APPENDIX F

IMPACT ASSESSMENT

APPENDIX F – IMPACT ASSESSMENT

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

List the potential direct, indirect and cumulative property/activity/design/technology/operational alternative related impacts (as appropriate) 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.

The following parameters are used to describe the impact/issues in this assessment:

1. **Nature**
   A brief written statement of the environmental aspect being impacted upon by a particular action or activity.

2. **Extent**
   The area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment phase of a project in terms of further defining the determined significance or intensity of an impact.

- **Site (1)** – Within the construction site.
- **Local (2)** – Within a radius of 2 km of the construction site.
- **Regional (3)** – the scale applies to impacts on a provincial level and parts of neighbouring provinces.
- **National (4)** – the scale applies to impacts that will affect the whole South Africa.

3. **Duration**

Indicates what the lifetime of the impact will be.

- **Short-term (1)** – less than 5 years.
- **Medium-term (2)** – between 5 and 15 years.
- **Long-term (3)** – between 15 and 30 years.
- **Permanent (4)** – over 30 years and resulting in a permanent and lasting change that will always be there.

4. **Intensity**
   Describes whether an impact is destructive or benign.

- **Very High (4)** - Natural, cultural and social functions and processes are altered to extent that they permanently cease.
- **High (3)** - Natural, cultural and social functions and processes are altered to extent that they temporarily cease.
- **Moderate (2)** - Affected environment is altered, but natural, cultural and social functions and processes continue albeit in a modified way.

- **Low (1)** - Impact affects the environment in such a way that natural, cultural and social functions and processes are not affected.

5. **Probability**

Describes the likelihood of an impact actually occurring.

- **Improbable (1)** - Likelihood of the impact materialising is very low.
- **Possible (2)** - The impact may occur.
- **Highly Probable (3)** - Most likely that the impact will occur.
- **Definite (4)** - Impact will certainly occur.

6. **Cumulative**

In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

7. **Significance**

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

Low impact (4 - 6 points)	A low impact has no permanent impact of significance. Mitigation measures are feasible and are readily instituted as part of a standing design, construction or operating procedure.
Medium impact (7 - 9 points)	Mitigation is possible with additional design and construction inputs.
High impact (10 - 12 points)	The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment.
Very High impact (13 - 16 points)	Permanent and important impacts. The design of the site may be affected. Intensive remediation is needed during construction and/or operational phases. Any activity which results in a "very high impact" is likely to be a fatal flaw.
Status	Denotes the perceived effect of the impact on the affected area.
Positive (+)	Beneficial impact.
Negative (-)	Deleterious or adverse impact.
Neutral (/)	Impact is neither beneficial nor adverse.

Alternative 1 (Green Route): Planning and Design

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct			
1. Flora/Vegetation and Fauna Placement of footprints near areas of high sensitivity (natural vegetation, protected tree species, riparian areas etc.) may impact these sensitive communities. New access roads and haulage routes could impact on areas of high sensitivity (natural vegetation, protected tree species and riparian areas etc.).	**Extent: Local (-2)** **Duration: Permanent (-4)** **Intensity: High (-3)** **Probability: Highly Probable (-3)** **Significance: High (-12)**	• General mitigation measures would include avoiding any physical damage to natural vegetation on the periphery of the proposed servitude as well as riparian vegetation. • The alignment of towers and the power line should be adjusted to prevent the destruction of remaining large (>4 m) indigenous tree species including the three protected tree species (*Pterocarpus angloensis* – Wild teak, *Philenoptera violacea* – Apple-Leaf and *Sclerocarya birrea* – Marula). • Prior to construction and vegetation clearance, a suitably qualified zoologist/botanist or ecologist should closely examine the proposed construction areas (tower supports) for the presence of animal burrows, rocky outcrops, logs, stumps and other debris and relocate any affected animals to appropriate habitats away from the servitude or tower. • 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	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Medium (-7)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		roads as far as possible.	
2. Surface water (including wetlands) Damage and degradation of wetlands and riparian areas as well as surface water bodies.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: High (-3)** **Probability: Highly Probable (-3)** **Significance: High (-11)**	• When the route of the power line is being finalised in the pre-construction phase, it is recommended that proposed tower positions be subject to a walk down by a surface water specialist in order to confirm that no towers are to be placed within a surface water feature. A crucial aspect of this walk down will also be to assess whether planned access routes for construction vehicles would cross / traverse any surface water features (in particular seepage wetland features), and to highlight any no-go areas in this context. It is strongly recommended that this walk down be done in summer when the vegetation and hydrology of such features would be most prominent and recognisable.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-8)**
3. Avifauna Bird collisions	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**	• An avifaunal walk through is recommended in order to confirm the high sensitivity areas to identify the exact spans of the power line to which the mitigation for bird collisions is required.	**Extent: Local (-2)** **Duration: Short term (-1)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Low (-6)**
Indirect Impacts			
None.			
Cumulative Impacts			
None.			

Alternative 3 (Purple Route): Planning and Design

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. Flora/Vegetation and Fauna Placement of footprints near areas of high sensitivity (natural vegetation, protected tree species, protected and red listed species, riparian areas etc.) may impact these sensitive communities. New access roads and haulage routes could impact on areas of high sensitivity (natural vegetation, protected tree species, protected and red listed species, riparian areas, etc.).	**Extent: Local (-2)** **Duration: Permanent (-4)** **Intensity: High (-3)** **Probability: Highly Probable (-3)** **Significance: High (-12)**	• General mitigation measures would include avoiding any physical damage to natural vegetation on the periphery of the proposed servitude as well as riparian vegetation. • The alignment of towers and the power line should be adjusted to prevent the destruction of remaining large (>4 m) indigenous tree species including the three protected tree species (*Pterocarpus angloensis* – Wild teak, *Philenoptera violacea* – Apple-Leaf and *Sclerocarya birrea* – Marula) as well as the red listed 'Declining' Cape Poison Bulb (*Boophone disticha*). • Prior to construction and vegetation clearance, a suitably qualified zoologist/botanist or ecologist should closely examine the proposed construction areas (tower supports) for the presence of animal burrows, rocky outcrops, logs, stumps and other debris and relocate any affected animals to appropriate habitats away from the servitude or tower. • 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	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Low (-1)** **Probability: Highly Probable (-3)** **Significance: Medium (-9)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		made of existing roads as far as possible.	
2. Wetlands and Surface Water Bodies Damage and degradation of wetlands and riparian areas as well as surface water bodies.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: High (-3)** **Probability: Highly Probable (-3)** **Significance: High (-11)**	• When the route of the power line is being finalised in the pre-construction phase, it is recommended that proposed tower positions be subject to a walk down by a surface water specialist in order to confirm that no towers are to be placed within a surface water feature. A crucial aspect of this walk down will also be to assess whether planned access routes for construction vehicles would cross / traverse any surface water features (in particular seepage wetland features), and to highlight any no-go areas in this context. It is strongly recommended that this walk down be done in summer when the vegetation and hydrology of such features would be most prominent and recognisable.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-8)**
3. Avifauna Bird collisions	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: High (-10)**	• An avifaunal walk through is recommended in order to confirm the high sensitivity areas to identify the exact spans of the power line to which the mitigation for bird collisions is required.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Low (-8)**
Indirect Impacts			
None.			
Cumulative impacts			
None.			

Proposed Tsakani Substation (Alternative 1): Planning and Design

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct			
None.			
Indirect Impacts			
None.			
Cumulative Impacts			
None.			

Proposed Tsakani Substation (Alternative 2): Planning and Design

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct			
None.			
Indirect Impacts			
None.			
Cumulative Impacts			
None.			

Alternative 1 (Green Route): Construction

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct impacts			
1. **Topography and Soils** The direct impact on landforms with the establishment of the transmission line as well as new substation (Tsakani) and the Mbumbu Substation upgrade is mainly one of disruption of surface soils. Potential erosion impacts are anticipated to be limited to the construction phase during site clearing activities.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-8)**	• 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	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		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.	
2. **Surface water (including 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 stormwater management could lead to the siltation (pollution) of surface water features. Temporary accesses across wetlands / rivers (riparian zones) 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.	**Extent: Local (-2)** **Duration: Medium term (-2)** **Intensity: High (-3)** **Probability: Possible (-2)** **Significance: Medium (-9)**	• 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 100 m of a wetland or other surface water feature. • A construction stormwater management plan to be devised to prevent silt ingress 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.	**Extent: Site (-1)** **Duration: Short term (-1)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Low (-6)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
3. Surface water (including wetlands) – riparian corridors Construction of the power line across riparian corridors would constitute an impact on the riparian zone as most woody vegetation is felled as part of the clearing of the servitude. This transforms a part of the riparian zone that would degrade riparian habitat integrity. As importantly this is associated with secondary impacts such as the risk of entry of, and proliferation of alien invasive vegetation into the riparian zone, as the cleared servitude would provide a convenient access point into the riparian zone from which alien invasive vegetation could colonise a greater area of the riparian zone adjacent to the servitude. Other secondary impacts include improved access for people and livestock into the riparian corridor crossed that could exacerbate disturbance of the riparian corridor and which could result in overgrazing of the non-woody understorey and creation of a pathway for cattle and people that could lead to development of erosion, especially in steeply sloping settings. Towers and spans constructed in any riparian habitat (i.e. creation of a	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: High (-3)** **Probability: Highly Probable (-3)** **Significance: High (-11)**	• All power line spans placed across a riparian zone must be subject to the acquisition of the relevant authorisation in terms of GN1199 from the DWS. • As far as possible infrastructure within the 32 m buffer should be less than 50 m^2 in order for Activity 11 of LN1 not to be triggered. • Only vegetation clearing within the servitude centreline clearing should be allowed, with retention of as much woody vegetation as possible • Construction of spans within riparian areas must be carefully monitored by the ECO and any construction team environmental officers.	**Extent: Local (-2)** **Duration: Medium term (-2)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-8)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
power line servitude through a riparian area) without permission / authorisation from the relevant authorities would be illegal in terms of the National Water Act.			
4. Flora and Fauna – Loss of Protected Tree Species The majority of vegetation adjacent to the proposed green route alternative consists of completely transformed bushveld habitat with limited habitat diversity. Impacts include: Loss of protected tree species. Protected trees have been encountered along the alignment.	**Extent: Site (-1)** **Duration: Long-term (-3)** **Intensity: Medium (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-9)**	• Protected tree species or plants shall not be removed unless they are interfering with a structure. • All protected species not to be removed must be clearly marked and such areas fenced off if required. • All remaining Aloes (*Aloe greatheadii*), bulbous plants (geophytes) should be replanted if unearthed during the construction phase of the project. • The alignment of towers and the power line should be adjusted to prevent the destruction of remaining large (>4 m) indigenous tree species including the three protected tree species (*Pterocarpus angloensis* – Wild teak, *Philenoptera violacea* – Apple-Leaf and *Sclerocarya birrea* – Marula). • The Department of Agriculture, Forestry and Fisheries (DAFF) will have to be approached to obtain the required permits for the removal of any Marula *Sclerocarya. Birrea ssp. caffra,* Apple-Leaf (*Philenoptera violacea*) and Wild teak (*Pterocarpus angolensis*).	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Highly Probable (-3)** **Significance: Low (-6)**
5. Flora and Fauna - Loss of faunal habitats.	**Extent: Local (-2)** **Duration: Long-term (-3)**	• All temporary stockpile areas including litter and dumped material	**Extent: Local (-2)** **Duration: Long-term (-3)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
During the construction phase (construction of access roads and clearing of servitudes), some habitat destruction and alteration inevitably takes place.	**Intensity: High (-3)** **Probability: Definite (-4)** **Significance: High (-12)**	and rubble must be removed on completion of construction. • Access to the power line servitude must be restricted. Access to the power line servitude should ideally be fenced off and gated along the main access roads. • No quad-bikes, motorcycles or off road vehicles and illegal hunting as well as illegal sand mining should be permitted in the adjacent properties. • Prior to construction and vegetation clearance a suitably qualified Zoologist/Botanist or Ecologist should closely examine the proposed construction areas (tower supports) for the presence of any animal burrows (including spiders and scorpions), rocky outcrops, logs, stumps and other debris and relocate any affected animals to appropriate habitat away from the servitude or tower.	**Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**
6. Flora and Fauna - Threatened fauna. Impact on protected or endangered species that may occur along the alignment.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**	• As a precautionary mitigation measure it is recommended that the developer and construction Contractor as well as an independent environmental control officer should be made aware of the possible presence of certain threatened animal species (South African Python, African Bullfrog, White-throated or Rock Monitor, Water Monitor) prior to the commencement of construction activities. In the event that any of the	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: :Low (-6)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		above-mentioned species are discovered they should be allowed to move away from the construction area and not interfered with. • No dumping of any materials in undeveloped open areas and neighbouring properties should be allowed. • Disturbance of vegetation cover as well as rocky outcrops, logs, stumps, termite mounds within sensitive areas should be limited. • Activities in the surrounding open undeveloped areas (especially open bushveld must be strictly regulated and managed. • Severe contractual fines must be imposed and immediate dismissal on any contract employee who is found attempting to snare or otherwise harms wild animals. • Contract employees must be educated about the value of wild animals and the importance of their conservation. • Educational programmes for the Contractor's staff must be implemented to ensure that project workers are alerted to the possibility of snakes being found during vegetation clearance.	
7. Flora and Fauna - Increased human presence.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-8)**	• Activities in the surrounding open undeveloped areas (especially open bushveld must be strictly regulated and managed. • Movement of workers must be	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Low (-6)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		limited to areas under construction and access to the undeveloped areas, especially the surrounding open areas must be strictly regulated ("no-go" areas during construction activities). • No animals should be intentionally killed or destroyed and poaching and hunting should not be permitted on the site.	
8. Flora and Fauna - Vegetation clearance. Dense vegetation under the line could be a fire hazard, particularly in the middle third of the span in the vicinity of the lowest point of the conductors.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Definite (-4)** **Significance: Medium (-9)**	• Only an 8 m strip may be cleared flush with the ground to allow vehicular passage during construction. No scalping shall be allowed on any part of the servitude road unless absolutely necessary. • The removal of all economically valuable trees or vegetation shall be negotiated with the Landowner before such vegetation is removed. • Vegetation clearing on tower sites must be kept to a minimum. • Big trees with large root systems shall be cut manually and removed, as the use of a bulldozer will cause major damage to the soil when the root systems are removed. Stumps shall be treated with herbicide. • Smaller vegetation can be flattened with a machine, but the blade should be kept above ground level to prevent scalping. • Any vegetation cleared on a tower site shall be removed or flattened and not be pushed to form an embankment around the tower.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Definite (-4)** **Significance: Medium (-8)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		• No vegetation clearing in the form of de-stumping, scalping or uprooting shall be allowed on river- and stream banks (riparian zone). Vegetation shall only be cut to allow for the passage of the pilot-cables and headboard. • Trees and vegetation not interfering with the statutory clearance to the conductors can be left under the line. • With permission of the landowner, the total servitude under the line and up to 5 m outside the outer phases should be cleared. • Disturbance of vegetation must be limited to areas of construction. • Where herbicides are used to clear vegetation, specimen-specific chemicals should be applied to individual plants only. General spraying should be prohibited. The use of herbicides shall only be allowed after a proper investigation into the necessity, the type to be used, the long-term effects and the effectiveness of the agent. The application of herbicides shall be under the direct supervision of a qualified technician. All surplus herbicide shall be disposed of in accordance with the supplier's specifications. • All alien vegetation in the total servitude and densifiers creating a fire hazard shall be cleared and treated with herbicides.	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		• All alien invasive plant should be removed from the site to prevent further invasion. • The Contractor must have the necessary knowledge to be able to identify protected species as well as species not interfering with the operation of the line due to their height and growth rate. • The Contractor must also be able to identify declared weeds and alien species that can be totally eradicated. • The Contractor must be in possession of a valid herbicide applicators licence.	
9. Flora and Fauna – Disturbance to livestock.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-7)**	• Construction activities must be planned carefully so as not to interfere with the calving and lambing season for most animal species. • The Contractor shall under no circumstances interfere with livestock without the Landowner being present. This includes the moving of livestock where they interfere with construction activities. • Should the Contractors workforce obtain any livestock for eating purposes, they must be in possession of a written note from the Landowner. • Speed limits must be restricted especially on farm roads (30km/hr) preventing unnecessary road fatalities of surrounding livestock.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Low (-6)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
10. Flora and Fauna – Fire.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: High (-3)** **Probability: Possible (-2)** **Significance: High (-10)**	• No open fires shall be allowed on site under any circumstance. The Contractor shall have fire-fighting equipment available on all vehicles working on site, especially during the winter months.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Low (-6)**
11. Avifauna - Disturbance of birds, impact on Red Data and other avifaunal species.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-7)**	• Strict control should be maintained over all activities during construction. • During construction, if any of the "Focal Species" identified in the avifaunal report (**Appendix D**) are observed to be roosting and/or breeding in the vicinity, an avifaunal specialist is to be contacted for further instruction.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Low (-6)**
12. Avifauna - Destruction or alteration of bird habitat, impact on Red Data and other species.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**	• Strict control should be maintained over all activities during construction, in particular heavy machinery and vehicle movements, and staff. It is difficult to mitigate properly for this as some habitat destruction is inevitable.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**
13. Heritage and Palaeontology Impact on sites of cultural significance, e.g. graves. Archaeological material, by its very nature, occurs below ground. The applicant and Contractor(s) should therefore keep in mind that archaeological sites might be exposed during the construction work.	**Extent: Local (-2)** **Duration: Permanent (-4)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Medium (-8)**	• If during construction any cultural heritage resources or graves are unearthed, all work has to be stopped until the site has been inspected and mitigated by a cultural heritage practitioner. • 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.	**Extent: Local (-2)** **Duration: Permanent (-4)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Medium (-8)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		• 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.	
14. Waste Waste generation during the construction phase will have a negative impact on the environment, if not controlled adequately. Waste includes general construction rubble and hazardous waste (used oil, cement and concrete etc.).	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-8)**	• 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 waste as prescribed in the applicable environmental legislation. • Burning of waste will not be permitted. • Further detailed mitigation measures are included in the EMPr (**Appendix G**).	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**
15. Dust Dust emissions will vary from day to day depending on the phase of construction, the level of activity, and the prevailing meteorological conditions. The following possible sources of fugitive dust have been identified as activities which could potentially generate dust during construction operations at the site: vehicle activities associated with the transport of equipment to the site; preparation of the surface areas which may be required prior to the	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-8)**	• Frequent and effective dust-suppression is advised, particularly along dirt roads. Dust must be suppressed on the construction site during dry periods by the regular application of water. Water used for this purpose must be used in quantities that will not result in the generation of run-off.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
set up of new infrastructure; and the removal of construction equipment from site after the set up of new equipment.			
16. Noise During the construction phase there is likely to be an increase in noise pollution. The following possible sources of noise could potentially generate noise pollution during construction: construction activities (excavating and site clearing); construction vehicles; and construction staff.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-8)**	• Surrounding communities and adjacent landowners are to be notified in advance of noisy construction activities. • Provide all equipment with standard silencers. Maintain silencer units on vehicles and equipment in good working order. • Construction staff working in areas where the 8-hour ambient noise levels exceed 85 dBA should wear ear protection equipment.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**
17. 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).	**Extent: Local (+2)** **Duration: Short-term (+1)** **Intensity: Low (+1)** **Probability: Definite (+4)** **Significance: Medium (+8)**	• Jobs should be given to local residents during construction (such as clearing of servitudes and digging of holes. Should this not be possible, it should be explained to residents that the nature of the development does not allow it, so that false expectations of possible jobs do not exist.	**Extent: Local (+2)** **Duration: Short-term (+1)** **Intensity: Low (+1)** **Probability: Definite (+4)** **Significance: Medium (+8)**
18. Visual Site (Servitude) clearing and removal of vegetation could partially alter the landscape as viewed from the surrounds of the site, with the emergence of an exposed strip of bare soil. Construction equipment such as cranes could be visually intrusive, albeit for a short time period.	**Extent: Local (-2)** **Duration: Medium term (-2)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-7)**	• Phased, rather than indiscriminate clearing of the length of the alignment to be undertaken. • Vegetation clearing to be limited to the servitude, and to be limited to species specimens presenting a fire danger or clearance danger.	**Extent: Local (-2)** **Duration: Short term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Indirect Impacts			
1. Flora Alien and exotic species encroachment.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-8)**	• Exotic weeds and invaders that might establish on the re-vegetated areas should be controlled to allow the grass 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 National Environmental Management: Biodiversity Act No. 10 of 2004 and Regulations. and should be addressed on a continual basis.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Low (-6)**
Cumulative Impacts			
1. Surface water (including wetlands) Cumulative loss of riparian habitat due to clearing of riparian vegetation and due to the risk of increased proliferation of alien invasive plant species within the riparian corridor associated with the new servitude could occur. These cumulative effects exist in the context of the most important existing impacts on riparian zones which are removal of woody vegetation from riparian corridors for fuel (firewood), intense overgrazing by cattle and potential hydrological changes due to increased seasonality of flows due to catchment degradation and transformation of wetlands in the catchment of drainage lines. Impacts on individual surface water features across the site could result in a cumulative impact on respective catchments, although other land use-related practices are more likely to cause wetland loss / degradation. Pollutants released into more than one surface water features through construction activities could result in downstream impacts, although this is thought to be unlikely.			

Alternative 3 (Purple Route): Construction

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. Topography and Soils The direct impact on landforms with the establishment of the transmission line as well as new substation (Tsakani) and the Mbumbu Substation upgrade is mainly one of disruption of surface soils. Potential erosion impacts are anticipated to be limited to the construction phase during site clearing activities.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-8)**	• 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.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**
2. Surface water (including 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 stormwater management could lead to the siltation (pollution) of surface water features.	**Extent: Local (-2)** **Duration: Medium term (-2)** **Intensity: High (-3)** **Probability: Possible (-2)** **Significance: Medium (-9)**	• 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 100 m of a wetland or other surface water feature. • A construction stormwater	**Extent: Site (-1)** **Duration: Short term (-1)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Low (-6)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Temporary accesses across wetlands / rivers (riparian zones) 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.		management plan to be devised to prevent silt ingress 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.	
3. **Surface water (including wetlands) – riparian corridors** Construction of the power line across riparian corridors would constitute an impact on the riparian zone as most woody vegetation is felled as part of the clearing of the servitude. This transforms a part of the riparian zone that would degrade riparian habitat integrity. As importantly this is associated with secondary impacts such as the risk of entry of, and proliferation of alien invasive vegetation into the riparian zone, as the cleared servitude would provide a convenient access point into the riparian zone from which alien invasive vegetation could colonise a greater area of the riparian zone adjacent to the servitude. Other secondary impacts include improved access for people and livestock into the riparian corridor crossed that could exacerbate disturbance of the riparian corridor and	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: High (-3)** **Probability: Highly Probable (-3)** **Significance: High (-11)**	• All power line spans placed across a riparian zone must be subject to the acquisition of the relevant authorisation in terms of GN1199 from the DWS. • As far as possible infrastructure within the 32 m buffer should be less than 50 m^2 in order for Activity 11 of LN1 not to be triggered. • Only vegetation clearing within the servitude centreline clearing should be allowed, with retention of as much woody vegetation as possible • Construction of spans within riparian areas must be carefully monitored by the ECO and any construction team environmental officers.	**Extent: Local (-2)** **Duration: Medium term (-2)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-8)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
which could result in overgrazing of the non-woody understorey and creation of a pathway for cattle and people that could lead to development of erosion, especially in steeply sloping settings. 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.			
4. Flora and Fauna – Loss of Protected Tree Species The vegetation in the purple route alignment displays a more natural species composition (more abundant tree and shrub species) and has been less impacted on than vegetation towards the south and east around the existing villages. Impacts include: Loss of protected tree species.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: High (-3)** **Probability: Highly Probable (-3)** **Significance: High (-11)**	• Protected tree species or plants shall not be removed unless they are interfering with a structure. • All protected species not to be removed must be clearly marked and such areas fenced off if required. • All remaining Aloes (*Aloe greatheadii*), bulbous plants (geophytes) should be replanted if unearthed during the construction phase of the project. • The alignment of towers and the power line should be adjusted to prevent the destruction of remaining large (>4 m) indigenous tree species including the three protected tree species (*Pterocarpus angloensis* – Wild teak, *Philenoptera violacea* – Apple-Leaf and *Sclerocarya birrea* – Marula). • The Department of Agriculture, Forestry and Fisheries (DAFF) will have to be approached to obtain the required permits for the removal of	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-7)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		any Marula *Sclerocarya. Birrea ssp. caffra,* Apple-Leaf (*Philenoptera violacea*) and Wild teak (*Pterocarpus angolensis*).	
5. Flora and Fauna - Loss of faunal habitats. During the construction phase (construction of access roads and clearing of servitudes), some habitat destruction and alteration inevitably takes place.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Medium (-2)** **Probability: Highly Possible (-3)** **Significance: High (-10)**	• All temporary stockpile areas including litter and dumped material and rubble must be removed on completion of construction. • Access to the power line servitude must be restricted. Access to the power line servitude should ideally be fenced off and gated along the main access roads. • No quad-bikes, motorcycles or off road vehicles and illegal hunting as well as illegal sand mining should be permitted in the adjacent properties. • Prior to construction and vegetation clearance a suitably qualified Zoologist/Botanist or Ecologist should closely examine the proposed construction areas (tower supports) for the presence of any animal burrows (including spiders and scorpions), rocky outcrops, logs, stumps and other debris and relocate any affected animals to appropriate habitat away from the servitude or tower.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-7)**
6. Flora and Fauna - Threatened fauna. Impact on protected or endangered species that may occur along the alignment.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**	• As a precautionary mitigation measure it is recommended that the developer and construction Contractor as well as an independent environmental control officer should be made aware of the possible presence of certain threatened	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-8)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		animal species (South African Python, African Bullfrog, White-throated or Rock Monitor, Water Monitor) prior to the commencement of construction activities. In the event that any of the above-mentioned species are discovered they should be allowed to move away from the construction area and not interfered with. • No dumping of any materials in undeveloped open areas and neighbouring properties should be allowed. • Disturbance of vegetation cover as well as rocky outcrops, logs, stumps, termite mounds within sensitive areas should be limited. • Activities in the surrounding open undeveloped areas (especially open bushveld must be strictly regulated and managed. • Severe contractual fines must be imposed and immediate dismissal on any contract employee who is found attempting to snare or otherwise harms wild animals. • Contract employees must be educated about the value of wild animals and the importance of their conservation. • Educational programmes for the Contractor's staff must be implemented to ensure that project workers are alerted to the possibility of snakes being found during	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		vegetation clearance.	
7. **Flora and Fauna - Increased human presence.**	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: High (-3)** **Probability: Highly Probable (-3)** **Significance: Medium (-9)**	• Activities in the surrounding open undeveloped areas (especially open bushveld must be strictly regulated and managed. • Movement of workers must be limited to areas under construction and access to the undeveloped areas, especially the surrounding open areas must be strictly regulated ("no-go" areas during construction activities). • No animals should be intentionally killed or destroyed and poaching and hunting should not be permitted on the site.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-7)**
8. **Flora and Fauna - Vegetation clearance.** Dense vegetation under the line could be a fire hazard, particularly in the middle third of the span in the vicinity of the lowest point of the conductors.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: High (-3)** **Probability: Definite (-4)** **Significance: High (-10)**	• Only an 8 m strip may be cleared flush with the ground to allow vehicular passage during construction. No scalping shall be allowed on any part of the servitude road unless absolutely necessary. • The removal of all economically valuable trees or vegetation shall be negotiated with the Landowner before such vegetation is removed. • Vegetation clearing on tower sites must be kept to a minimum. • Big trees with large root systems shall be cut manually and removed, as the use of a bulldozer will cause major damage to the soil when the root systems are removed. Stumps shall be treated with herbicide. • Smaller vegetation can be flattened	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Definite (-4)** **Significance: Medium (-8)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		with a machine, but the blade should be kept above ground level to prevent scalping. • Any vegetation cleared on a tower site shall be removed or flattened and not be pushed to form an embankment around the tower. • No vegetation clearing in the form of de-stumping, scalping or uprooting shall be allowed on river- and stream banks (riparian zone). Vegetation shall only be cut to allow for the passage of the pilot-cables and headboard. • Trees and vegetation not interfering with the statutory clearance to the conductors can be left under the line. • With permission of the landowner, the total servitude under the line and up to 5 m outside the outer phases should be cleared. • Disturbance of vegetation must be limited to areas of construction. • Where herbicides are used to clear vegetation, specimen-specific chemicals should be applied to individual plants only. General spraying should be prohibited. The use of herbicides shall only be allowed after a proper investigation into the necessity, the type to be used, the long-term effects and the effectiveness of the agent. The application of herbicides shall be under the direct supervision of a qualified technician. All surplus	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		herbicide shall be disposed of in accordance with the supplier's specifications. • All alien vegetation in the total servitude and densifiers creating a fire hazard shall be cleared and treated with herbicides • All alien invasive plant should be removed from the site to prevent further invasion. • The Contractor must have the necessary knowledge to be able to identify protected species as well as species not interfering with the operation of the line due to their height and growth rate. • The Contractor must also be able to identify declared weeds and alien species that can be totally eradicated. • The Contractor must be in possession of a valid herbicide applicators licence.	
9. Flora and Fauna – Disturbance to livestock.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-7)**	• Construction activities must be planned carefully so as not to interfere with the calving and lambing season for most animal species. • The Contractor shall under no circumstances interfere with livestock without the Landowner being present. This includes the moving of livestock where they interfere with construction activities. • Should the Contractors workforce obtain any livestock for eating purposes, they must be in	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Low (-6)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		possession of a written note from the Landowner. • Speed limits must be restricted especially on farm roads (30km/hr) preventing unnecessary road fatalities of surrounding livestock.	
10. Flora and Fauna – Fire.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: High (-3)** **Probability: Possible (-2)** **Significance: High (-10)**	• No open fires shall be allowed on site under any circumstance. The Contractor shall have fire-fighting equipment available on all vehicles working on site, especially during the winter months.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Low (-6)**
11. Avifauna - Disturbance of birds, impact on Red Data and other avifaunal species.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-7)**	• Strict control should be maintained over all activities during construction. It is difficult to mitigate properly for this as some disturbance is inevitable. • During construction, if any of the "Focal Species" identified in the avifaunal report (**Appendix D**) are observed to be roosting and/or breeding in the vicinity, an avifaunal specialist is to be contacted for further instruction.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Low (-6)**
12. Avifauna - Destruction or alteration of bird habitat, Impact on Red Data and other species.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**	• Strict control should be maintained over all activities during construction, in particular heavy machinery and vehicle movements, and staff. It is difficult to mitigate properly for this as some habitat destruction is inevitable.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**
13. Heritage and Palaeontology Impact on sites of cultural significance, e.g. graves. Archaeological material, by its very nature, occurs below ground. The applicant and Contractor(s) should	**Extent: Local (-2)** **Duration: Permanent (-4)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Medium (-8)**	• If during construction any cultural heritage resources or graves are unearthed, all work has to be stopped until the site has been inspected and mitigated by a cultural	**Extent: Local (-2)** **Duration: Permanent (-4)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Medium (-8)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
therefore keep in mind that archaeological sites might be exposed during the construction work.		heritage practitioner. • 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.	
14. Waste Waste generation during the construction phase will have a negative impact on the environment, if not controlled adequately. Waste includes general construction rubble and hazardous waste (used oil, cement and concrete etc.).	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-8)**	• 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 waste as prescribed in the applicable environmental legislation. • Burning of waste will not be permitted. • Further detailed mitigation measures are included in the EMPr (**Appendix G**).	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**
15. Dust Dust emissions will vary from day to day depending on the phase of construction, the level of activity, and the prevailing meteorological conditions. The following	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-8)**	• Frequent and effective dust-suppression is advised, particularly along dirt roads. Dust must be suppressed on the construction site during dry periods by the regular	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
possible sources of fugitive dust have been identified as activities which could potentially generate dust during construction operations at the site: vehicle activities associated with the transport of equipment to the site; preparation of the surface areas which may be required prior to the set up of new infrastructure; and the removal of construction equipment from site after the set up of new equipment.		application of water. Water used for this purpose must be used in quantities that will not result in the generation of run-off.	
16. Noise During the construction phase there is likely to be an increase in noise pollution. The following possible sources of noise could potentially generate noise pollution during construction: construction activities (excavating and site clearing); construction vehicles; and construction staff.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-8)**	• Surrounding communities and adjacent landowners are to be notified in advance of noisy construction activities. • Provide all equipment with standard silencers. Maintain silencer units on vehicles and equipment in good working order. • Construction staff working in areas where the 8-hour ambient noise levels exceed 85 dBA should wear ear protection equipment.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**
17. 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).	**Extent: Local (+2)** **Duration: Short-term (+1)** **Intensity: Low (+1)** **Probability: Definite (+4)** **Significance: Medium (+8)**	• Jobs should be given to local residents during construction (such as clearing of servitudes and digging of holes. Should this not be possible, it should be explained to residents that the nature of the development does not allow it, so that false expectations of possible jobs do not exist.	**Extent: Local (+2)** **Duration: Short-term (+1)** **Intensity: Low (+1)** **Probability: Definite (+4)** **Significance: Medium (+8)**
18. Visual Site (Servitude) clearing and removal of vegetation could partially alter the landscape as viewed from the	**Extent: Local (-2)** **Duration: Medium term (-2)** **Intensity: Low (-1)** **Probability: Possible (-2)**	• Phased, rather than indiscriminate clearing of the length of the alignment to be undertaken. • Vegetation clearing to be limited to	**Extent: Local (-2)** **Duration: Short term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
surrounds of the site, with the emergence of an exposed strip of bare soil. Construction equipment such as cranes could be visually intrusive, albeit for a short time period.	**Significance: Medium (-7)**	the servitude, and to be limited to species specimens presenting a fire danger or clearance danger.	**Significance: Low (-5)**
Indirect Impacts			
1. Flora a) Alien and exotic species encroachment.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-8)**	• Exotic weeds and invaders that might establish on the re-vegetated areas should be controlled to allow the grass 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 National Environmental Management: Biodiversity Act No. 10 of 2004 and Regulations should be addressed on a continual basis.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Low (-6)**
Cumulative Impacts			
1. Surface water (including wetlands) Cumulative loss of riparian habitat due to clearing of riparian vegetation and due to the risk of increased proliferation of alien invasive plant species within the riparian corridor associated with the new servitude could occur. These cumulative effects exist in the context of the most important existing impacts on riparian zones which are removal of woody vegetation from riparian corridors for fuel (firewood), intense overgrazing by cattle and potential hydrological changes due to increased seasonality of flows due to catchment degradation and transformation of wetlands in the catchment of drainage lines. Impacts on individual surface water features across the site could result in a cumulative impact on respective catchments, although other land use-related practices are more likely to cause wetland loss / degradation. Pollutants released into more than one surface water features through construction activities could result in downstream impacts, although this is thought to be unlikely.			

Proposed Tsakani Substation (Alternative 1) - Construction

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. Topography and Soils The direct impact on landforms with the establishment of substation components is mainly one of disruption of surface soils. Potential erosion impacts are anticipated to be limited to the construction phase during site clearing activities.	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-7)**	• 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.	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**
2. Water Resources Pollution of groundwater and surface water resources.	**Extent: Regional (-3)** **Duration: Short-term (-1)** **Intensity: High (-3)** **Probability: Highly Probable (-3)** **Significance: High (-10)**	• 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	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Low (-6)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		potentially leak into the ground must be controlled. • Further detailed mitigation measures are included in the EMPr (**Appendix G**).	
3. Flora The proposed Tsakani Substation site is dominated by degraded, transformed bushveld and the forb layer is overgrazed. The proposed substation site is adjacent to fallow agricultural lands and livestock enclosures. Construction and operational activities are not expected to result in significant impacts on the floristic environment.	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**	• Gardens or landscaped areas around the Tsakani Substation should be planted with indigenous (preferably using endemic or local species from the area) grasses, forbs, shrubs and trees, which are water wise and require minimal horticultural practices.	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**
4. Access Road Construction - Impact on fauna and flora, wetlands or surface water features The proposed Tsakani Substation site is dominated by degraded, transformed bushveld and the forb layer is overgrazed. The proposed Substation site is adjacent to fallow agricultural lands and livestock enclosures. Construction and operational activities are not expected to result in significant impacts on the floristic environment..	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**	• Limit construction, maintenance and inspection activities to dry periods in order to curb occurrence/ augmentation of erosion in areas that might be conducive to soil erosion. • Demarcate construction areas in order to control movement of personnel, vehicles and provide boundaries for construction sites in order to limit spread of impacts. • Disturbance of vegetation must be limited only to areas of construction. • The removal or picking of any protected trees or protected plants shall not be permitted unless the relevant permits are in place. • Limit construction, maintenance and inspection activities to dry periods when Red Data species of the area	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		are most likely to be absent or hibernating, limiting potential impacts to a large extent. • No temporary roads or construction accesses must be constructed through any wetland or other surface water feature unless there is no other feasible option for access to stretches of the alignment. • It is also strongly recommended that no permanent access roads / tracks along the servitude be constructed through any surface water feature. Rather existing track / road crossings of these surface water features should be used (even if they are a distance upstream or downstream of the crossing) and upgraded where necessary. • No track / access road must be developed through any seepline wetland, even if the wetland is located away from the alignment. • Tracks / roads should not be developed across any sodic area on the footslopes adjacent to valley bottom riparian corridors due to the risk of erosion (gulley / rill development) that could adversely affect riparian zones or adjacent wetlands. Such areas must be designated as sensitive and access into them prevented. • In the event of the need for a river crossing: – Should culverts be used as the	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		structure for crossing a river or watercourse, culvert structures must be placed so that the base of the culvert is located at the current level of the current bed of the watercourse. No water must be impounded behind the culvert structure at a level lower than the base of the culvert during low flows. In addition the culvert must not create a step (drop in levels) between its base and the downstream watercourse that would hinder the movement of aquatic biota up the system. – Where channelled wetlands / watercourses crossed by the road / access track are associated with adjacent areas of wetland or riparian habitat which would be subject to periodic inundation by spate flows in the channel (caused by overtopping of the banks of the channel), the crossing structure must be extended to include this area of wetland / riparian habitat to the boundary of the wetland / riparian habitat. – All tracks / access roads that are developed must have formal stormwater measures included in the design so that no erosion develops on these tracks that could lead to the siltation of downslope surface water	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		features.	
5. Heritage and Palaeontology Impact on sites of cultural significance, e.g. graves. Archaeological material, by its very nature, occurs below ground. The applicant and Contractor(s) should therefore keep in mind that archaeological sites might be exposed during the construction work.	**Extent: Site (-1)** **Duration: Permanent (-4)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Medium (-7)**	• If during construction any cultural heritage resources or graves are unearthed, all work has to be stopped until the site has been inspected and mitigated by a cultural heritage practitioner. • 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.	**Extent: Site (-1)** **Duration: Permanent (-4)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Medium (-7)**
6. Waste Waste generation during the construction phase will have a negative impact on the environment, if not controlled adequately. Waste includes general construction rubble and hazardous waste (used oil, cement and concrete etc.).	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-7)**	• 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 waste as prescribed in the applicable environmental legislation. • Burning of waste will not be permitted. • Further detailed mitigation measures are included in the EMPr (**Appendix**	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		G).	
7. Dust Dust emissions will vary from day to day depending on the phase of construction, the level of activity, and the prevailing meteorological conditions. The following possible sources of fugitive dust have been identified as activities which could potentially generate dust during construction operations at the site: vehicle activities associated with the transport of equipment to the site; preparation of the surface areas which may be required prior to the set up of new infrastructure; and the removal of construction equipment from site after the set up of new equipment.	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-7)**	• Frequent and effective dust-suppression is advised, particularly along dirt roads. Dust must be suppressed on the construction site during dry periods by the regular application of water. Water used for this purpose must be used in quantities that will not result in the generation of run-off.	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**
8. Noise During the construction phase there is likely to be an increase in noise pollution. The following possible sources of noise could potentially generate noise pollution during construction: construction activities (excavating and site clearing); construction vehicles; and construction staff.	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-7)**	• Surrounding communities and adjacent landowners are to be notified in advance of noisy construction activities. • Provide all equipment with standard silencers. Maintain silencer units on vehicles and equipment in good working order. • Construction staff working in areas where the 8-hour ambient noise levels exceed 85 dBA should wear ear protection equipment.	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**
9. Visual Site (Servitude) clearing and removal of vegetation could partially alter the landscape as viewed from the surrounds of the site, with the	**Extent: Local (-2)** **Duration: Medium term (-2)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-7)**	• Phased, rather than indiscriminate clearing of the construction site to be undertaken. Only footprint of substation to be cleared of vegetation.	**Extent: Local (-2)** **Duration: Short term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
emergence of an exposed strip of bare soil. Construction equipment such as cranes could be visually intrusive, albeit for a short time period.		• Construction lighting to be limited to that which is necessary.	
10. 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).	**Extent: Local (+2)** **Duration: Short-term (+1)** **Intensity: Low (+1)** **Probability: Definite (+4)** **Significance: Medium (+8)**	• Jobs should be given to local residents during construction (such as clearing of servitudes and digging of holes. Should this not be possible, it should be explained to residents that the nature of the development does not allow it, so that false expectations of possible jobs do not exist.	**Extent: Local (+2)** **Duration: Short-term (+1)** **Intensity: Low (+1)** **Probability: Definite (+4)** **Significance: Medium (+8)**
Indirect Impacts			
None.			
Cumulative Impacts			
None.			

Proposed Tsakani Substation (Alternative 2) - Construction

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
11. Topography and Soils The direct impact on landforms with the establishment of distribution lines and additional substation components is mainly one of disruption of surface soils. Potential erosion impacts are anticipated to be limited to the construction phase during site clearing activities.	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-7)**	• 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	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		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.	
12. Water Resources Pollution of groundwater and surface water resources.	**Extent: Regional (-3)** **Duration: Short-term (-1)** **Intensity: High (-3)** **Probability: Highly Probable (-3)** **Significance: High (-10)**	• 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 G**).	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Low (-6)**
13. Flora – Construction of the substation The proposed Tsakani Substation site is dominated by degraded, transformed bushveld and the forb layer is overgrazed. The proposed Substation site is adjacent to fallow agricultural lands and livestock enclosures. Construction and	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**	• Gardens or landscaped areas around the Tsakani Substation should be planted with indigenous (preferably using endemic or local species from the area) grasses, forbs, shrubs and trees, which are water wise and require minimal horticultural practices.	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
operational activities are not expected to result in significant impacts on the floristic environment.			
14. Access Road Construction - Impact on fauna and flora, wetlands or surface water features The proposed Tsakani Substation site is dominated by degraded, transformed bushveld and the forb layer is overgrazed. The proposed Substation site is adjacent to fallow agricultural lands and livestock enclosures. Construction and operational activities are not expected to result in significant impacts on the floristic environment.	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**	• Limit construction, maintenance and inspection activities to dry periods in order to curb occurrence/ augmentation of erosion in areas that might be conducive to soil erosion. • Demarcate construction areas in order to control movement of personnel, vehicles and provide boundaries for construction sites in order to limit spread of impacts. • Disturbance of vegetation must be limited only to areas of construction. • The removal or picking of any protected trees or protected plants shall not be permitted unless the relevant permits are in place. • Limit construction, maintenance and inspection activities to dry periods when Red Data species of the area are most likely to be absent or hibernating, limiting potential impacts to a large extent. • No temporary roads or construction accesses must be constructed through any wetland or other surface water feature unless there is no other feasible option for access to stretches of the alignment. • It is also strongly recommended that no permanent access roads / tracks along the servitude be constructed through any surface water feature.	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		Rather existing track / road crossings of these surface water features should be used (even if they are a distance upstream or downstream of the crossing) and upgraded where necessary. • No track / access road must be developed through any seepline wetland, even if the wetland is located away from the alignment. • Tracks / roads should not be developed across any sodic area on the footslopes adjacent to valley bottom riparian corridors due to the risk of erosion (gulley / rill development) that could adversely affect riparian zones or adjacent wetlands. Such areas must be designated as sensitive and access into them prevented. • In the event of the need for a river crossing: – Should culverts be used as the structure for crossing a river or watercourse, culvert structures must be placed so that the base of the culvert is located at the current level of the current bed of the watercourse. No water must be impounded behind the culvert structure at a level lower than the base of the culvert during low flows. In addition the culvert must not create a step (drop in levels) between its base and the downstream	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		watercourse that would hinder the movement of aquatic biota up the system. – Where channelled wetlands / watercourses crossed by the road / access track are associated with adjacent areas of wetland or riparian habitat which would be subject to periodic inundation by spate flows in the channel (caused by overtopping of the banks of the channel), the crossing structure must be extended to include this area of wetland / riparian habitat to the boundary of the wetland / riparian habitat. – All tracks / access roads that are developed must have formal stormwater measures included in the design so that no erosion develops on these tracks that could lead to the siltation of downslope surface water features.	
15. Heritage and Palaeontology Impact on sites of cultural significance, e.g. graves. Archaeological material, by its very nature, occurs below ground. The applicant and Contractor(s) should therefore keep in mind that archaeological sites might be exposed during the construction work.	**Extent: Site (-1)** **Duration: Permanent (-4)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Medium (-7)**	• If during construction any cultural heritage resources or graves are unearthed, all work has to be stopped until the site has been inspected and mitigated by a cultural heritage practitioner. • 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	**Extent: Site (-1)** **Duration: Permanent (-4)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Medium (-7)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		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.	
16. Waste Waste generation during the construction phase will have a negative impact on the environment, if not controlled adequately. Waste includes general construction rubble and hazardous waste (used oil, cement and concrete etc.).	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-7)**	• 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 waste as prescribed in the applicable environmental legislation. • Burning of waste will not be permitted. • Further detailed mitigation measures are included in the EMPr (**Appendix G**).	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**
17. Dust Dust emissions will vary from day to day depending on the phase of construction, the level of activity, and the prevailing meteorological conditions. The following possible sources of fugitive dust have been identified as activities which could potentially generate dust during construction operations at the site: vehicle activities associated with the	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-7)**	• Frequent and effective dust-suppression is advised, particularly along dirt roads. Dust must be suppressed on the construction site during dry periods by the regular application of water. Water used for this purpose must be used in quantities that will not result in the generation of run-off.	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
transport of equipment to the site; preparation of the surface areas which may be required prior to the set up of new infrastructure; and the removal of construction equipment from site after the set up of new equipment.			
18. Noise During the construction phase there is likely to be an increase in noise pollution. The following possible sources of noise could potentially generate noise pollution during construction: construction activities (excavating and site clearing); construction vehicles; and construction staff.	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: Medium (-7)**	• Surrounding communities and adjacent landowners are to be notified in advance of noisy construction activities. • Provide all equipment with standard silencers. Maintain silencer units on vehicles and equipment in good working order. • Construction staff working in areas where the 8-hour ambient noise levels exceed 85 dBA should wear ear protection equipment.	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**
19. Visual Site (Servitude) clearing and removal of vegetation could partially alter the landscape as viewed from the surrounds of the site, with the emergence of an exposed strip of bare soil. Construction equipment such as cranes could be visually intrusive, albeit for a short time period.	**Extent: Local (-2)** **Duration: Medium term (-2)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-7)**	• Phased, rather than indiscriminate clearing of the construction site to be undertaken. Only footprint of substation to be cleared of vegetation. • Construction lighting to be limited to that which is necessary.	**Extent: Local (-2)** **Duration: Short term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**
20. 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	**Extent: Local (+2)** **Duration: Short-term (+1)** **Intensity: Low (+1)** **Probability: Definite (+4)** **Significance: Medium (+8)**	• Jobs should be given to local residents during construction (such as clearing of servitudes and digging of holes. Should this not be possible, it should be explained to residents that the nature of the development	**Extent: Local (+2)** **Duration: Short-term (+1)** **Intensity: Low (+1)** **Probability: Definite (+4)** **Significance: Medium (+8)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
bush clearing and the digging of foundations).		does not allow it, so that false expectations of possible jobs do not exist.	
Indirect Impacts			
None.			
Cumulative Impacts			
None.			

Alternative 1 (Green Route) – Operation

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct impacts			
1. Surface water (including wetlands) Power line servitudes constructed through riparian areas will be kept cleared of most woody and non-grassy vegetation, thus constituting an impact on the affected part of the riparian corridor for the entire operational lifespan of the power line. In addition, the cleared servitude through the riparian corridor will pose a risk of encroachment of alien invasive vegetation into the riparian zone due to the servitude creating favourable conditions for the establishment of alien pioneers. The risk will be even greater should operational management of the servitude not be properly undertaken.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**	• Operational clearing of vegetation within the servitude must be limited to vegetation above the minimum clearance zone within the centreline, and indigenous shrubs should be allowed to remain should these not pose a fire risk. • It is critical that all alien invasive vegetation management in the servitude be undertaken at regular intervals (at least every 6 months) for the operational life of the power line servitude. This must not just be undertaken for riparian areas but for servitudes in adjacent areas. As part of this management all alien invasive vegetation within the servitude must be removed.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**
2. Surface water (including	**Extent: Local (-2)**	• Operational line access procedures	**Extent: Site (-1)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
wetlands) Operational Risk of the development to wetlands relating to access into / through wetlands for line maintenance purposes. Access along the line that enters / crosses wetlands could damage wetland soils and vegetation as detailed for construction above.	**Duration: Medium term (-2)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-8)**	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 relevant Eskom environmental procedures must be followed. Any damage to the wetland must be fully rehabilitated.	**Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Improbable (-1)** **Significance: Low (-5)**
3. Avifauna - Collisions Collisions with overhead power lines. Collisions with the proposed line of certain large flying bird species such Secretary Bird, Kori Bustard, various Stork species, and Southern Ground Hornbill, is a possibility.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**	• A "Bird Friendly" monopole structure, with a bird perch (as per standard Eskom guidelines) should be used for the tower structures.	**Extent: Local (-2)** **Duration: Medium term (-2)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-6)**
4. Avifauna – Electrocution Possible bird electrocution, impact on Red Data and other species.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: High (-10)**	• Mark sections of line in high sensitivity areas with anti-collision marking devices on the earth wire to increase the visibility of the power line and reduce likelihood of collisions. Marking devices should be spaced 10 m apart. High sensitivity areas should be finalised in a site "walkthrough" by an avifaunal specialist once the final route is decided and towers/pylons pegged as a condition of the EMPr.	**Extent: Local (-2)** **Duration: Medium term (-2)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-6)**
5. Waste Waste generation during the operation phase will have a negative impact on the environment, if not controlled adequately. Waste	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-7)**	• Where possible, operational waste on site must be reused or recycled. • Disposal of waste must be in accordance with relevant legislative requirements.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
includes general waste or hazardous waste (used oil etc.).		• The Contractor must familiarise themselves with the definitions of waste and the handling, storage and transport of waste as prescribed in the applicable environmental legislation. • Burning of waste material will not be permitted. • Further detailed mitigation measures are included in the EMPr (**Appendix G**).	
6. Visual By virtue of their size (height), power line towers and lines could be visually intrusive. However only limited areas of permanent human habitation would be exposed to high or very high degree of visual exposure.	**Extent: Local (-2)** **Duration: Long term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**	• Limiting of operational vegetation clearing along the servitude to woody vegetation higher than maximum clearance height. • Use of monopoles to limit visibility factor of power line.	**Extent: Local (-2)** **Duration: Long term (-3)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-8)**
7. Social The proposed 132 kV power line will improve electricity supply in the area.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: High (+3)** **Probability: Possible (+2)** **Significance: High (+11)**	• No mitigation proposed.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: High (+3)** **Probability: Possible (+2)** **Significance: High (+11)**
8. Social The proposed 132 kV power line will increase in electricity supply to new users within the area.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: Very High (+4)** **Probability: Possible (+2)** **Significance: High (+12)**	• No mitigation proposed.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: Very High (+4)** **Probability: Possible (+2)** **Significance: High (+12)**
9. Social The reliable power source will also encourage new investments, within the area, in turn contributing to an increase in GDP.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: High (+3)** **Probability: Possible (+2)** **Significance: High (+11)**	• No mitigation proposed.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: High (+3)** **Probability: Possible (+2)** **Significance: High (+11)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Indirect Impacts			
1. Flora and Fauna Surrounding areas and species present in the direct vicinity of the study area could be affected by indirect impacts resulting from maintenance activities.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-8)**	• Maintenance activities must be restricted to the power line servitude.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-8)**
2. Electromagnetic Fields Magnetic fields that naturally emanate from sources such as power lines are directly proportionate to the amount of current flowing through the power lines at any given time. A higher loading condition such as may be present in hot summer months will result in increased magnetic field levels. According to the World Health Organisation (WHO) it has become increasingly unlikely (based on the existing body of research) that exposure to Electromagnetic Fields (EMFs) constitutes a serious health hazard, although some uncertainty remains.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Improbable (-1)** **Significance: Medium (-8)**	• In general, it is not recommended that humans should live under power lines due to the effects of EMF. However, the radiation decreases with an increase in distance from the source. The EMFs are insignificant on the servitude border.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Medium (-7)**
3. Safety There is the potential risk of electrocution (people and livestock) if access to the site is not controlled.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**	• Safety and security issues should be addressed as a priority by Eskom. It is recommended that the landowners and affected community members be contacted in advance to ensure that they are forewarned of the construction and maintenance activities planned in the area. In addition, the local community must be educated about the dangers of high voltage electricity.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-8)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Cumulative Impacts			
Establish economic growth within the area will be stimulated.			

Alternative 3 (132 kV power line – Purple Route Alignment) – Operation

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. **Surface water (including wetlands)** Power line servitudes constructed through riparian areas will be kept cleared of most woody and non-grassy vegetation, thus constituting an impact on the affected part of the riparian corridor for the entire operational lifespan of the power line. In addition, the cleared servitude through the riparian corridor will pose a risk of encroachment of alien invasive vegetation into the riparian zone due to the servitude creating favourable conditions for the establishment of alien pioneers. The risk will be even greater should operational management of the servitude not be properly undertaken.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: High (-3)** **Probability: Highly Probable (-3)** **Significance: High (-11)**	• Operational clearing of vegetation within the servitude must be limited to vegetation above the minimum clearance zone within the centreline, and indigenous shrubs should be allowed to remain should these not pose a fire risk. • It is critical that all alien invasive vegetation management in the servitude be undertaken at regular intervals (at least every 6 months) for the operational life of the power line servitude. This must not just be undertaken for riparian areas but for servitudes in adjacent areas. As part of this management all alien invasive vegetation within the servitude must be removed.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**
2. **Surface water (including wetlands)** Operational Risk of the development to wetlands relating to access into / through wetlands for line monitoring purposes. Access along the line that	**Extent: Local (-2)** **Duration: Medium term (-2)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-8)**	• 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	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Improbable (-1)** **Significance: Low (-5)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
enters / crosses wetlands could damage wetland soils and vegetation as detailed for construction above.		into wetlands to be required, access into the wetland must be carefully controlled, and all relevant Eskom environmental procedures must be followed. Any damage to the wetland must be fully rehabilitated.	
3. Avifauna - Collisions Collisions with overhead power lines. Collisions with the proposed line of certain large flying bird species such Secretary Bird, Kori Bustard, various Stork species, and Southern Ground Hornbill, is a possibility.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**	• A "Bird Friendly" monopole structure, with a bird perch (as per standard Eskom guidelines) should be used for the tower structures.	**Extent: Local (-2)** **Duration: Medium term (-2)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-6)**
4. Avifauna – Electrocution Possible bird electrocution, impact on Red Data and other species.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Highly Probable (-3)** **Significance: High (-10)**	• Mark sections of line in high sensitivity areas with anti-collision marking devices on the earth wire to increase the visibility of the power line and reduce likelihood of collisions. Marking devices should be spaced 10 m apart. High sensitivity areas should be finalised in a site "walkthrough" by an avifaunal specialist once the final route is decided and towers/pylons pegged as a condition of the EMPr.	**Extent: Local (-2)** **Duration: Medium term (-2)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-6)**
5. Waste Waste generation during the operation phase will have a negative impact on the environment, if not controlled adequately. Waste includes general waste or hazardous waste (used oil etc.).	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-7)**	• Where possible, operational 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 waste as prescribed in the applicable environmental	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		legislation. • Burning of waste material will not be permitted. • Further detailed mitigation measures are included in the EMPr (**Appendix G**).	
6. Visual By virtue of their size (height), power line towers and lines could be visually intrusive. However only limited areas of permanent human habitation would be exposed to high or very high degree of visual exposure.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**	• Limiting of operational vegetation clearing along the servitude to woody vegetation higher than maximum clearance height. • Use of monopoles to limit visibility factor of power line.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium(-8)**
7. Social The proposed 132 kV power line will improve electricity supply in the area.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: High (+3)** **Probability: Possible (+2)** **Significance: High (+11)**	• No mitigation proposed.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: High (+3)** **Probability: Possible (+2)** **Significance: High (+11)**
8. Social The proposed 132 kV power line will increase in electricity supply to new users within the area	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: Very High (+4)** **Probability: Possible (+2)** **Significance: High (+12)**	• No mitigation proposed.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: Very High (+4)** **Probability: Possible (+2)** **Significance: High (+12)**
9. Social The reliable power source will also encourage new investments, within the area, in turn contributing to an increase in GDP.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: High (+3)** **Probability: Possible (+2)** **Significance: High (+11)**	• No mitigation proposed.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: High (+3)** **Probability: Possible (+2)** **Significance: High (+11)**
Indirect Impacts			
1. Flora and Fauna Surrounding areas and species	**Extent: Local (-2)** **Duration: Long-term (-3)**	• Maintenance activities must be restricted to the power line servitude.	**Extent: Local (-2)** **Duration: Long-term (-3)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
present in the direct vicinity of the study area could be affected by indirect impacts resulting from maintenance activities.	**Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-8)**		**Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-8)**
2. Electromagnetic Fields Magnetic fields that naturally emanate from sources such as power lines are directly proportionate to the amount of current flowing through the power lines at any given time. A higher loading condition such as may be present in hot summer months will result in increased magnetic field levels. According to the World Health Organisation (WHO) it has become increasingly unlikely (based on the existing body of research) that exposure to Electromagnetic Fields (EMFs) constitutes a serious health hazard, although some uncertainty remains.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Improbable (-1)** **Significance: Medium (-8)**	• In general, it is not recommended that humans should live under power lines due to the effects of EMF. However, the radiation decreases with an increase in distance from the source. The EMFs are insignificant on the servitude border.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Medium (-7)**
3. Safety There is the potential risk of electrocution (people and livestock) if access to the site is not controlled.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**	• Safety and security issues should be addressed as a priority by Eskom. It is recommended that the landowners and affected community members be contacted in advance to ensure that they are forewarned of the construction and maintenance activities planned in the area. In addition, the local community must be educated about the dangers of high voltage electricity.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-8)**
Cumulative Impacts			
Economic growth within the area will be stimulated.			

Proposed Tsakani Substation (Alternative 1) - Operation

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. Waste Waste generation during the operation phase will have a negative impact on the environment, if not controlled adequately. Waste includes general waste or hazardous waste (used oil etc.).	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Low (-6)**	• 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. • Further detailed mitigation measures are included in the EMPr (**Appendix G**).	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**
2. Visual By virtue of their size (height), substation components could be visually intrusive. However only limited areas of permanent human habitation would be exposed to high or very high degree of visual exposure Lighting at the substation could cause unnecessary light spill.	**Extent: Local (-2)** **Duration: Long term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**	• Development of Alternative 1 as the less visually intrusive option. • Lighting to only be switched on when operationally required. • All lighting to be inward facing to prevent light spill.	**Extent: Site (-1)** **Duration: Long term (-3)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-7)**
3. Social The proposed Tsakani substation will improve electricity supply in the area.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: High (+3)** **Probability: Possible (+2)** **Significance: High (+11)**	• No mitigation proposed.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: High (+3)** **Probability: Possible (+2)** **Significance: High (+11)**
4. Social	**Extent: Local (+2)**	• No mitigation proposed.	**Extent: Local (+2)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
The proposed Tsakani substation will increase in electricity supply to new users within the area.	**Duration: Permanent (+4)** **Intensity: Very High (+4)** **Probability: Possible (+2)** **Significance: High (+12)**		**Duration: Permanent (+4)** **Intensity: Very High (+4)** **Probability: Possible (+2)** **Significance: High (+12)**
5. Social The reliable power source will also encourage new investments, within the area, in turn contributing to an increase in GDP.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: High (+3)** **Probability: Possible (+2)** **Significance: High (+11)**	• No mitigation proposed.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: High (+3)** **Probability: Possible (+2)** **Significance: High (+11)**
Indirect Impacts			
1. Fauna and Flora Surrounding areas and species present in the direct vicinity of the study area could be affected by indirect impacts resulting from operational and maintenance activities.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-8)**	• No mitigation proposed.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-8)**
Cumulative Impacts			
None.			

Proposed Tsakani Substation (Alternative 2) - Operation

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. Waste Waste generation during the operation phase will have a negative impact on the environment, if not controlled adequately. Waste includes general waste or hazardous waste (used oil etc.).	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Low (-6)**	• 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	**Extent: Site (-1)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-4)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		permitted. • Further detailed mitigation measures are included in the EMPr (**Appendix G**).	
2. Visual By virtue of their size (height), substation components could be visually intrusive. However only limited areas of permanent human habitation would be exposed to high or very high degree of visual exposure Lighting at the substation could cause unnecessary light spill.	**Extent: Local (-2)** **Duration: Long term (-3)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-9)**	• Development of Alternative 1 as the less visually intrusive option. • Lighting to only be switched on when operationally required. • All lighting to be inward facing to prevent light spill.	**Extent: Site (-1)** **Duration: Long term (-3)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-7)**
3. Social The proposed Tsakani substation will improve electricity supply in the area.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: High (+3)** **Probability: Possible (+2)** **Significance: High (+11)**	• No mitigation proposed.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: High (+3)** **Probability: Possible (+2)** **Significance: High (+11)**
4. Social The proposed Tsakani substation will increase in electricity supply to new users within the area	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: Very High (+4)** **Probability: Possible (+2)** **Significance: High (+12)**	• No mitigation proposed.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: Very High (+4)** **Probability: Possible (+2)** **Significance: High (+12)**
5. Social The reliable power source will also encourage new investments, within the area, in turn contributing to an increase in GDP.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: High (+3)** **Probability: Possible (+2)** **Significance: High (+11)**	• No mitigation proposed.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: High (+3)** **Probability: Possible (+2)** **Significance: High (+11)**
Indirect Impacts			
1. Fauna and Flora Surrounding areas and species	**Extent: Local (-2)** **Duration: Long-term (-3)**	• No mitigation proposed.	**Extent: Local (-2)** **Duration: Long-term (-3)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
present in the direct vicinity of the study area could be affected by indirect impacts resulting from operational and maintenance activities.	**Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-8)**		**Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Medium (-8)**
Cumulative Impacts			
None			

Alternative 1 (Green Route) – Decommissioning and Closure

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. Waste Waste generation during the decommissioning phase will have a negative impact on the environment, if not controlled adequately. Waste includes general waste or hazardous waste.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-7)**	• Disposal of waste must be in accordance with relevant legislative requirements. • Waste must be disposed off in the appropriate manner at a licensed disposal site.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**
2. Surface water (including wetlands) Removal of towers placed in wetlands could cause damage to the hydrology and vegetation of the wetland in the manner described above for construction. The termination of servitude management through riparian corridors post-decommissioning could increase the risk of alien invasive plant encroachment into the servitude area, and thus into adjoining riparian habitat.	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: High (-3)** **Probability: Possible (-2)** **Significance: High (-10)**	• Decommissioning to be guided by Eskom guidelines for construction / decommissioning. • Decommissioning to be monitored by an ECO according to the stipulations of the EMPr. • No temporary 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 decommissioning activity. • After decommissioning of the power line, management of alien invasive vegetation should continue for a period.	**Extent: Site (-1)** **Duration: Medium term (-2)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-7)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
If roads and tracks associated with the power line are not maintained this could result in erosion and siltation.			
3. Erosion All areas disturbed during construction and operation are to be re-vegetated to avoid erosion.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: High (-3)** **Probability: Possible (-2)** **Significance: Medium (-8)**	• Rehabilitation of areas affected by construction and operation activities should ideally commence at the start of the rainy season. • Recommended rehabilitation is in the form of active re-vegetation of affected areas, including areas where surface disturbances resulted from construction. • All partially constructed areas should be completed and prepared for final rehabilitation and re-vegetation. • All areas where topsoil was removed or placing of monopoles should be landscaped in order to reflect surrounding conditions. • Erosion monitoring and control should be conducted. This should be in the form of inspections subsequent to rains. Topsoil should be replaced in all areas that were eroded. It is critical that adequate topsoil remains in construction areas, implying that topsoil might need to be supplemented in some areas until such time that a layer of vegetation has stabilised the soil.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**
Indirect Impacts			
1. Visual Removal of towers and rehabilitation of the (cleared) servitude could constitute a positive visual impact as	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: Moderate (+2)** **Probability: Possible (+2)**	• No mitigation proposed.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: Moderate (+2)** **Probability: Possible (+2)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
the landscape could be returned to a more natural appearance.	**Significance: Medium (+10)**		**Significance: Medium (+10)**
Cumulative Impacts			
None.			

Alternative 3 (Purple Route) – Decommissioning and Closure

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. Waste Waste generation during the decommissioning phase will have a negative impact on the environment, if not controlled adequately. Waste includes general waste or hazardous waste.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-7)**	• Disposal of waste must be in accordance with relevant legislative requirements. • Waste must be disposed off in the appropriate manner at a licensed disposal site.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**
2. Surface water (including wetlands) Removal of towers placed in wetlands could cause damage to the hydrology and vegetation of the wetland in the manner described above for construction. The termination of servitude management through riparian corridors post-decommissioning could increase the risk of alien invasive plant encroachment into the servitude area, and thus into adjoining riparian habitat. If roads and tracks associated with the power line are not maintained this could result in erosion and	**Extent: Local (-2)** **Duration: Long-term (-3)** **Intensity: High (-3)** **Probability: Possible (-2)** **Significance: High (-10)**	• Decommissioning to be guided by Eskom guidelines for construction / decommissioning. • Decommissioning to be monitored by an ECO according to the stipulations of the EMPr. • No temporary 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 decommissioning activity. • After decommissioning of the power line, management of alien invasive vegetation should continue for a period.	**Extent: Site (-1)** **Duration: Medium term (-2)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-7)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
siltation.			
3. Erosion All areas disturbed during construction and operation are to be re-vegetated to avoid erosion prior to operation.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: High (-3)** **Probability: Possible (-2)** **Significance: Medium (-8)**	• Rehabilitation of areas affected by construction and operation activities should ideally commence at the start of the rainy season. • Recommended rehabilitation is in the form of active re-vegetation of affected areas, including areas where surface disturbances resulted from construction. • All partially constructed areas should be completed and prepared for final rehabilitation and re-vegetation. • All areas where topsoil was removed or placing of mono poles should be landscaped in order to reflect surrounding conditions. • Erosion monitoring and control should be conducted. This should be in the form of inspections subsequent to rains. Topsoil should be replaced in all areas that were eroded. It is critical that adequate topsoil remains in construction areas, implying that topsoil might need to be supplemented in some areas until such time that a layer of vegetation has stabilised the soil.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**
Indirect Impacts			
1. Visual Removal of towers and rehabilitation of the (cleared) servitude could constitute a positive visual impact as the landscape could be returned to a more natural appearance.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: Moderate (+2)** **Probability: Possible (+2)** **Significance: Medium (+10)**	• No mitigation proposed.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: Moderate (+2)** **Probability: Possible (+2)** **Significance: Medium (+10)**
Cumulative Impacts			

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
None.			

Proposed Tsakani Substation (Alternative 1) - Decommissioning and Closure

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. **Waste** Waste generation during the decommissioning phase will have a negative impact on the environment, if not controlled adequately. Waste includes general waste or hazardous waste.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: High (-3)** **Probability: Highly Probable (-3)** **Significance: Medium (-9)**	• Disposal of waste must be in accordance with relevant legislative requirements. • Waste must be disposed off in the appropriate manner at a licensed disposal site.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Low (-6)**
2. **Removal of equipment** Equipment not adequately removed from the site after decommissioning will have a negative impact on the environment if not mitigated.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-7)**	• All structures comprising of the construction camp are to be removed from site. • The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc, and these shall be cleaned up and contaminants disposed of appropriately. • All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top soiled and landscaped.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**
3. **Erosion:** All areas disturbed during decommissioning are to be re-vegetated to avoid erosion.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: High (-3)** **Probability: Possible (-2)** **Significance: Medium (-8)**	• Rehabilitation of areas affected by decommissioning activities should ideally commence at the start of the rainy season. • Recommended rehabilitation is in the form of active re-vegetation of affected areas, including areas where surface disturbances resulted	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		from construction. • All partially constructed areas should be completed and prepared for final rehabilitation and re-vegetation. • All areas where topsoil was removed or placing of monopoles should be landscaped in order to reflect surrounding conditions. • Erosion monitoring and control should be conducted. This should be in the form of inspections subsequent to rains. Topsoil should be replaced in all areas that were eroded. It is critical that adequate topsoil remains in construction areas, implying that topsoil might need to be supplemented in some areas until such time that a layer of vegetation has stabilised the soil.	
Indirect Impacts			
1. **Visual** Removal of the substation components and rehabilitation of substation footprint could constitute a positive visual impact as the landscape could be returned to a more natural appearance.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: Moderate (+2)** **Probability: Possible (+2)** **Significance: Medium (+10)**	• No mitigation proposed.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: Moderate (+2)** **Probability: Possible (+2)** **Significance: Medium (+10)**
Cumulative Impacts			
None.			

Proposed Tsakani Substation (Alternative 2) - Decommissioning and Closure

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
1. **Waste** Waste generation during the decommissioning phase will have a negative impact on the environment, if not controlled adequately. Waste includes general waste or hazardous waste.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: High (-3)** **Probability: Highly Probable (-3)** **Significance: Medium (-9)**	• Disposal of waste must be in accordance with relevant legislative requirements. • Waste must be disposed off in the appropriate manner at a licensed disposal site.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Possible (-2)** **Significance: Low (-6)**
2. **Removal of equipment** Equipment not adequately removed from the site after decommissioning will have a negative impact on the environment if not mitigated.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Moderate (-2)** **Probability: Possible (-2)** **Significance: Medium (-7)**	• All structures comprising of the construction camp are to be removed from site. • The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc, and these shall be cleaned up and contaminants disposed of appropriately. • All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top soiled and landscaped.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**
3. **Erosion:** All areas disturbed during decommissioning are to be re-vegetated to avoid erosion.	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: High (-3)** **Probability: Possible (-2)** **Significance: Medium (-8)**	• Rehabilitation of areas affected by decommissioning activities should ideally commence at the start of the rainy season. • Recommended rehabilitation is in the form of active re-vegetation of affected areas, including areas where surface disturbances resulted from construction. • All partially constructed areas should be completed and prepared for final rehabilitation and re-vegetation. • All areas where topsoil was removed or placing of monopoles should be landscaped in order to reflect	**Extent: Local (-2)** **Duration: Short-term (-1)** **Intensity: Low (-1)** **Probability: Improbable (-1)** **Significance: Low (-5)**

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		surrounding conditions. • Erosion monitoring and control should be conducted. This should be in the form of inspections subsequent to rains. Topsoil should be replaced in all areas that were eroded. It is critical that adequate topsoil remains in construction areas, implying that topsoil might need to be supplemented in some areas until such time that a layer of vegetation has stabilised the soil.	
Indirect Impacts			
1. Visual Removal of the substation components and rehabilitation of substation footprint could constitute a positive visual impact as the landscape could be returned to a more natural appearance.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: Moderate (+2)** **Probability: Possible (+2)** **Significance: Medium (+10)**	• No mitigation proposed.	**Extent: Local (+2)** **Duration: Permanent (+4)** **Intensity: Moderate (+2)** **Probability: Possible (+2)** **Significance: Medium (+10)**
Cumulative Impacts			
None.			