)** **Medium- High**	• All individuals / stands of protected trees must be clearly and visibly marked prior to the start of construction or maintenance procedures. It is recommended that a walk-through of the approved servitude be conducted prior to construction activities commencing. • No painting or marking of rocks or vegetation to identify locality or other information shall be allowed as it will disfigure the natural setting. • Marking shall be done by steel stakes with tags, if required Demarcate construction areas by semi-permanent	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**

ALTERNATIVE 5(A) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
biodiversity on a regional scale.		means in order to control movement of personnel, vehicles, providing boundaries for construction sites in order to prevent spread of impacts; • Construction sites/camps need a detailed ecological assessment prior to construction; • Disturbance of vegetation must be limited to areas of construction. • Removal of vegetation / plants shall be avoided until such time as soil stripping is required and similarly exposed surfaces must be re-vegetated or stabilised as soon as is practically possible. • The establishment and re-growth of alien vegetation must be controlled after the removal of grass. All declared aliens must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).	
7. Avifauna: • Construction Activities in sensitive avifaunal habitats could lead to disturbance of sensitive / threatened species that could result in them moving	**Duration :** Medium Term (3) **Extent :** Regional (3) **Frequency:** Frequent (3) **Probability:** Probable (2) **Intensity :** Low (2) **Significance Rating (13)**	• Construction to be guided by Eskom guidelines for construction. • The ECO and Contractor's EO must be made aware and trained in recognition of certain key species, especially those species that nest in non-wetland	**Duration :** Short Term (1) **Extent:** Site (1) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (7)**

ALTERNATIVE 5(A) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
away from the area thus adversely affecting natural foraging habits. • Terrestrial nesting species could be disturbed by construction activities, potentially resulting in the death of fledglings or destruction of the nest, and the failure of the breeding attempt. For threatened species, this could be significant at the regional population level.	**Medium -high**	grasslands. • If there is a period of time in between the pre-construction walk-down by the avifaunal specialist and the onset of construction in a certain area, the ECO / EO must walk the line in order to identify the presence of any nests. • Construction workers must also be trained in awareness of priority species in the event that a ground-based nest is discovered. • Should an active nest of a priority species be discovered in or near the servitude, construction activities should be halted until such time as the young have successfully fledged as far as possible. • Construction activities must be restricted to the servitude, and the footprint of the construction area must not be expanded unnecessarily. • In pre-determined sensitive areas (as identified by the pre-construction walk-down), a construction vehicle access right of way must be identified and demarcated, from which vehicles must not deviate. • Vehicles must not enter / cross any	**Medium**

ALTERNATIVE 5(A) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		wetland / seepage grassland area. • Extreme care must be taken when stringing across wetland areas. Care must be taken to disturb the wetland habitat as far as possible.	
8. Heritage: • A number of late Stone Age artefacts and Historical features were found along all corridors alternatives.	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Very low (1) **Significance Rating: (11)** **Medium-high**	• If anything is noticed, work in that area should be stopped and the occurrence should immediately be reported to a museum, preferably one at which an archaeologist is available. The archaeologist should then investigate and evaluate the find. • Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits must be obtained from the South African Heritage Resources Agency. • Any mitigation measures applied by an archaeologist, in the sense of excavation and documentation, should be published in order to bring this information into the public domain.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Very Low (1) **Significant Rating: (9)** **Medium**
9. Visual: • Site clearing and removal of vegetation could alter the landscape as viewed	**Duration:** Medium Term (3) **Extent:** Local (2) **Frequency:** Local (2) **Probability:** Possible (2)	• Vegetation should be cleared in a phased manner on site and should be limited to the servitude.	**Duration:** Short Term (1) **Extent:** Local (2) **Frequency:** Local (2) **Probability:** Improbable (1)

ALTERNATIVE 5(A) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
from the surroundings of the site. • Construction equipment such as cranes could be visually intrusive.	**Intensity:** Low (2) **Significance Rating: (11)** **Medium High**		**Intensity:** Very Low (1) **Significance Rating: (7)** **Medium**
10. Social: • Loss of grazing land and impact on landowner's sense of place.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency :** Very rare(1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (9)** **Medium**	• Compensation for the temporary loss of grazing land should be included in the negotiation process with the landowner. • The area should be rehabilitated upon completion of the construction activities to ensure that the land is returned in the same condition as prior to the construction activities. • Mitigation measures should be implemented to avoid any negative impact on animals (e.g. fencing off the construction area). • Eskom or its appointed contractor(s) should assist with the temporary relocation of livestock during construction, as well as relocating cattle back to their original grazing area once construction in an area is completed. • Grazing areas should be rehabilitated to their original grazing conditions to ensure that cattle can continue to graze in the area once they are returned to that area.	**Duration:** Short Term (1) **Extent:** Site (1) **Frequency :** Very rare (1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (8)** **Medium**

ALTERNATIVE 5(A) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		• Where the area cannot be rehabilitated to its original condition within a reasonable period of time, Eskom or its appointed contractor(s) should provide funding to obtain alternative food sources to the farmer for the time period required for natural rehabilitation to occur within the grazing area.	
INDIRECT IMPACTS			
13. Flora: • Floristic species changes subsequent to development. • Impacts on surrounding habitat / species.	**Duration:** Short Term (2) **Extent:** Localised (2) **Frequency:** Unusual (1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (10)** **Medium**	• Exotic weeds and invaders that might establish on the re-vegetated areas should be controlled to allow the grasses to properly establish. • Monitoring the potential spread of declared weeds and invasive alien vegetation to neighbouring land and protecting the agricultural resources and soil conservation works are regulated by the Conservation of Agricultural Resources Act, No. 43 of 1983 and should be addressed on a continual basis.	**Duration:** Short Term (2) **Extent:** Localised (2) **Frequency:** Unusual (1) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
14. Wetlands: • The erosion and/or sedimentation of the wetland downslope of the tower location and the access roads during the construction phase as a result of poor	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2)	• Provision of adequate storm water measures and controls during construction. • The establishment and re-growth of alien vegetation must be controlled after the removal of grass. All declared aliens	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2)

ALTERNATIVE 5(A) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
storm water management and/or poor tower and/or access road location. • Alien vegetation encroachment associated with the above mentioned disturbances.	**Significant Rating: (13)** **Medium High**	must be identified and managed in accordance with the National Environmental Management Biodiversity (Act 10 of 2004).	**Significance Rating: (10)** **Medium**
15. Social: • Limited opportunities do, however, exist for manual labour for unskilled tasks, where the appointed contractor would be required to make use of local workers (e.g. for bush clearing and the digging of foundations).	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**	• In order to minimise the potential for influx of workers, however, it is recommended that local labour be utilised as far as possible.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
CUMULATIVE IMPACTS			
4. Flora: • Increase in local and regional fragmentation / isolation of habitat.	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**	• Cumulative impacts associated with this type of development will lead to initial, incremental or augmentation of existing types of environmental degradation, including impacts on the air, soil and water present within available habitat. Pollution of these elements might not always be immediately visible or readily quantifiable, but incremental or fractional increases might rise to levels where biological attributes could be affected adversely on a local or regional	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**

ALTERNATIVE 5(A) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		scale. In most cases are these effects are not bound and is dispersed, or diluted over an area that is much larger than the actual footprint of the causal factor.	

ALTERNATIVE 5(B) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
DIRECT IMPACTS			
1. Construction Related Impacts: • Movements of trucks, delivery of construction material, oil leakages from machinery and vehicles, disposal of construction waste, excessive noise etc. will constitute the main impacts during construction.	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Very Frequent (4) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (14)** **Medium–High**	• Construction related (solid & hazardous) and general waste must be collected regularly from the site and disposed of at an appropriate registered landfill site. • Management of oil and other spillages and leakages must be minimized. • Construction waste must not be stored more than 30 days on site. • Dust suppression measures must be implemented by the appointed Contract to minimise dust nuisance in the surrounding communities. • Construction activities must be undertaken during normal working hours (07H00 to 17H00) to minimise noise and disturbance of neighbouring landowners.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Improbable (1) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**

ALTERNATIVE 5(B) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
2. Topography and Soils: The direct impact on landforms with the establishment of distribution power lines is mainly one of disruption of surface soils. Potential erosion impacts are anticipated to be limited to the construction phase during site clearing activities.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**	• Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately to prevent soil erosion. • Limit construction-, maintenance- and inspection activities to dry periods in order to curb occurrence/ augmentation of erosion in areas of existing erosion. • No vehicles should be allowed to cross rivers or streams in any area other than an approved crossing, taking care to prevent any impact (particularly erosion) in surrounding habitat. • Remove and store topsoil separately in areas where excavation/degradation takes place. Topsoil should be used for rehabilitation purposes in order to facilitate re-growth of species that occur naturally in the area.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Low (1) **Significance Rating: (7)** **Medium**
3. Wetlands: Irresponsible construction practices could lead to the pollution of wetlands and rivers (e.g. faecal contamination, or pollution of surface water through hydrocarbons) • Poor storm water management could lead to the siltation (pollution) of surface waters. • Temporary accesses across wetlands /	**Duration:** Medium Term (3) **Extent :** Local (2) **Frequency :** Unusual (2) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (11)** **Medium-high**	• Construction to be guided by Eskom guidelines for construction • Construction to be monitored by an ECO according to the stipulations of the EMPr • No batching or chemical / fuel storage areas to be located within any surface water feature or within 100m of a wetland or other surface water feature. • A construction storm water management plan to be devised to prevent silt ingress	**Duration:** Short Term (1) **Extent:** Site specific (1) **Frequency:** Very rare (1) **Probability:** Probable (2) **Intensity :** Low (2) **Significance Rating: (7)** **Medium**

ALTERNATIVE 5(B) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
rivers could cause hydrological and morphological impacts and degrade the resource quality • Construction of towers in wetlands could cause significant damage to the wetland in which the tower(s) is constructed. This would relate primarily to the access of machinery into the wetland to construct the tower – heavy vehicles and other machinery.		into surface water features • No temporary construction accesses to be constructed through any surface water feature and no machinery to enter any wetland unless authorised under the EMPr by the ECO as part of a construction activity	
4. Riparian zones • Construction of the power line within riparian corridors • Construction of the power line across riparian corridors would constitute an impact on the riparian zone and transforms a part of the riparian zone, and increases In Towers and spans constructed in any riparian habitat (i.e. creation of a power line servitude through a riparian area) without permission / authorisation from the relevant authorities would be illegal in terms of the National Water Act	**Duration:** Medium Term (2) **Extent:** Local (2) **Frequency:** Unusual (2) **Intensity:** Moderate (2) **Probability:** Highly Probable (3) **Significance: (11)** **Medium- High**	• Line planning should be done in such a manner that the power line avoids crossing / traversing riparian areas unnecessarily. • All power line spans and towers placed within a riparian zone must be subject to the acquisition of a Water Use Licence from the DWA. • The stipulations of the WUL technical report and any licence conditions as stipulated in the WUL must be adhered to. • Construction of towers and spans within riparian areas must be carefully monitored by the ECO and any construction team environmental officers.	**Duration:** Medium Term (2) **Extent:** Local (2) **Frequency:** Very rare (1) **Intensity:** Moderate (2) **Probability:** Probable (2) **Significance: (9)** **Medium**

ALTERNATIVE 5(B) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
5. Water Resources: • Pollution of groundwater and surface water resources.	**Duration:** Short Term (1) **Extent:** Regional (3) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (11)** **Medium-high**	• Waste water should be directed into the proper systems. • Sewage water should not be channelled through surface water bodies or be allowed to flow freely or stagnate on the soil surface. • Adequate sanitary facilities and ablutions must be provided for construction workers. • Use and or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled. • Further detailed mitigation measures are included in the EMPr (Appendix F).	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Very low (1) **Significance Rating: (7)** **Medium**
6. Flora: Impacts include: • Destruction of threatened and protected flora species – physical damage or destruction of Red Data or Protected species or areas that is suitable for these species, representing a significant impact on the biodiversity of a region. • Destruction of sensitive pristine habitat types – The loss of pristine habitat types or habitat that are regarded sensitive as a result of restricted presence in the larger region (atypical habitat) represents a potential loss of habitat and	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (12)** **Medium- High**	• All individuals / stands of protected trees must be clearly and visibly marked prior to the start of construction or maintenance procedures. It is recommended that a walk-through of the approved servitude be conducted prior to construction activities commencing. • No painting or marking of rocks or vegetation to identify locality or other information shall be allowed as it will disfigure the natural setting. • Marking shall be done by steel stakes with tags, if required Demarcate construction areas by semi-permanent	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**

ALTERNATIVE 5(B) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
biodiversity on a regional scale.		means in order to control movement of personnel, vehicles, providing boundaries for construction sites in order to prevent spread of impacts; • Construction sites/camps need a detailed ecological assessment prior to construction; • Disturbance of vegetation must be limited to areas of construction. • Removal of vegetation / plants shall be avoided until such time as soil stripping is required and similarly exposed surfaces must be re-vegetated or stabilised as soon as is practically possible. • The establishment and re-growth of alien vegetation must be controlled after the removal of grass. All declared aliens must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).	
7. Avifauna: • Construction Activities in sensitive avifaunal habitats could lead to disturbance of sensitive / threatened species that could result in them moving	**Duration :** Medium Term (3) **Extent :** Regional (3) **Frequency:** Frequent (3) **Probability:** Probable (2) **Intensity :** Low (2) **Significance Rating (13)**	• Construction to be guided by Eskom guidelines for construction. • The ECO and Contractor's EO must be made aware and trained in recognition of certain key species, especially those species that nest in non-wetland	**Duration :** Short Term (1) **Extent:** Site (1) **Frequency:** Very Rare (1) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (7)**

ALTERNATIVE 5(B) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
away from the area thus adversely affecting natural foraging habits. • Terrestrial nesting species could be disturbed by construction activities, potentially resulting in the death of fledglings or destruction of the nest, and the failure of the breeding attempt. For threatened species, this could be significant at the regional population level.	**Medium -high**	grasslands. • If there is a period of time in between the pre-construction walk-down by the avifaunal specialist and the onset of construction in a certain area, the ECO / EO must walk the line in order to identify the presence of any nests. • Construction workers must also be trained in awareness of priority species in the event that a ground-based nest is discovered. • Should an active nest of a priority species be discovered in or near the servitude, construction activities should be halted until such time as the young have successfully fledged as far as possible. • Construction activities must be restricted to the servitude, and the footprint of the construction area must not be expanded unnecessarily. • In pre-determined sensitive areas (as identified by the pre-construction walk-down), a construction vehicle access right of way must be identified and demarcated, from which vehicles must not deviate. • Vehicles must not enter / cross any	**Medium**

ALTERNATIVE 5(B) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		wetland / seepage grassland area. • Extreme care must be taken when stringing across wetland areas. Care must be taken to disturb the wetland habitat as far as possible.	
8. Heritage: • A number of late Stone Age artefacts and Historical features were found along all corridors alternatives.	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Very low (1) **Significance Rating: (11)** **Medium-high**	• If anything is noticed, work in that area should be stopped and the occurrence should immediately be reported to a museum, preferably one at which an archaeologist is available. The archaeologist should then investigate and evaluate the find. • Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits must be obtained from the South African Heritage Resources Agency. • Any mitigation measures applied by an archaeologist, in the sense of excavation and documentation, should be published in order to bring this information into the public domain.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Very Low (1) **Significant Rating: (9)** **Medium**
9. Visual: • Site clearing and removal of vegetation could alter the landscape as viewed	**Duration:** Medium Term (3) **Extent:** Local (2) **Frequency:** Local (2) **Probability:** Possible (2)	• Vegetation should be cleared in a phased manner on site and should be limited to the servitude.	**Duration:** Short Term (1) **Extent:** Local (2) **Frequency:** Local (2) **Probability:** Improbable (1)

ALTERNATIVE 5(B) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
from the surroundings of the site. • Construction equipment such as cranes could be visually intrusive.	**Intensity:** Low (2) **Significance Rating: (11)** **Medium High**		**Intensity:** Very Low (1) **Significance Rating: (7)** **Medium**
10. Social: • Loss of grazing land and impact on landowner's sense of place.	**Duration:** Short Term (1) **Extent:** Localised (2) **Frequency :** Very rare(1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (9)** **Medium**	• Compensation for the temporary loss of grazing land should be included in the negotiation process with the landowner. • The area should be rehabilitated upon completion of the construction activities to ensure that the land is returned in the same condition as prior to the construction activities. • Mitigation measures should be implemented to avoid any negative impact on animals (e.g. fencing off the construction area). • Eskom or its appointed contractor(s) should assist with the temporary relocation of livestock during construction, as well as relocating cattle back to their original grazing area once construction in an area is completed. • Grazing areas should be rehabilitated to their original grazing conditions to ensure that cattle can continue to graze in the area once they are returned to that area.	**Duration:** Short Term (1) **Extent:** Site (1) **Frequency :** Very rare (1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (8)** **Medium**

ALTERNATIVE 5(B) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		• Where the area cannot be rehabilitated to its original condition within a reasonable period of time, Eskom or its appointed contractor(s) should provide funding to obtain alternative food sources to the farmer for the time period required for natural rehabilitation to occur within the grazing area.	
INDIRECT IMPACTS			
1. Flora: • Floristic species changes subsequent to development. • Impacts on surrounding habitat / species.	**Duration:** Short Term (2) **Extent:** Localised (2) **Frequency:** Unusual (1) **Probability:** Likely (3) **Intensity:** Probable (2) **Significance Rating: (10)** **Medium**	• Exotic weeds and invaders that might establish on the re-vegetated areas should be controlled to allow the grasses to properly establish. • Monitoring the potential spread of declared weeds and invasive alien vegetation to neighbouring land and protecting the agricultural resources and soil conservation works are regulated by the Conservation of Agricultural Resources Act, No. 43 of 1983 and should be addressed on a continual basis.	**Duration:** Short Term (2) **Extent:** Localised (2) **Frequency:** Unusual (1) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
2. Wetlands: • The erosion and/or sedimentation of the wetland downslope of the tower location and the access roads during the construction phase as a result of poor	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Frequent (3) **Probability:** Likely (3) **Intensity:** Low (2)	• Provision of adequate storm water measures and controls during construction. • The establishment and re-growth of alien vegetation must be controlled after the removal of grass. All declared aliens	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2)

ALTERNATIVE 5(B) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
storm water management and/or poor tower and/or access road location. • Alien vegetation encroachment associated with the above mentioned disturbances.	**Significant Rating: (13)** **Medium High**	must be identified and managed in accordance with the National Environmental Management Biodiversity (Act 10 of 2004).	**Significance Rating: (10)** **Medium**
3. Social: • Limited opportunities do, however, exist for manual labour for unskilled tasks, where the appointed contractor would be required to make use of local workers (e.g. for bush clearing and the digging of foundations).	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**	• In order to minimise the potential for influx of workers, however, it is recommended that local labour be utilised as far as possible.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (9)** **Medium**
CUMULATIVE IMPACTS			
1. Flora: • Increase in local and regional fragmentation / isolation of habitat.	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**	• Cumulative impacts associated with this type of development will lead to initial, incremental or augmentation of existing types of environmental degradation, including impacts on the air, soil and water present within available habitat. Pollution of these elements might not always be immediately visible or readily quantifiable, but incremental or fractional increases might rise to levels where biological attributes could be affected adversely on a local or regional	**Duration:** Short-Term (2) **Extent:** Localised (2) **Frequency:** Very rare (1) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**

ALTERNATIVE 5(B) – CONSTRUCTION PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		scale. In most cases are these effects are not bound and is dispersed, or diluted over an area that is much larger than the actual footprint of the causal factor.	

SUMMARY OF IMPACTS AND AVERAGE POINTS ALLOCATED TO EACH DISTRIBUTION POWER LINE ALTERNATIVE DURING THE CONSTRUCTION PHASE

IMPACTS	Alternative 1: Without Mitigation	Alternative 1: With Mitigation	Alternative 2: Without Mitigation	Alternative 2: With Mitigation	Alternative 3: Without Mitigation	Alternative 3: With Mitigation	Alternative 4 Without Mitigation	Alternative 4: With Mitigation	Alternative 5(a) Without Mitigation	Alternative 5(a) With Mitigation	Alternative 5(b) Without Mitigation	Alternative 5(b) With Mitigation
DIRECT												
1. Construction	14	9	14	9	14	9	14	9	14	9	14	9
2. Topography and Soils	9	7	9	7	9	7	9	7	9	7	9	7
3. Wetlands	11	7	11	7	11	7	11	7	11	7	11	7
4. Riparian Zone	11	9	11	9	11	9	11	9	11	9	11	9
5. Water Resources	11	7	11	7	11	7	11	7	11	7	11	7
6. Flora: Destruction of threatened and protected flora species	12	9	12	9	12	9	12	9	12	9	12	9
7. Avifauna	13	7	13	7	13	7	13	7	13	7	13	7
8. Heritage	11	9	11	9	11	9	11	9	11	9	11	9
9. Visual	11	7	11	7	11	7	11	7	11	7	11	7
10. Social	9	8	9	8	9	8	9	8	9	8	9	8
TOTAL	**112**	**79**	**112**	**79**	**112**	**79**	**112**	**79**	**112**	**79**	**112**	**79**
INDIRECT												
1. Flora: Species change	10	9	10	9	10	9	10	9	10	9	10	9
2. Wetlands	13	10	13	10	13	10	13	10	13	10	13	10
3. Social	9	9	9	9	9	9	9	9	9	9	9	9
TOTAL	**32**	**28**	**32**	**28**	**32**	**28**	**32**	**28**	**32**	**28**	**32**	**28**
CUMULATIVE												
1. Flora	10	10	10	10	10	10	10	10	10	10	10	10
TOTAL	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**

1 (C).POTENTIAL IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE

ALTERNATIVE 1 – OPERATION PHASE			
ALTERNATIVE 2-OPERATIONAL PHASE			
ALTERNATIVE 3-OPERTAIONAL PHASE			
ALTERNATIVE 4-OPERATIONAL PHASE			
ALTERNATIVE 5(a)-OPERATIONAL PHASE			
ALTERNATIVE 5(b)-OPERATIONAL PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
DIRECT IMPACTS			
1. Access Roads: • Access roads used for maintenance might impact on vegetation and water bodies.	**Duration:** Medium Term (3) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (12)** **Medium- High**	• Use should be made of existing roads as far as possible, ensuring proper maintenance/upgrade. Alternative methods of construction / access to sensitive areas are recommended. • No vehicles should be allowed to cross rivers or streams in any area other than an approved crossing, taking care to prevent any impact (particularly erosion) in surrounding habitat. • Vehicular traffic shall not be allowed in permanently wet areas, no damage shall be caused to wet areas. Where necessary, alternative methods of construction shall be used to avoid damage to wet areas. • Any work or access near or in a	**Duration:** Medium (3) **Frequency:** Localised (2) **Frequency:** Low (1) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**

ALTERNATIVE 1 – OPERATION PHASE			
ALTERNATIVE 2-OPERATIONAL PHASE			
ALTERNATIVE 3-OPERTAIONAL PHASE			
ALTERNATIVE 4-OPERATIONAL PHASE			
ALTERNATIVE 5(a)-OPERATIONAL PHASE			
ALTERNATIVE 5(b)-OPERATIONAL PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
		permanent drainage system may have implications in terms of the National Water Act, 1998 (Act No. 36 of 1998), and therefore may well require the application of a Water Use License. Therefore, the contractor must in consultation with the ECO, assess all areas along the alignment well in advance in order to ensure the relevant Water Use License is applied for where required.	
2. Avifauna **Collisions:** • Power line-sensitive species (i.e. those species that are poorly mobile in flight), in particular large birds that are threatened are at significant risk of collisions with overhead lines, resulting in injury and death. Power lines placed in bird-sensitive habitats.	**Duration:** Medium Term (3) **Extent:** Regional (3) **Frequency:** Frequent (3) **Probability:** Probable (2) **Intensity :** Low (2) **Significance Rating: (13)** **Medium- High**	• A walk-down by an avifaunal specialist must be conducted along the route chosen for development prior to construction. This walk-down must identify spans along which flappers / bird diverters must be fitted in order to mitigate the risk of collisions of birds with overhead wires.	**Duration :** Medium Term (3) **Extent :** Localised(2) **Frequency:** Low (1) **Probability:** Probable (2) **Intensity:** Low (2) **Significance Rating : (10)** **Medium**

ALTERNATIVE 1 – OPERATION PHASE			
ALTERNATIVE 2-OPERATIONAL PHASE			
ALTERNATIVE 3-OPERTAIONAL PHASE			
ALTERNATIVE 4-OPERATIONAL PHASE			
ALTERNATIVE 5(a)-OPERATIONAL PHASE			
ALTERNATIVE 5(b)-OPERATIONAL PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
3. Waste: • Waste generation during the maintenance of the distribution power line will have a negative impact on the environment, if not controlled adequately. Waste includes: general waste or hazardous waste (used oil etc.).	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Unusual (2) **Probability:** Likely (3) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**	• Where possible, construction waste on site must be reused or recycled. • Disposal of waste must be in accordance with relevant legislative requirements. • The Contractor must familiarise themselves with the definitions of waste and the handling, storage and transport of it as prescribed in the applicable environmental legislation. • Burning of waste material will not be permitted.	**Duration:** Short-Term (1) **Extent:** Localised (2) **Frequency:** Low (1) **Probability:** Unlikely (2) **Intensity:** Possible (2) **Significance Rating: (8)** **Medium**
4. Wetlands • Operational Risk of the development to wetlands relates primarily to access into / through wetlands for line monitoring purposes. Access along the line that enters / crosses wetlands could damage wetland soils and vegetation as detailed	**Duration:** Short Term (2) **Extent:** Local (2) **Frequency :** Unusual(2) **Probability :** Probable(2) **Intensity:** Low (2) **Significance Rating: (10)** **Medium**	• Operational line access procedures must ensure that there is no vehicular access into wetlands, unless in an emergency situation. • If an emergency maintenance situation arises that requires access into wetlands to be required, access into the wetland must be carefully controlled, and all	**Duration :** Short-term (1) **Extent:** Site (1) **Frequency:** Unusual (2) **Probability:** Improbable(1) **Intensity:** Very low (1) **Significance Rating: (6)** **Medium**

ALTERNATIVE 1 – OPERATION PHASE			
ALTERNATIVE 2-OPERATIONAL PHASE			
ALTERNATIVE 3-OPERTAIONAL PHASE			
ALTERNATIVE 4-OPERATIONAL PHASE			
ALTERNATIVE 5(a)-OPERATIONAL PHASE			
ALTERNATIVE 5(b)-OPERATIONAL PHASE			
Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation: In addition please refer to the EMPr: Appendix F**	**Significance rating of impacts after mitigation:**
for construction above.		relevant Eskom environmental procedures must be followed. • Any damage to the wetland must be fully rehabilitated.	
INDIRECT IMPACTS			
NONE			
CUMULATIVE IMPACTS			
NONE			

SUMMARY OF IMPACTS AND AVERAGE POINTS ALLOCATED TO EACH DISTRIBUTION LINE CORRIDOR ALTERNATIVE DURING THE OPERATION PHASE

IMPACTS	Alternative 1 Without Mitigation	Alternative 1 With Mitigation	Alternative 2 Without Mitigation	Alternative 2 With Mitigation	Alternative 3 Without Mitigation	Alternative 3 With Mitigation	Alternative 4 With out Mitigation	Alternative 4 With Mitigation	Alternative 5(a) Without Mitigation	Alternative 5(a) With Mitigation	Alternative 5(b) Without Mitigation	Alternative 5(b) With Mitigation
DIRECT												
1. Access Roads	12	10	12	10	12	10	12	10	12	10	12	10
2. Avifauna	13	10	13	10	13	10	13	10	13	10	13	10
3. Waste	10	8	10	8	10	8	10	8	10	8	10	8
4. Wetlands	10	6	10	6	10	6	10	6	10	6	10	6
Total	**45**	**34**	**45**	**34**	**45**	**34**	**45**	**34**	**45**	**34**	**45**	**34**
INDIRECT												
None												
CUMULATIVE												
None												

2. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative 1

Avifauna Assessment

Alternative 1 would run parallel to an existing power line for its entire length, which is usually preferable as birds (especially large birds of poor mobility) will be aware of the presence of existing power lines. Although much of the route traversed by Alternative 1 is relatively undisturbed (except for the presence of the power lines) and mountainous, the area traversed is covered in woodland rather than grassland, with the route not running past any cliff faces. Although this alternative runs through an avifaunal hotspot associated with the lower-lying grassland favoured by the White-bellied Korhaan and is located close to the Kudu Ranch Vulture Restaurant, vultures are likely to be aware of the presence of the existing power lines, and power line collision-related mortality is considered a lesser threat to the White-bellied Korhaan than habitat disturbance and alteration. Alternative 1 would consolidate power line-related impacts to one part of the study area where an existing impact is present.

Ecology Assessment

Alternative 1 is the least preferred option from an ecological perspective as the alignment bisects the mountainous areas of the Kudu Private Nature Reserve which is classified as a 'Protected Area' (PA) and large natural open Lydenburg Thornveld and Ohrigstad Mountain Bushveld areas.

Heritage Assessment

The development of the distribution power line can take place in all proposed alternatives.

Palaeontological Assessment

Alternative 1 has the longest sector overlying the Silverton Formation outcrop area, along the western side of the Spekboomrivier Valley, where there is a (low) possibility of stromatolitic limestone horizons. There is likewise a slight possibility of Late Caenozoic mammalian remains or other fossils being encountered within superficial sediments on the northern (SE-NW) sector through to Merensky Substation. The impact significance of this route option as far as palaeontological heritage resources are concerned is rated as low.

Surface Water Assessment

Alternative 1 (with sections of Alternative 2) is recommended for development. This alternative runs parallel to an existing 132kV power line for its entire length. Thus the surface water features crossed by Alternative 1 have already been subject to a degree of impact.

Visual Assessment

Alternative 1 (with sections of Alternative2) is not preferred for development due to the impact on the Kudu Ranch Nature Reserve.

Alternative 2

Avifauna Assessment

Alternatives 2 traverse the highest number of sensitive habitats from an avifaunal perspective, and accordingly the highest

number of 'hotspots'. The hotspots associated with the mountainous areas traversed by Alternative 2 along the ridge forming the western side of the Watervals valley and on the Thaba Tholo Wilderness Reserve property are considered to be very important for most of the priority species within the area, and are associated with the highest degree of adverse impact on these species associated with the lines.

Ecology Assessment

Alternative 2 is the least preferred option from an ecological perspective as the proposed alignment bisects mountainous areas which have been classified as "Irreplaceable" Critical Biodiversity Area (CBA) as well as "Optimal" Critical Biodiversity Area (CBA) with high diversity of endemic and threatened plant and animal species.

Heritage Assessment

The development of the distribution power line can take place in all proposed alternatives.

Palaeontological Assessment

Alternative 2 has the longest sector overlying the Magaliesberg Formation outcrop area, on either side of the Watervalsrivier valley, where there is a possibility of microbial mat features being encountered in association with shallow water to littoral sandy sediments. There is a small possibility of stromatolitic carbonates in the southeast, near Lydenburg, and of Late Caenozoic mammalian remains or other fossils in the northernmost (SE-NW) sector through Olifantspoortjie. The impact significance of this route option as far as palaeontological heritage resources are concerned is also rated low.

Surface Water Assessment

Alternative 2 runs across a mountainous area, with the presence of certain areas in which springs and narrow valleyhead seepage wetlands are located. Thus, this route not recommended for development.

Visual Assessment

Alternative 2 section of route runs to the south of the D737 road and is considered a fatal flaw due to the high degree of impact on the Lapolosa Wilderness Reserve.

Alternative 3

Avifauna Assessment

Alternatives 3 traverse the highest number of sensitive habitats from an avifaunal perspective, and accordingly the highest number of 'hotspots'. The hotspots associated with the mountainous areas traversed also by Alternative 2 along the ridge forming the western side of the Watervals valley and on the Thaba Tholo Wilderness Reserve property are considered to be very important for most of the priority species within the area, and are associated with the highest degree of adverse impact on these species associated with the lines.

Ecology Assessment

This is the least preferred alternative from an ecological perspective as the proposed alignment bisects mountainous areas as the proposed alignment bisects mountainous areas which have been classified as "Irreplaceable" Critical Biodiversity Area (CBA) as well as "Optimal" Critical Biodiversity Area (CBA) with high diversity of endemic and threatened plant and animal species with high diversity of endemic and threatened plant and animal species.

Heritage Assessment

The development of the distribution power line can take place in all proposed alternatives.

Palaeontological Assessment

Route Option 3 has the longest sector overlying Late Cainozoic superficial sediments where there is a slight possibility of Late Cainozoic mammalian remains or other fossils being encountered. There is likewise a small possibility of stromatolitic carbonates in the southeast, near Lydenburg (Silverton Formation), and of microbial mat features within Magiesberg Formation quartzites on higher ground flanking the eastern side of the Watervals River Valley. The impact significance of this route option as far as palaeontological heritage resources are concerned is also rated as low.

Surface Water Assessment

Alternative 3 is strongly not preferred due to the high degree of impact on the Watervals River riparian corridor.

Visual Assessment

Alternative 3 is considered a fatal flaw due to the high degree of impact on the Thaba Tholo Wilderness Reserve.

Alternative 4

Avifauna Assessment

Alternative 4 links up with Alternative 3 in the Watervals River valley, and thus bypasses the highly sensitive avifaunal hotpots traversed by Alternative 3. The alternative follows the R37 as it climbs over the mountainous area of the Watervals River Pass. Although there is a high noise factor related to the presence of vehicles moving along the road, the route traverses mountainous terrain which is otherwise undisturbed, and which is likely to be more frequented by raptors and vultures than lower-lying areas. In the context of other alternatives which run through lower altitudes and areas of more greatly transformed habitats, the traversing of this high ground by a power line which is likely to introduce the risk of collisions of raptors and vultures with the line spans is not seen as acceptable from an avifaunal perspective and is not recommended.

Ecology Assessment

As a large section of the alignment is situated within a privately owned nature reserve or 'Protected Area' (PA) as well as bisecting natural Ohrigstade Mountain Bushveld and wooded ravines and non-perennial drainage lines this is the least preferred option from an ecological perspective.

Heritage Assessment

The development of the distribution power line can take place in all proposed alternatives.

Palaeontological Assessment

Route Alternative 4 largely overlies Silverton Formation bedrocks, where there is a small possibility of stromatolitic limestone horizons, but over a shorter distance that Alternative 1. The impact significance of this route option as far as palaeontological heritage resources are concerned is also rated as low.

Surface Water Assessment

Alternative 4 is strongly not preferred due to the high degree of impact on the Watervals River riparian corridor.

Visual Assessment

Alternative 4 is not preferred due to the high degree of impact on the Sharlalumbi Estate.

Alternative 5(A)

Avifauna

Alternatives 5A and 5B run through areas of a relatively high human footprint and partial transformation of the landscape

in the parts of the study area to the north-east of Mashishing. The alternatives do not traverse any avifaunal hotpots due to this factor, except for the two crossings of the Spekboom River valley. A single span of the power line is likely to be able to cross the valley due to the incised 'gorge-like' nature of the valley, but the lines could pose a risk of collision to raptors that are flying along the course of the valley, in particular certain priority species such as the African Crowned Eagle. It is important to note that these alternatives join Alternative 1 to the north of the Kudu Ranch Nature Reserve, thus running along an existing power line to the Merensky Substation.

Ecology Assessment

This is the preferred option from an ecological perspective as the alignment bisects transformed Lydenburg Thornveld and adjacent to existing access roads as well as distribution power line servitude which will ameliorate the potential impacts of new access roads and further vegetation clearance.

Heritage Assessment

The development of the distribution power line can take place in all proposed alternatives.

Palaeontological Assessment

Route Alternative 5 is mainly underlain by Silverton Formation sedimentation but their palaeontological sensitivity towards the south may have been compromised by extensive dolerite intrusion. There is a slight possibility of Late Caenozoic mammalian remains or other fossils being encountered within small patches of superficial sediment cover. The impact significance of this route option as far as palaeontological heritage resources are concerned is also rated as low. This assessment applies equally to the 5a and 5b route options.

Surface Water Assessment

Alternative 5A route can be developed for the project and is preferred from the surface water perspective.

Visual Assessment

Alternative 5A is preferred from the visual perspective and can be developed for the project.

Alternative 5(B)

Avifauna

Alternatives 5A and 5B run through areas of a relatively high human footprint and partial transformation of the landscape in the parts of the study area to the north-east of Mashishing. The alternatives do not traverse any avifaunal hotpots due to this factor, except for the two crossings of the Spekboom River valley. A single span of the power line is likely to be able to cross the valley due to the incised 'gorge-like' nature of the valley, but the lines could pose a risk of collision to raptors that are flying along the course of the valley, in particular certain priority species such as the African Crowned Eagle. It is important to note that these alternatives join Alternative 1 to the north of the Kudu Ranch Nature Reserve, thus running along an existing power line to the Merensky Substation. It is also important to note that Alternative 5B runs along a set of four existing power lines.

Ecology Assessment

This is the preferred option from an ecological perspective as the alignment bisects transformed Lydenburg Thornveld and adjacent to existing access roads as well as distribution power line servitude which will ameliorate the potential impacts of new access roads and further vegetation clearance. Although the alignment bisects Ecological Support Areas or biological corridors within a local and landscape scale; the alignment does not bisect a 'Critical Biodiversity Area' (CBA) or 'Protected Area'.

Heritage Assessment

The development of the distribution power line can take place in all proposed alternatives.

Palaeontological Assessment

Route Alternative 5 is mainly underlain by Silverton Formation sediment but their palaeontological sensitivity towards the south may have been compromised by extensive dolerite intrusion. There is a slight possibility of Late Caenozoic mammalian remains or other fossils being encountered within small patches of superficial sediment cover. The impact significance of this route option as far as palaeontological heritage resources are concerned is also rated as low. This assessment applies equally to the 5a and 5b route options.

Surface Water Assessment

Alternative route can be developed and is recommended for the surface water perspective.

Visual Assessment

Alternative 5B route is recommended for development.

NO Option

The ***no go*** *option* would be not to construct the additional Power line. If the proposed project does not proceed as planned then the status quo will remain the same. At present **low voltages are experienced during peak hours** and various complaints have been received from customers. In addition, **new customers cannot be connected** to the existing networks. Power cuts would be prevalent and therefore the No Go option is not preferred.

SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?

YES

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

Not Applicable.

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application.

The findings of the specialist studies undertaken within the Basic Assessment provided an assessment of both benefits and potential negative impacts anticipated as a result of the proposed project. The findings conclude that there are no environmental fatal flaws that should prevent the proposed project from proceeding, provided that the recommended mitigation and management measures are implemented. In terms of the alternative preferences, these are outlined below in Table 15.

Table 15: Assessment of Alternatives

Study	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5(a)	Alternative 5(b)
Avifauna	✓	×	×	×	✓	✓
Ecology	×	×	×	×	✓	✓
Heritage	✓	✓	✓	✓	✓	✓
Palaeontological	✓	✓	✓	✓	✓	✓
Surface water	✓	×	×	×	✓	✓
Visual	×	×	×	×	✓	✓

The below recommendation must be considered for this project:

- The developer need to ensure that adverse environmental impacts are minimal.
- Implementation of the mitigation measures outlined in this report and EMPr is highly recommended.
- Alternatives 5(a) and 5(b) emerged as the preferred alternatives for the project.

Is an EMPr attached?

YES

The EMPr must be attached as Appendix G.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Any other information relevant to this application and not previously included must be attached in Appendix J.

_____

NAME OF EAP

_____ _____

SIGNATURE OF EAP DATE

SECTION F: APPENDIXES

The following appendixes must be attached:

Appendix A: Maps

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix E: Public Participation

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J: Additional Information