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IMPALA-MTUBATUBA SITE SPECIFIC ENVIRONMENTAL MANAGEMENT PLAN REPORT

Eskom
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DOCUMENT EDIT AND REVIEW

Name		Company	Date
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Dr Nelson Mnyamana	Report reviewer	Isineke Consulting	10 May 2019

DECLARATION OF INDEPENDENCE

In terms of section 1 of the National Environmental Management Act of 1998 EIA Regulations GNR 326 I Busisiwe Duduzile Ngidi, the appointed independent Environmental Scientists for the preparation of the Site-Specific Environmental management Plan Report and Independent ECO for the compilation of the Environmental Audit Report for this project, declare I have no business, financial, personal or other interest in the activity or application in respect of which that EAP, specialist or person is appointed in terms of these Regulations; or that there are no circumstances that may compromise my objectivity. All opinions and recommendations expressed in this document are my own and are based on professional experience and knowledge of the environmental audit process.

Signature

Date

EXECUTIVE SUMMARY

Aim for the site-specific environmental management plan

One of the conditions of the Environmental Authorisation (EA) for the proposed approximately 56km 2nd Impala-Mtubatuba 132kV powerline between existing Impala substation and existing Mtubatuba substation is to undertake a walkthrough of the entire proposed powerline route to identify specific spans and towers requiring mitigation and to survey for any sensitive habitats and species and presence of protected species at micro level as opposed to the basic assessment identification of issues done at a macro level. An additional walkthrough was undertaken with National Department of Environmental Affairs officials which led to update of the Site-Specific Environmental Impact Assessment Report. Additional to that is the undertaking of the walkthrough of approximately 100m Tee line between existing KwaMbonambi substation and existing 1st Impala-Mtubatuba powerline. The Tee line will form a ringfence to the local grid network and provide sustained supply of electricity. The salient aim for the walkthrough of the powerline route is to produce a Site-Specific Environmental Management plan report with findings from the walkthrough as well as suggested recommendations. The Site-Specific Environmental Management Plan (SSEMP) report will then become an updated Environmental Management Plan (EMP) report of the EMP of the Basic Assessment Report (BAR) undertaken for the application for Environmental Authorisation (EA) for the proposed powerline.

The ecological assessment looked at the local biodiversity, its current status along the powerline servitude, access tracks, work area and tower base area. The social assessment looked at homesteads, landuse, cultural sites and local infrastructure. Each tower site and the area between towers were investigated. The walkthrough involved observing and recording on these ecological and social aspects. Each tower base and the servitude between towers was visited. The findings are presented in this report and attached in the specialist report. Recommendations in the attached specialist report have been included in this report. Operational issues of the proposed powerline are considered in the EMP that was submitted with the BAR. The objective of the walkthrough was to undertake identification of the presence and significance of sensitive habitats and presence of protected species along the entire powerline route at micro level as opposed to the basic assessment identification of issues done at a macro level.

The walkthrough involved observing and recording on the ecological and social aspects. The findings are presented in this report and in the attached in the ecological report. In this assessment it was observed that the presence and significance of sensitive habitats and protected species was low to moderate with pockets of high biodiversity sites found occurring sporadically along the powerline servitude. The low value for environmental and ecological significance is a result of the high transformation of the natural vegetation along the entire route due to changes effected by various landuse. A few pockets of habitats with various plant species exists. These pockets vary in the density of biological species. Areas where there is less grazing or disturbance a relatively high number of species exist. However even high biodiversity habitats are often infested with weeds, an indication of some sort of disturbance, grazing being a common factor. Sugarcane, timber commercial plantations and linear developments such railway lines and roads, rural homesteads spreading across open areas, overgrazing have replaced most natural vegetation between Impala substation (start of powerline) and Mtubatuba substation (end of powerline).

The study area is divided into two areas, from Impala substation (start of the servitude) to Nseleni substation (midway) and from Nseleni substation to Mtubatuba substation (end of servitude). The area south of Nseleni river predominantly comprises of sugarcane and commercial timber while area north of Nseleni river and Mtubatuba substation is characterised by rural homesteads, subsistence farming, fallow lands, open grasslands, and network of rural roads. Because of high population density within tribal areas, and inability to avoid some dwellings, some homesteads will need to be relocated. The negotiations to relocate or access private land has been done by Eskom Lands and Rights. Effective and coordinated negotiations and engagements with the affected landowners and involvement of local community structures have prevented any potential conflicts between the developer, Eskom Holdings, and the affected homestead owners and local traditional authority. Successful negotiations with the routing of the powerline, location of towers and servitude have had a positive impact on the construction of the powerline. The powerline is needed to boost the deteriorating capacity in the electrical network supported by Nseleni and Mtubatuba substations. A no-go situation will lead to system failure and ultimately loss of power supply.

The need for the site-specific environmental management plan

One of the conditions in the EA published in 27 September 2016 (EIA Ref: 14/12/16/3/3/1/1505) for this proposed powerline is the undertaking of the walkthrough of the entire powerline route, specific condition No.30. An additional survey provided detailed information on sensitive habitats as well as specific impacts resulting from locating the powerline route on land and socially. This SSEMP is a fulfilment of this condition. Ludloko Developments has been appointed by Eskom Holdings SOC to conduct the walkthrough of the 56km of powerline route from Impala substation to Mtubatuba substation between two districts, uThungulu and uMkhanyakude districts, KwaZulu Natal. Department of Environmental Affairs is the responsible authority for approving amendments.

Investigation method

The walkthrough involved visiting each tower base and the powerline route between towers where conductors will be suspended. Observation involved recording of findings and discussions with team members. Discussions involved weighing all possible options that will suit environmental, technical and social requirements. Team members included, independent environmental consultant, independent ecologist, Independent environmental intern, Eskom environmental officer, Eskom surveyor, Eskom designing engineer, Eskom Lands & Rights. Meeting with affected landowners was thoroughly done. Their input, queries, and suggestions have been incorporated into this report

Vegetation; biodiversity and sensitive habitats

According to the sensitivity (ecological) report the powerline route is located within of Zululand Coastal Thornveld and Maputaland Coastal belt. The area along the powerline route and adjacent areas is characterised by observable changes in biodiversity due to changes in the natural environment. The area is highly transformed by commercial and subsistence farming, homesteads, invasive species, overgrazing, excessive burning, informal roads and tracks including footpaths. Wetlands exist along the study area and were their functional role was observed to be disturbed. Towers by design had been located outside designated wetland areas. The prominent ecological sensitive areas existing within the study area are riparian areas such as the floodplain adjacent to Umfolozi River, drainage lines, river channels and small catchment areas (slopes). No towers are located within the floodplain, drainage lines or wetland areas. It should be noted that tower 116(187) is located outside the riparian and floodline of Umfolozi Rive. A floodline report was submitted with the Basic assessment Report. A summary of the affected sites (flagged towers) is presented in Appendix A. Potential impacts along affected sites have been explained and recommendations provided. The potential impacts involve damage and disturbance to protected species, poor rehabilitation, driving along tracks or roads not constructed to accommodate heavy vehicles which might lead to erosion, relocation of rural homesteads, damage to sugarcane and subsistence timber plantations, deviation of a rural road, damages to homestead fences, disturbance to the ground cover rendering the underlying ground to erosion if the disturbed areas are not stabilised.

Access to towers

Most towers are accessible through driving along existing roads and tracks. A few towers are accessible by driving along open terrain, in such instances driving is to be kept along single tracks to prevent creation of multiple tracks. It is suggested that no new access tracks should be constructed. Towers located upslope are to be accessed and constructed manually in-order to minimise creating new access tracks. This will prevent causing significant potential erosion on a slope. Driving to sites on slopes should be done along natural contour lines.

Public participation

Public participation process involved meeting with affected landowners and local authority structures. The public participation process is attached in Appendix B.

Impact assessment

Severity of impacts and provision of appropriate mitigation measures were determined by the sensitivity of the affected area in terms of local biotic and abiotic elements, conservation status of the area, and connectivity of ecosystems such as connections between wetlands and local streams or rivers. It also considered whether the area falls under a conservancy as well as accessibility to the tower sites. The level of transformation as well as rapid expansion of homestead settlement into open areas contributed to the present status and quality of

biodiversity. The main factors considered were the presence of sensitive habitats, protected or threatened species, effects on houses and applicability of mitigation measures to minimise the effects of potential impacts resulting from construction of the powerline. Application to destroy or disturb identified protected species has been undertaken with relevant authorities and permits are attached in Appendix F. Compensation for destroyed protected tree species, as recommended in the tree cutting permit from Department of Agriculture, Forestry and Fisheries (DAFF) will be undertaken at suitable locations such as schools, creches, clinics or at traditional offices where they will be protected from being destroyed.

Application for permit

According to Impala-Mtubatuba Sensitivity Report for the Site-Specific report application for permits to disturb or destroy the following protected plant species have been put through to Ezemvelo KZN Wildlife (EKZNW) and Department of Agriculture Fisheries and Forestry (DAFF). Table A1 in Appendix A shows towers with protected plant species. Recommendations will be provided in the permit.

EKZNW

- Permit to relocate any affected *Aloe ferox* (Bitter Aloe), *Aloe maculata* (Common Soap Aloe), *A.marlothii* (Mountain Aloe) and *Huernia zebrina* (Zebra Huernia).
- Permit to destroy any *Freesia laxa*, *Gladiolus* spp., *Bulbine asphodeloides* (Snake Flower), *Trachyandra* sp. *Ledebouria ovatifolia*, *Boophone disticha* (Poison Bulb) and *Cyrtanthus contractus* (Fire Lily), all Least Concern species, with option to translocate where/when possible.

DAFF:

- Permit to destroy *Sclerocarya caffra* (Marula) where affected. Prune-only option if practical.

Table 3 provides identified potential impacts associated with construction of the powerline and recommended mitigation measures to address the identified impacts. **Table A1 in Appendix A**, shows affected sites along flagged towers and provides recommendations to be implemented to minimise identified impacts and issues along the powerline route.

Recommendations:

- All construction staff including sub-contractors to be inducted on the project's Environmental Authorisation (EA) conditions, Environmental Management Plan (EMP) recommendations and recommendations in the Site Specific EMP report
 - Aim of induction is to provide a clear explanation on the content of the EA, EMP and the Site-Specific EMP.
- Permits to disturb protected plant species has been issued for the project by the relevant authority
 - It is however, recommended that disturbance or damage to protected plant species be avoided as much as possible;
 - If disturbance or damage to protected plants is unavoidable due care be applied to minimise the disturbance or damage.
- Licence to disturb, damage or cut specially protected trees species has been issued for the project by the relevant authority
 - Contractor to apply much effort to avoid any disturbance, damage or need to cut the protected tree species;
 - Since a limited number to disturb, damage or cut protected trees species along the length of the powerline, including protected trees growing along access into tower base sites has been licensed to be disturbed, the contractor is urged to limit disturbance to the protected tree species;
 - Should disturbance to protected tree species exceed the licensed number, any additional need to disturb, damage or cut protected tree species should be strictly discussed with the project ECO and ecologist prior to damaging, disturbing or cutting of the protected tree species.
- The number of trees to be disturbed has been indicated in the licence.
- DAFF has to be notified should additional protected trees need to be destroyed.
- No cutting of trees not indicated in the SSEMP Sensitive Report should be done without a proper license being issued to cater for the additional trees.

- DAFF has requested to be invited during construction to observe areas where protected trees occur, either during or after construction.
- The license to disturb, damage or cut protected tree species has issued a condition that specifies that for every cut protected tree three locally suitable indigenous trees be planted in locations where growth of the trees will support long-term growth. It is important that the contractor discusses planting of the locally indigenous trees at suitable places, such as clinics, schools, community halls or traditional council office, be decided upon by local induna and by the traditional council.
- A handful succulent protected succulent plants will be affected by the location of the powerline. It is recommended that they be relocated and planted at a safe distance from the work area
 - There might be budget constraints with regards to planting new succulent plants at safe locations, it was determined that it will work out cheaper to relocate and replant them.
- Strictly no cutting or disturbance of trees or vegetation within 32m (riparian area) from the edge of a drainage line, river course or dams.
- Strictly no cutting or disturbance of trees or vegetation within 500m from the edge of the wetland.
- Where relocation of protected plants species is necessary an Eskom approved landscaper should undertake the relocation and replanting of the protected species
 - Eskom Holdings have established a database of approved landscapers who are familiar with Eskom Holding vegetation management procedure.
- Minimise disturbance to protected plant species
 - Only a few bulbs will be affected by digging along the tower foundation in comparison to the number of bulbs occurring per tower area and surrounding. The tower foundations will occupy a relatively smaller area to the rest of the tower footprint. Disturbance should be limited to a designated and demarcated work area.
 - Underground bulbs even though compacted or affected by digging will recover during growing season;
 - No aloes were identified to be affected.
- All work areas are to be strictly demarcated to indicate extent of work area and thus minimise disturbance within the demarcated work area
 - Demarcation of the work area is to limit disturbance and prevent extending it outside work area. Demarcation of work area is also a safety requirement.
- Bird flight diverters and aviation spheres are to be fitted along specified conductor spans especially along spans crossing water bodies, drainage lines and some roads.
- Driving along slopes is to be limited along contour lines. However, driving to site located at upper slopes should be done along contour lines and not directly up the slope in order to prevent potential erosion associated with disturbed slopes.
- No creation of new tracks is to be done mechanically, i.e., by bulldozers
 - There is no need to establish new tracks mechanically to access any tower sites.
- Only single vehicle tracks are to be established across all accessible terrain
 - The vehicle tracks will be established by driving the vehicle along the terrain.
- Strictly no multiple vehicle tracks are to be created.
- It is recommended that protected tree species be trimmed where possible or avoided
 - Trimming or cutting of protected or indigenous trees is to be done by Eskom Holding approved bush-clearing contractors who are familiar with Eskom Holding vegetation management procedure.
- Steep access into tower base areas need to be slanted and compacted to prevent scouring and collapse Earth road banks, in particular, which has been flattened to provide access to the tower base need to be restored to original state post-construction
 - Steep access into tower base positions occur in some places;
 - The flattening specification of the steep banks has been discussed with the project civil engineer.
- Contractor to relocate cultural sites, such as places of worship or football grounds which have been affected by location of towers or servitude
 - Relocation of open places of open places of worship needs to be discussed with the worshippers and consent received for such an activity to be done;
 - Reestablishment of a football ground is to be discussed with the local induna who in turn is to inform the local community. Written consent must be received and filed accordingly.

- Relocation of homesteads is to be done through an organised consultation process which should be recorded and filled accordingly.

Wetlands

Considerable care was taken by survey to locate towers away from wetlands. The location was done in collaboration with the project ecologist. Therefore, wetlands will not be impacted by the location of the towers.

Presence of protected plant species

Some sites were found to have protected plant species. In some sites it is possible when locating the tower base to either avoid disturbing or to relocate or cause minimal disturbance to the protected plant species. Application for disturbance and relocation of protected plant species was sought with relevant authorities. Permits have been received from Department of Fisheries and Forestry and from Ezemvelo KZN Wildlife Services.

Presence of sites of worship and graves

Tower 125 (196) is located within a fenced open place of worship. Eskom Lands and Rights has met with church representatives to discuss possible relocation of the open place of worship. The church representatives have conceded to relocation of the open place of worship, however on condition that Eskom Holdings will pay for the necessary relocation costs. During the walkthrough a few graves sites were identified. However, all the identified graves are situated away from the tower base, work area and access into the work area. Therefore, no grave will be affected. It was suggested that all identified graves be fenced to prevent any potential damage to them during construction also as a sign of respect. Fencing of the graves is to be discussed with the family and the local Induna should be involved.

Proximity to houses

Effort was applied during survey of the powerline route to locate towers away from houses and place the towers within open spaces. Where relocation of affected homesteads was inevitable, the affected property owners were engaged about the proposed relocations. Proposed relocations will occur mainly within the rural areas. Community structures such as tribal authorities have been made aware of possible relocation of affected homesteads from the time of basic assessment study and the relocation plan of affected homesteads was repeated during the site specific EMP walkthrough assessment. Initial meetings with affected homestead owners were undertaken by Eskom Holding Lands and Rights department. The negotiations involved liaising with local traditional councils. The traditional councils requested that the negotiations with affected homesteads should involve local izinduna for proof of consultation and transparency of the process. The environmental consultant for the project participated in the consultation process informally during the walkthrough process and then formally at public meetings in order to address public questions pertaining to project process particularly with regards to environmental permits process and periods for issuing of the permits. Community supports the proposed powerline project and mostly wanted to understand the process. Questions concerning problems with existing powerline infrastructure or work undertaken by Eskom Holding personnel were also addressed and the questions were going to be taken to local Eskom office in Empangeni where Eskom community liaison officer was to address the locals.

Expanded floodplain adjacent to Umfolozi River

Tower 116 (187) is located just outside the riparian area and floodline of Umfolozi River. Tower 116(187) site has a gentle slope towards Umfolozi River. Construction of the tower will have less impact on the ground but may disturb some protected plant species. A permit to disturb has been sought with relevant authority. It is recommended that sandbags be located at the edge of the site to contain any silt from the excavated holes. The collected silt can be spread around the tower base or spread thinly along the adjacent area. The sandbags to be removed after construction of the tower has been completed.

Disturbance of ground by excavation for tower foundations

All disturbed areas around tower bases and along access roads will be restored by first loosening the ground along the disturbed area, followed by application of stored topsoil (from excavated holes) around bare areas along the tower bases. All construction debris should be removed along the work area including disturbed area before preparing the ground for regrowth of grass cover. After construction all affected soils within construction

sites as well access tracks should be ripped and topsoil applied and lightly compacted. Grass will grow naturally back along disturbed tracks and tower bases after the ground has been prepared for growth and if these areas are not disturbed further.

Structuring of the report

The first section of the report consists of:

- Executive summary providing the highlights of the report.
- The first section of the report provides description of the area, the biodiversity setting of the area, level of sensitivity of the area, the investigation methodology and a summary of recommendations against each identified impact.
- The second section of the report provides a description of tower area, per tower, or group of towers and provides recommendations.
- Appendixes provide procedures to be undertaken.

Reading of the report

Appendix A contains specific recommendations to be implemented during construction of the proposed powerline. During induction the content of the report will be explained and important sections of the report will be highlighted. Definition and explanation of terms provides understanding of the terms in the context of the report.

Sensitive areas along the proposed powerline

This report states specific recommendations of the findings of the walkthrough against each flagged tower. Towers are flagged due to the sensitivity of ecological and social environments observed along the powerline. The main sensitivities observed are:

- Presence of protected plant and tree species.
- Presence of threatened species.
- Presence of indigenous trees in a canopy.
- Presence of National Freshwater Ecosystem Priority Area (NFEPA) wetlands including 500m buffer from the edge of the wetland.
- Presence of riparian areas along watercourses.
- Presence of perennial or seasonal watercourses including drainage lines and man-made earth dams.
- Presence of trees within buffer zone of watercourse.
- Proximity to homesteads within servitude.
- Proximity and presence of graves.
- Proximity to cultural sites.
- Deviation of a local road to accommodate a tower leg.

Table 1

Environmental and Social aspect	Explanation	Identified impacts	Recommendations
ECOLOGICAL ASPECTS			
Red Data Species	Presence of Red Data Species	None	No Red Data Listed Plant species were observed during the walkthrough of the powerline route
Protected plant species	Protected plant species were observed to occur within tower bases, access tracks to tower sites, within the extent of the work area, within the servitude. Towers and servitude between towers where the protected plants were observed were flagged	Destruction of protected species through <ul style="list-style-type: none"> • Driving or construction of the tower • Stringing (pulling) of the conductor • Digging holes to accommodate tower foundations • Failure to lightly compact of soil along areas disturbed by construction of the powerline 	There are a few tower sites where there will be complete clearing of protected species within a designated work area Permit from relevant authority to disturb protected plants is available Disturbance will not necessarily denude the area but will affect a limited area within the designated work area Construction work area should be

Environmental and Social aspect	Explanation	Identified impacts	Recommendations
		<p>can lead to erosion as a result of the loose of the soil which will be susceptible to being washed away. Slight compacting help bind the soil with organic material and help with the quick settling of the topsoil</p>	<p>designated to limit work within the designated area and not extend disturbance to adjacent areas</p> <p>In some areas protected species such as aloes should be relocated to about 20m away from the work area</p> <p>In other sites bulbs of protected species occur underground and driving or walking will not destroy them</p> <p>Digging to accommodate tower bases should be limited to designated areas to minimise damage to protected plant species It should be noted that plants can regrow after construction has stopped and no disturbance occurs in that area</p>
Protected plants within vehicle tracks	Protected plants growing within vehicle tracks	A few places where protected plant species exists along potential access areas. However, damage to these protected plant species will be minimal as vegetation will regrow once construction stops	<p>Permit from relevant authority to disturb protected plants is available</p> <p>Driving to be kept along single vehicle tracks to minimise extending disturbance to a larger area</p> <p>No physical opening (removal of ground cover) of the tracks. Vehicle should drive along the open terrain within single tracks</p> <p>No driving vertically upslope</p> <p>Vegetation including protected plants will grow back when driving stops</p>
Protected tree species	<p>Protected Marula, <i>Sclerocarya birrea</i>, commonly grows mostly within the rural areas</p> <p>Permit from Department of Agriculture and Forestry and Fisheries (DAFF) has provided a permit to destroy or trim or disturb only 12 trees along the length of powerline</p>	<p>Destruction through:</p> <ul style="list-style-type: none"> • Clearing of trees • Trimming • Breaking of branches during pulling of the conductor 	<p>Where possible location of the tower and pulling of the conductor should avoid disturbing Marula trees</p> <p>Disturbance should happen only when there are no feasible options to avoid the tree</p> <p>If more than 12 Marula trees need to be cleared, this can only be done so after an application to DAFF has been received for the additional trees. Work should be done in other areas until the permit has been received</p>
Indigenous trees in a canopy	<p>Two or more indigenous trees whose branches touch each other is considered to have formed a canopy A permit to disturb these trees is need A general clearance permit to disturb indigenous trees in a canopy has been issued</p>	<p>Disturbance through:</p> <ul style="list-style-type: none"> • Clearing of the tree • Trimming • Breaking of branches during stringing 	<p>Only flagged canopies are not to be disturbed</p> <p>The permit allows cutting, trimming of the indigenous trees in a canopy</p> <p>Cleared trees are to be cut into sizeable pieces and stacked neatly</p> <p>The stack is not to prevent movement of people and livestock</p> <p>Nearby communities are to be made aware</p>

Environmental and Social aspect	Explanation	Identified impacts	Recommendations
			of available cut wood
Wetlands	<p>NFEPA wetlands occur in the area</p> <p>A 500m riparian buffer area from the edge of the wetland is not to be disturbed, as stipulated in the National Water Act No 36 of 1998</p>	<p>Disturbed through:</p> <ul style="list-style-type: none"> • Location of towers within 500m riparian area • Driving through wetland area • Cutting trees along the 500m riparian are of the wetland 	<p>Care has been taken to place towers outside 500m riparian buffer area from the edge of the wetland. Therefore, no disturbance should occur within wetland riparian area</p> <p>It is recommended that conductors that run over wetland riparian area should be strung manual</p> <p>Trees growing along the wetland riparian area should not be disturbed as they protect the functionality and integrity of the riparian area thus prevent potential erosion and pollution of the wetland which may lead to the destruction of the edge of the wetland</p>
Riparian area 32m area from the edge of any watercourse	<p>Watercourses comprise of:</p> <ul style="list-style-type: none"> • Seasonal, dry or perennial rivers • Drainage lines • Natural or artificial dams • Seasonal, dry or perennial streams 	<p>Disturbance to riparian areas through:</p> <ul style="list-style-type: none"> • Driving through the riparian area • Cutting of trees growing along the riparian area 	<p>No tower positions are located within 32m riparian buffer area from the edge of a watercourse</p> <p>Disturbance within these areas entail clearing of trees, driving and indiscriminate pulling of conductors. Effort is to be applied to prevent disturbance to riparian areas. Vegetation growing along riparian areas stabilises these areas to prevent potential erosion.</p>
Crossing of watercourses	<p>Crossing includes:</p> <ul style="list-style-type: none"> • Stringing of conductors • Driving across the watercourse 	<p>Disturbance through:</p> <ul style="list-style-type: none"> • Driving through rivers 	<p>Driving of construction vehicles should be done over bridges. Tower positions across the rivers should be accessed through vehicle tracks, existing local tracks or roads</p>
Stringing of conductors	<p>Stringing involves pulling of conductor between towers</p>	<ul style="list-style-type: none"> • Potential breaking of tree branches 	<p>Stringing of conductors is recommended to be done manually especially along riparian areas to prevent or minimise breaking of trees along riparian areas</p>
Fitting of bird flight diverters and aviation spheres on conductors suspended across or parallel to watercourses	<p>Conductors running across or over watercourses, rivers, wetlands, drainage lines or natural or man-made dams or main roads (common places for bird flight paths)</p>	<p>Potential collisions of birds with the conductors</p>	<p>Conductor spans that are suspended across bird flight paths should be fitted with bird flight diverters to make them visible to the birds to prevent potential collisions</p> <p>Aviation spheres are to be fitted along the conductor span crossing main roads and large rivers (small aeroplanes use large rivers as flight paths)</p> <p>Approved bird flight diverters and avian spheres are to be fitted in alternating black and white colours 10m along the middle 50% of the earth strand at various positions along the proposed powerline, more specifically between towers. Subsequent reports of any collisions with the unmarked line will require retro-fitting of diverters between the relevant towers.</p> <p>Both the bird flight diverters and aviation</p>

Environmental and Social aspect	Explanation	Identified impacts	Recommendations
			spheres will make the conductors visible to birds and to small aeroplanes The project designing engineer will provide Eskom approved bird flight diverter fitting standard. Towers to be fitted with bird flight diverters and aviation spheres are indicated in Table B & C in Appendix A.
Fitting spikes on towers	Spikes are fitted as per Eskom spike fitting procedure	Potential electrocution when large raptor wings touch conductors	Spikes are fitted at the top of flagged towers to prevent raptors from roosting at the top of the tower thereby preventing electrocution of the birds when their large wings touch conductors
SOCIAL ASPECTS			
Relocation of houses existing within servitude	Houses located within the proposed powerline servitude pose safety threat and are to be relocated	Relocation of the whole homesteads Difficulties in the negotiation process Safety concerns with buildings located within a powerline servitude under electricity charged conductors	All homesteads identified to be relocated had been discussed with affected owners, local traditional structures Local traditional structures and homestead owners had been engaged with extensively to discuss relocation of the affected houses through traditional council meetings and meetings with the affected homestead owner Ingonyama Trust which manages tribal land on behalf of the King had been consulted and invited to attend traditional council meetings Ingonyama trust mentioned that it will sign over the servitude land to Eskom Holdings once all the house relocations had been completed and homestead owners compensated accordingly. Eskom Land and Rights had been involved in the liaisons with the affected homestead owners and with the local tribal authorities. Eskom is to pay for the relocation and rebuilding of the relocated homesteads The relocation process had been explained to the affected homestead owner and to the local tribal authority Local traditional council will be updated of the relocation process No resistance to relocate had been reported
Presence of graves	Graves exist near tower base positions However, all the identified graves are located away from the work area and chances of disturbance are minimal		It is recommended that the graves be fenced to prevent any potential disturbance to the graves Fencing of the graves should be discussed with the affected family and the need to fence the graves explained
Presence of cultural	The cultural site that will be	Disturbance to a sacred place of	Relocation of the worship site has been

Environmental and Social aspect	Explanation	Identified impacts	Recommendations
sites	<p>affected by the powerline is site of worship</p> <p>This site of worship is located within the proposed powerline servitude and needs to be relocated for safety purpose</p>	worship during construction of the powerline	<p>discussed with the affected church and the church members agreed to relocate</p> <p>Eskom to pay for the relocation costs</p>
Deviation of a local road	<p>To accommodate a tower base</p> <p>Relocation of the tower away from the local road is not possible</p> <p>Deviation of the road is more feasible than relocating of the tower</p>	Location of the tower leg within the existing road	<p>Deviation of the local road will be discussed with the local tribal authority</p> <p>The deviation will be constructed to accommodate two vehicles passing each other</p> <p>The deviation specification will be shown and explained to the local tribal authority</p>

Effects of implementation of recommendations

The level of disturbance will be limited within demarcated tower foundations work area and along the powerline servitude. The dug holes will be filled with concrete and backfilled with topsoil around the tower legs to prevent potential scouring and erosion. Grass will grow back naturally especially when a layer of topsoil has been applied.

Definition of Terms

Definition and explanation of terms appears in the first section of the report. Specific recommendations against findings of the walkthrough per flagged towers

Activity tables

The following activities appear in Appendix A:

Table with

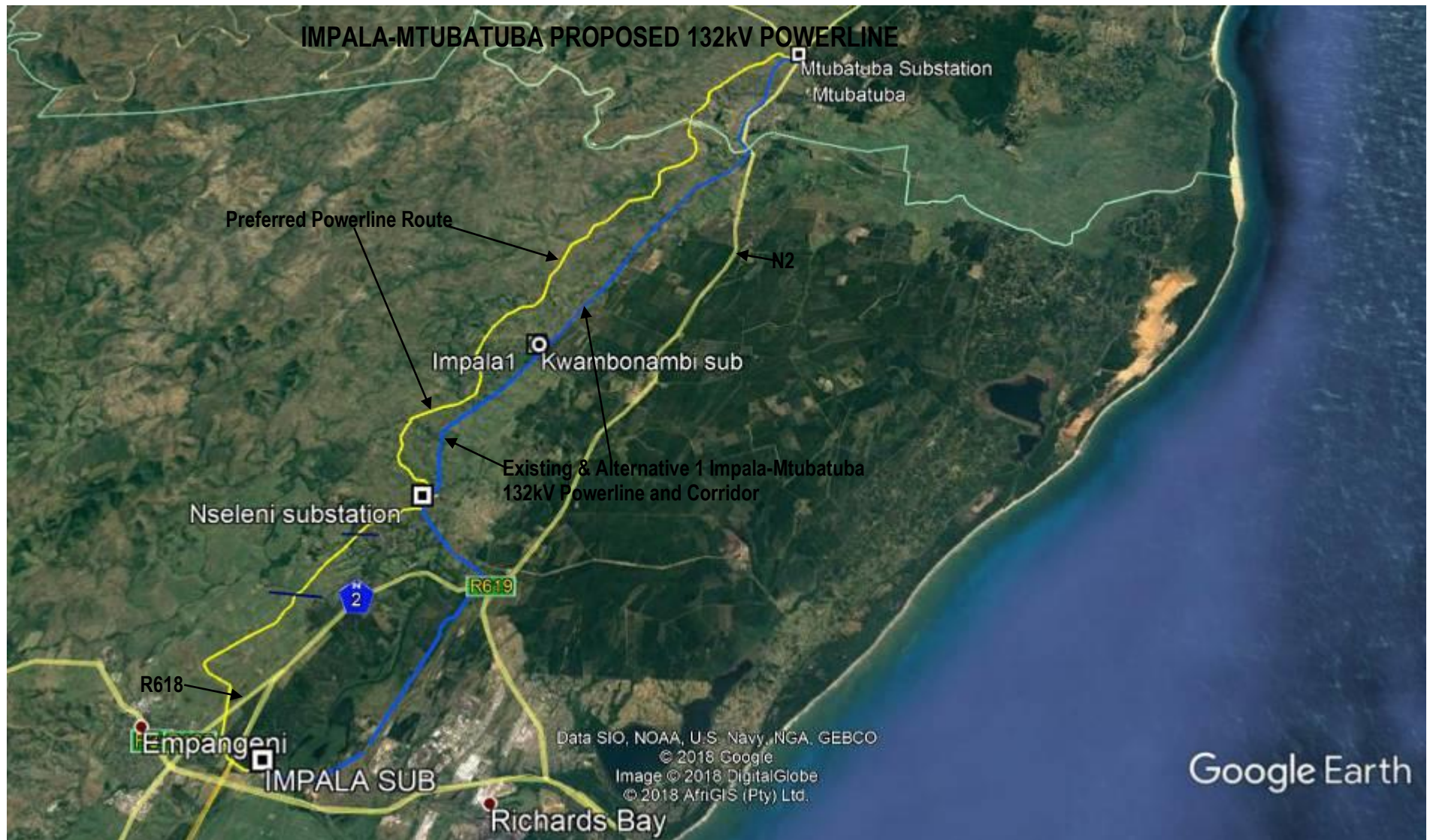
1. **Table A1: Tower to be fitted with bird flight diverters & permit to disturb protected species**
2. **Table A2: Towers to be fitted with Aviation Spheres**
3. **Table A3: Towers with access for construction, Relocation of houses and protection of graves**

The tables indicate flagged towers with specific activities to be undertaken. The specific activities are aimed at preventing potential negative impacts that can result from construction activities.

Definition of terms

Term	Definition
Walkthrough	Walking through the whole line on foot investigating and taking data
Site Specific EMPr	EMPR with information from a walkthrough to each aspect of the project
Powerline tower	A tall structure, usually a steel lattice tower, used to support an overhead powerline 132kV Tower Steel structures with pile foundations.
Powerline route	Route a surveyed powerline within a corridor
Powerline span	The length between two towers.
Corridor	Extent of linear area from start to the end of the powerline and with up to a kilometre width
Rehabilitation	Restoring areas disturbed by development activities including replanting natural vegetation, removing development litter, and protecting the habitat from further degradation and potential pollution
Catchment	A catchment is an area where water is collected by the natural landscape. It is essentially an area of land where water collects when it rains, often bounded by hills. As the water flows over the landscape it finds its way into streams and down into the soil, eventually feeding the adjacent watercourses
Habitat	An ecological or environmental area that is inhabited by a particular species of animal, plant or other type of organism
Riparian area	Riparian habitat includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterized by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent areas.
Sensitive habitat/environment	An area is defined as a "sensitive habitat" if it meets one or more of the following criteria: <ul style="list-style-type: none"> • Areas of special biological significance as identified by the relevant authority • Areas which provide habitat for locally unique biotic species/communities • Areas adjacent to essential habitats of rare, endangered or threatened species • Areas which provide habitat for rare or endangered species • Areas which provide habitat for rare, endangered or threatened species as designated by relevant authority
Activity	Placement or erection of any solid material or structure on under or on land
Structure	Structure means anything constructed or erected which requires a location on the ground or in the water
Protected plant species	A species of animal or plant which it is forbidden by law to harm or destroy
Endangered species	A species whose numbers are so small that the species is at risk of extinction
Watercourse	A natural or artificial channel through which water flows. A watercourse is a permanent landmark. Flow of water may not be constant
Drainage line	A land channel through which water flows
Riparian habitat	A habitat found along the banks of a river, stream which is ecologically diverse and may occur in a range of general habitat types. Consists of vegetation that relies on the water
Buffer zone	Is a naturally vegetated area along a river or stream corridor. They are the natural vegetation from the edge of the stream bank out through the riparian zone. The vegetative zone serves as a buffer to pollutants entering a stream from runoff, controls erosion, and provides habitat and nutrient input into the stream
Wetland	Wetlands are considered as those ecosystems defined by the National Water Act: "land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil."
NFEPA (National Freshwater Ecosystem Priority Areas)	NFEPA maps provide strategic spatial priorities for conserving South Africa's freshwater ecosystems and supporting sustainable use of water resources. These strategic spatial priorities are known as Freshwater Ecosystem Priority Areas, or FEPA. NFEPA are protected by National Environmental Management: Biodiversity Act (Act 10 of 2004); National Environmental Management: Protected Areas Act (Act 57 of 2003) and the National Water Act (Act 36 of 1998)
Obligate wetland plants	Almost always grow in wetlands (> 99% of occurrences). Some species are only found in wetland environments. This suite of plants is useful for reliably indicating the presence of wetlands
Facultative wetland species	Usually grow in wetlands (67-99% of occurrences) but occasionally are found in non-wetland

Ecological Integrity	<p>areas. Other plant species can occur in both wetland and non-wetland soils (although they are generally preferentially found in wetlands) and are known as facultative wetland species.</p> <p>Ecological Integrity refers to the ability of an ecosystem to support and maintain ecological processes and a diverse community of organisms</p>
Wetland functionality	<p>Wetland functions are defined as the physical, chemical, and biological processes or attributes that are vital to the integrity of the wetland system.</p>
Dry Wetland	No surface water
Koppie	A small hill in a generally flat area
DEA	Department of Environmental Affairs
DAFF	Department of Agriculture Forestry & Fisheries



Map showing preferred and alternative powerline route

1. INTRODUCTION

Eskom Holdings SOC appointed an independent environmental consultant, Ludloko Developments to compile and submit a site-specific draft EMPr as part of the requirements of the Environmental Authorisation for approximately 56km Impala-Mtubatuba powerline. The compilation of this Walkthrough/Site Specific Environmental Management Programme report (EMPr) is in fulfilment of specific conditions stipulated in the Environmental Authorisation (EA) issued by the Department of Environmental Affairs, dated 27 September 2016, EIA Ref No. 14/12/16/3/3/1/1505. This authorisation is for the construction of +/-56km Impala-Mtubatuba 132kV powerline which will start at existing Impala 275/132kV substation, an Eskom Transmission substation (31°56'51.01"E; 28°45'59.39"S GPS coordinates) located near Richards Bay along John Ross Rd ending at existing Mtubatuba 132/22kV substation, a Distribution substation (32°10'38.92"E; 32°10'38.92"E GPS coordinates) located near Mtubatuba town, parallel to N2 towards the town of Pongola.

Compilation of the report considered the recommendations stipulated in regulations 34, 35 and 37 of GNR 982 of National Environmental Management Act (107/1998): Environmental Impact Assessment Regulations, 2014, as well as conditions mentioned in Environmental Authorisation (EA) for EIA Ref No. 14/12/16/3/3/1/1505 particularly condition 30 of EA. Additional to that is complying with the letter from DEA dated 28 February 2019 Ref No.14/12/16/3/3/1/1505/MP1. The proposed powerline includes a loop-in-loop-out (enters and exists) at existing Nseleni 132/22kV substation (31°59'41.24"E 28°39'35.60"S) which is located at Kwabhejane tribal area as well as short link between existing 132kV Impala-Mtubatuba 1 and existing KwaMbonambi substation. This document is compiled to be used as a site-specific environmental management plan for the use by Eskom appointed construction contractor. It is intended to provide recommendations for the site establishment activities in addition to recommendations appearing in the EA and EMP submitted with the Basic Assessment Report for application for EA.

The powerline traverses different landuse types comprising of privately-owned farms, commercial tree plantation, tribal areas which are characterised by rural homesteads and subsistence farming and municipality owned property adjacent to Mtubatuba substation. Three distinct landuse types characterises the areas traversed by the powerline route, viz., sugarcane plantation along privately-owned farms, commercial tree plantations and tribal areas under the tribal authority. Commercial forest is predominantly located at the south of the powerline. Fields of sugarcane occupy the area between commercial tree plantation and Nseleni River. Tribal areas occupy the rest of the area above Nseleni River ending at Mtubatuba substation.

1.1 Additional walkthrough

Additional walkthrough was undertaken with the National Department of Environmental Affairs in February 2019 after reviewing the first draft of this report. Additional walkthrough provided additional information that responded to the letter from DEA dated 28 Feb 2019 and referenced 14/12/16/3/3/1/1505/MP1. The additional information gathered was used to update this report.

1.2 Scope of work

The findings of this report are based on the site inspections of each tower position and the servitude between tower sites. Each access track to the tower position was inspected. This report has been compiled to provide recommendations for construction of each tower and stringing of conductors between towers as part of the design package for the powerline. Each tower position has unique environmental and social features. Significance of each environmental and social feature was assessed and recommendations provided. Recommendations provided involved collaborative discussions with Eskom Land Survey, Lands and Rights and affected individuals and relevant community structures. It became necessary to interact with traditional council as affected individuals engaged the traditional council about pertinent questions especially those that require relocation of houses. Public meetings were arranged and all questions relating to relocation of houses and project process were answered and resolved by Lands and Rights.

1.3 Activities for the Scope of Work

- Walkthrough from existing Impala substation through Nseleni substation ending at existing Mtubatuba substation
- Walkthrough Kwambonambi +/- 100m tee line
- Investigating each tower position
- Investigate access roads to each tower position and into associated servitudes
- Record all relevant environmental and social as well a civil data pertinent to the towers and the servitude
- Meet with relevant and affected parties
- Update EMPr

1.4 Knowledge Gaps

Key assumptions and limitations relevant to the assessment included:

- Most of the wetlands show signs of transformation. There is visible hydrological and structural transformation which has implications on habitat and species composition. There is lack of indicator species throughout the project area. Due to the lack of water and indicator species therefore, exact buffer delineation was a challenge
- Access posed some limitations to some areas. Access constraints resulted in some of the delineations to be completed at a desktop level only, with extrapolations from field surveys
- Wetland buffers were identified for delineation were based on a desktop review of available information and a walkthrough site inspection. The data was based on online data sources which are based on macro assessment;
- The survey was undertaken during extended dry spell and some wetland plants may have been missed as they would only be identifiable during flowering (wet season);
- Wetland systems identified at desktop level within 500m of the project area were considered for the identification and desktop delineation, with wetland areas within the project area being the focus for ground truthing;
- During the study hand held GPS was utilized and there is a margin of error

1.5 Amending of the EMPr

Amending of the EMPr conditionally approved in the Environmental Authorisation DEA Ref No: 14/12/16/3/3/1/1505 is undertaken in terms of regulation 31 of the Impact Assessment Regulations, 2014. Amendments to the EMPr have been necessitated by the finding during the powerline walkthrough. Regulation 31 stipulates that amending of Environmental Authorised condition, Condition 14 of the EA states that The EMPr submitted as part of the EA must be amended and submitted to the Department for written approval prior to the commencement of the activity. The recommendations and mitigation measures as per findings of the walkthrough, condition 30 in the EA and a copy of the final layout of the powerline route, micro siting of the towers, must be incorporated into the amended EMPr. Additional conditions were submitted by DEA in the letter mentioned above after a walkthrough with DEA officials in February 2019. Once approved, the EMPr must be implemented and adhered to. Regulation 31 of the EIA Regulations, 2014 outlines the process to follow when making amendments which will make changes in the scope of the valid EA and where such change will result in an increased level or nature of impact where such level or nature of impact was not:

- i. Assessed and included in the initial EA or
- ii. Taken into consideration in the initial EA

Findings of the walkthrough showed that there are sensitive species, habitats that can be protected where towers are located. Major findings included:

- i. Presence of threatened, and protected species
- ii. Steep access to tower locations
- iii. Potential erosion due to slope and soil type
- iv. Micro habitats that contain protected, and threatened species

Regulation 31 stipulates that the applicant within 90 days of receipt by the competent authority of the application submit to the competent authority a report containing:

- i. an assessment of all impacts related to the proposed change;
- ii. advantages and disadvantages associated with the proposed change; and
- iii. measures to ensure avoidance, management and mitigation of impacts associated with such proposed change; and
- iv. any changes to the EMPr had been subjected to a public participation process, which had been agreed to by the competent authority, and which was appropriate to bring the proposed change to the attention of potential and registered interested and affected parties, including organs of state, which have jurisdiction in respect of any aspect of the relevant activity, and the competent authority
- v. reflects the incorporation of comments received, including any comments of the competent authority; OR;
- vi. a notification in writing that the report will be submitted within 140 days of receipt of the application by the competent authority, as significant changes have been made or significant new information has been added to the report, which changes or information was not contained in the report consulted on during the initial public participation process contemplated in sub-regulation (1)(a) and that the revised report will be subjected to another public participation process of at least 30 days.

After completing the walkthrough of the entire powerline route investigating each tower position and servitude, the investigation and observations provided specific information pertaining each tower and servitude. The information gathered provided ecology, social, archaeology and cultural information.

We will comply with GNR 982 of NEMA 2014 as mentioned in EA and not with GNR 326 of NEMA 2017. Both have similar sub-regulations 34, 35 and 37

Sub-regulation 34 is about Auditing of compliance with environmental authorisation, environmental management programme and closure plan

Sub-regulation 35 is about Amendment of environmental management programme or closure plan as a result of an audit

Sub-regulation 37 is about Amendment of environmental management programme or closure plan on application by holder of environmental authorisation.

1.6 Pertinent environmental (bio-physical, cultural and social) issues

The following environmental issues were observed during the walkthrough exercise:

- Presence of wetlands, especially watercourses (wetlands, rivers, drainage lines, natural depressions and man-made dams) classified as National Freshwater Priority Areas (NFEPA)
- Presence of protected plant species
- Presence of sites of worship and graves
- Proximity of houses
- Expanded floodplain adjacent to Umfolozi River
- Disturbance of ground by excavation for tower foundations

2. PURPOSE AND OBJECTIVES OF THE WALKTHROUGH EXERCISE

2.1 Purpose

The purpose of this document is to provide findings of the walkthrough of the planned powerline between Impala substation near the Richards Bay and Mtubatuba substation near the town of Mtubatuba in northern Zululand. The aim of the walkthrough is to:

- a. Address specific conditions stated in the environmental authorisation for the project as well as response to the additional letter from DEA;
- b. Document the condition of the natural landscape and key features;
- c. Identify sensitive habitats and species and provide coordinates for the identified protected species
- d. Determine their status and functionality;
- e. Determine the proximity of the proposed powerline to identified sensitive areas;
- f. Ensures that potential impacts associated with location, erection of towers and spanning of conductors between towers are minimised particularly along identified sensitive environments and natural environments;
- g. Provide suitable mitigation measures for disturbed areas during construction and operation of the powerline
- h. Provide rehabilitation methods to minimise potential impacts;
- i. To avoid disturbance of identified sensitive environments;
- j. To provide offsets such as planting of destroyed protected plant and tree species on locations where their growth will be protected;
- k. Identify and mark areas requiring monitoring of construction activities by the project ecologist;
- l. Discuss appropriate mitigation and management procedures relevant to the conserving wetland areas on the site; and
- m. Update the existing EMP which was submitted with the BAR for application of EA for this project

2.2 Objectives

The objectives for each component are outlined below:

- To reduce the impact of construction on the terrestrial and aquatic environments;
- To minimise disturbance on the receiving natural environment (landscape, fauna and flora) of the development site during construction and operation of the powerline
- To protect natural environment and functionality of the natural systems by applying intervention methods such as ground rehabilitation, preventing invasion of weeds
- To provide applicable mitigation tools
- To provide offsets that will compensate for loss of protected species and assure its long-term existence

Table 1 Description of environmental aspects

Environmental aspects	Description
Terrain	Slope and accessibility
Ground cover	Dominant type and other existing types
Uniformity of ground cover	Species types
Invasive species	Level of invasion
Status of ground cover	Rich or poor in species diversity
Type of habitat	Visible habitat type
Habitats status	Degraded or well-kept or not invaded or grazed or burnt
Type of species	Existing within observed area
Species register	For data interpretation
Conservations status of identified species	Will determine what to do with each affected species and not affected species with regards to work space, and crane space
Protection status of habitat and associated species	As per provincial and national legislation
Ecological interconnectedness of adjoining habitats	Due to habitat fragmentation

Level of sensitivity of species and supporting habitats	Inability of affected sensitive habitat to recover from disturbance
Types of landuse	Four dominant landuse types were observed; forestry, cane field, rural settlements, and subsistence farming (mostly fallow lands due to prominent drought)
Land status	Stable, susceptible to erosion
Environmental Management Plan Report (EMPr)	Updated version of the EMP done during the Basic Assessment study

2.3 Project team

An investigating team consisted of the following professionals, Table 2, who helped with investigation and reporting:

Table 2 Project team

Project team members	Responsible	Roles
Independent environmental scientist	Ludloko Developments	To gather environmental information pertinent to the project, the servitude, tower positions and access road including salient social issues To integrate environmental observation to ecological observations To opt for locations and activities with less impact to the ground, habitats and to communities
Independent ecologist sub-contracted by the independent environmentalist	Gavin MacDonalds	To assess ecological issues, assess their significance, level of protection and provide recommendations relevant rehabilitation methods, information that was crucial with regards to positioning of towers and direction of the powerline
Applicant project surveyors	Eskom Land Development	Locate towers as per correct GPS positions in liaisons with project ecologist and project independent environmentalist; liaised with affected landowners on site to discuss possible house relocations
Applicant project designing engineer	Eskom Design Engineer	To investigate correct position and location of the towers with regards to their angles and direction
Applicant project environmental officer	Eskom Environmental Officer	To engage predominantly with project independent environmentalist and independent project ecologist on findings and recommendations
Applicant project civil engineers	Eskom Civil Engineer	To provide recommendations on access roads by selecting suitable access roads according to accessibility and minimal disturbance to the ground
Applicant project lands and rights person	Eskom Land Development	To provide information on social issues, consent from affected landowners; ensure liaisons with relevant community structures; mediate on possible relocations of house and necessary compensations; encourage community leaders to protect newly established servitude from occupation

2.4 Roles

Project manager

- Ensure that the conditions in the environmental authorisation are applied
- Ensure that recommendations in the site-specific Environmental Management Plan are adhered to
- Ensure that environmental incidents are fully closed
- Ensure that reporting on incidents is done accordingly

2.4.1 Project Coordinator

- Monitor application of mitigation measures

- Ensure that application of conditions and recommendations is fully done
- Ensure that complaints and environmental incidents are attended to as per recommendations or procedures
- Address non-compliance as per observations

2.4.2 Environmental Control Officer (ECO)

- Ensure that the site Specific EMPr is fully implemented and that appropriate actions are undertaken to address any discrepancies and non-compliances;
- To supply environmental information as and when required;
- The ECO should be conversant and has full understanding of the contents of the EMPr;
- The ECO should and explain the EMPr to the contractor, the site staff, the supervisors and any other relevant personnel or I&AP's;
- The ECO would have to be on site on a regular basis – preferably once a month or as agreed upon by project manager, to supervise environmental actions associated with construction activities;
- To advise the project manager on remedial actions for the protection of the environment in the event of any accidents or emergencies during construction, and to advise on appropriate clean-up activities;
- Review complaints received and make instructions as necessary;
- The ECO should be able to understand, interpret, monitor, audit and implement the EMP;
- The ECO must then give feedback of the audits to Eskom and Contractors. This must be in the form of a written report;
- The ECO must ensure that the contractor understands what is to be done to rectify and address any problems that have arisen from the audit;
- Be familiar with environmental and other related legislation including contraventions and penalties;
- Attendance at scheduled project meetings;
- Monitor the contractor's compliance with the EMP on site;
- Keep all records of project monitoring for audit;
- To be responsible for all environmental communication on the project with the project team;
- To discuss queries from I&AP;
- To channel/direct all public statement on environmental issues to Environmental practitioner;
- Discuss content of the EMP with construction supervisor and with Project management;
- Monitor compliance to EA and EMP and EMPr recommendations;
- Attend to environmental incidents and liaise with construction supervisor to implement prevention measures;
- Keep a regular photographic record of all environmental incidents;
- Report environmental incidents to Eskom Environmental Senior Advisor and to Environmental Practitioner assigned to the project;
- Liaise with Drizit (Oil and Chemical Management Specialists) on correct management procedures. Contacts provided in section 12 end of document;
- Bring to the attention of project team environmental related problems and report on progress;
- Check quality of revegetation work;
- Review and approve all areas that have been rehabilitated by the Contractor;
- Discuss poor quality with construction supervisor and ensure proper implementation of procedures;
- To provide environmental practitioner with progress reports; and
- Approve completion of each revegetation work.

2.4.3 Contractor

- Be familiar with the contents of the EMPr and the specifications contained in the document;
- Comply with the Environmental Specifications contained in the EMPr and subsequent revisions

- Designate, appoint and/or assign tasks to personnel who will be responsible for managing all or parts of the construction EMP
- Assign appropriate authority, accountability and responsibility for these personnel to carry out their duties
- Ensure that all sub-contractors and other workers appointed by the Contractor are aware of their environmental responsibilities while on site or during the provision of their services off site
- Ensure that all sub-contractors and other workers appointed by the Contractor are complying with, and implementing the construction EMP during the duration of their specific contracts
- Provide appropriate resources – budgets, equipment, personnel and training – for the effective control and management of the environmental risks associated with the construction of the project
- Notify landowners prior to entering private property;
- Notify landowners and local municipality about project schedule and activities prior to construction;
- Confirm legislative requirements for the construction works, and to ensure that appropriate permissions and permits have been obtained before commencing activities;
- Notify the ECO and RE immediately in the event of any accident of the Environmental Specifications and ensure appropriate remedial action is taken;
- Ensure environmental awareness among his employees, sub-contractors and workforce so that they are fully aware of, and understand the Environmental;
- Maintain a register of environmental training for site staff and sub-contractor's staff for the duration of the contract;
- Undertake daily site inspections to monitor environmental performance and conformance with the Environmental Management Plan;
- Undertake rehabilitation of all areas affected by construction activities to restore them to their original states, as determined by the RE and the ECO;
- Rehabilitating services, utilities, private/public property and other areas adversely affected by construction activities outside of demarcated areas; and
- Notify the ECO and RE immediately in the event of any accident or infringements of the Environmental Specifications and ensure appropriate remedial action is taken
- Communicate and liaise with the RE / Site Manager and the ECO to ensure effective, proactive environmental management with the overall objective of preventing or reducing negative environmental impacts while enhancing positive environmental impacts
- Ensure environmental awareness among his employees, sub-contractors and workforce so that they are fully aware of, and understand the Environmental Specifications and the need for them

2.4.4 Sub-contractor

- To adhere to all recommendations appearing in the main contract
- To report environmental incidents to the main contractor
- To be receive induction prior to embarking on the construction

2.5 Induction of Contractor and Sub-Contractor

Environmental induction (environmental awareness) on the recommendations in the EMPr and recommendations in this Site-Specific EMPr including conditions Environmental Authorisation should be done to the main contractor, sub-contractors as well as applicant project team. Tree cutting contractor is also be to be inducted on the EMPr and in this Site-Specific EMPr including conditions Environmental Authorisation.

2.6 Environmental setting

According to the ecological sensitivity report the proposed powerline development is sited in an area which was once a mixture of Zululand Coastal Thornveld and Maputaland Coastal Belt with pockets of various vegetation

types, and wetland habitats. The primary vegetation in the area has over the years been highly transformed as a result of disturbance from overgrazing, rampant fires and extension of homesteads into open areas. At present the Zululand Coastal Thornveld is affected by a variety of landuse such as road extensions, extended grazing areas etc. Along the proposed powerline route, the dominating landuse are extensive sugarcane fields, timber plantations and informal and formal rural homesteads. Lack of spatial planning for the area to assist in the layout of development and landuse particularly separating grazing areas, farming areas and human habitation areas as well as location of roads through wetlands has led to the transformation of open areas and impact on wetlands. Sensitive areas existing within the study area are the river basins and their associated riparian areas, floodplains, wetlands (most dysfunctional), drainage lines with adjacent catchment areas that channel run-off into the drainage systems, drainage lines and catchments areas. Some drainage lines have riverine vegetation to protect them from erosion and weed invasion. Catchment areas are covered in grass or mixture of plant species forming ground cover which prevent erosion and channel run-off downslope. Soils in the area do not show erosion except in a few areas where erosion occurs but is not extensive. A few areas show scars on the ground and they occur along mainly cattle paths. However, such cattle paths are now degrading as a result of continuous impact from livestock. Most tracks such as human paths and paths created by livestock are not showing signs of eroding. The area is characterised by undulating coastal plains incised by rivers. Parts of the primary grassland is dominated by *Themeda triandra* which occurs predominantly along hilly areas. Lack of tall wooded plants indicates effects of drought, overgrazing and human clearance.

Most of the sites with protected species occur along areas subjected to invasion for human habitation. Some of the sites are between houses and occurrence of the species is within highly transformed habitats. Open velds are either subjected to intense grazing and excessive fires and show signs of overgrazing thereby reducing the biodiversity of the site. Acacia karoo species have invaded the grasslands of the bioregion such that existing vegetation is now a secondary veld. The effects of invasion have brought considerable changes to natural ecosystems and their associated services.

These transformed habitats impact on ecosystems services. Only slopes adjacent to drainage lines or connecting to the streams along bottom of the slope provide some ecological services. Preservation of protected species in the face of oncoming threats may only protect them until the onslaught of the threat, threats such as expanding homestead, intense grazing, rampant fires and harvesting for medicinal purposes.

Vegetation and Landscape features: Highly dissected undulating coastal plains which presumably used to be covered to a great extent with various types of subtropical coastal forest.

2.7 Environmental, Social and Cultural Issues

2.7.1 Sensitive habitats

Land or aquatic areas which supports unique vegetation communities, or the habitats of rare or endangered species or subspecies of animals or plants and are vulnerable to change. Sensitive habitats are characterised to have unique components, support endangered species, and they provide significant ecological functions. The level of sensitivity is low.

2.7.2 Protected plants species

Plants listed as threatened or protected in terms of section 56 of the National Environmental Management: Biodiversity Act (NEMBA) of 2004. These plants may not be damaged, removed without a permit. Permit to disturb sites with protected species has been obtained from Ezemvelo KwaZulu-Natal Wildlife Ref 3836/2018.

2.7.3 Plants protected under the Provincial Conservation Ordinance

A number of species of Specially Protected plants are encountered along the proposed route. All are Listed as of Least Concern. Permit authorisation from Ezemvelo KwaZulu-Natal Wildlife has been obtained and is attached in Appendix A. The following protected species were identified along the powerline route.

- *Aloe maculata* & *Aloe marlothii*
- *Crinum* sp. (River Lily).
- *Freesia laxa* & *Aristea ecklonii* (Blue Stars),

All aloes are protected plants and it is illegal to remove them from their natural habitat without a permit from the local nature conservation authority. A permit to relocate *Aloe maculata* & *Aloe marlothii* (Common Soap Aloe) & *Crinum* sp. (River Lily) has been provided by Ezemvelo KZN Wildlife Service. Permit to destroy any *Freesia laxa* & *Aristea ecklonii* (Blue Stars) has also been provided by Ezemvelo KZN Wildlife Service. Only both Aloe species and *Huernia zebrina* are to be relocated.

2.7.4 Disturbance to protected plant species

There are three types of disturbance to protected plant species, viz.,

- destroying of the plant;
- driving or walking over the plant;
- digging the plant out and discarding it; and
- placing heavy equipment to above-ground herbaceous plant parts.

2.7.5 Disturbance to underground bulbs

Disturbance to underground bulb species will happen when digging to accommodate tower foundations. However only bulbs growing along tower foundation bases will be affected. Only a few bulbs per site will be affected in relation to the number of bulbs growing along the tower bases and area surrounding the tower bases. Disturbance to above-ground vegetative shoot of underground protected bulbs through driving or walking will not affect the underground bulbs which will regrow in the next growing season.

Table 3 Protected plants

A. ALOES Impala Sub-Nseleni Sub

Tower	Lat(DD)	Long(DD)	Species	eKZNw	DAFF	Other sensitivity
54	-28.673704690 28°40'25.38"S	31.965520750 31°57'55.97"E	<i>Aloe maculata</i> (H) (Common Soap Aloe)	X		
55	-28.673074360 28°40'23.07"S	31.966221670 31°57'58.46"E	<i>Aloe maculata</i> (H) (Common Soap Aloe)			Avoid in general area
Access to 63			<i>Aloe maculata</i> (H) (Common Soap Aloe)	X		
63	-28.663935030	31.979925360	<i>Aloe maculata</i> (H) (Common Soap Aloe)	X		Could possibly be avoided

B. ALOES Nseleni Sub-Mtubatuba Sub

Tower	Species	EKZNW	DAFF	Other sensitivity
58(129)	<i>Aloe maculata</i> (H) (Common Soap Aloe)	X		
Access to 60	<i>Aloe maculata</i> (H) (Common Soap Aloe)	X		
94	<i>Aloe marlothii</i> (H)			Avoid

	(Mountain Aloe)			
96	<i>Aloe marlothii</i> (H) (Mountain Aloe)	X		
107	<i>Aloe marlothii</i> (H) (Mountain Aloe)			Avoid
110	<i>Aloe maculata</i> (H) Common Soap Aloe)	X		
115	<i>Aloe marlothii</i> (H) (Mountain Aloe)	X		
116	<i>Aloe marlothii</i> (H) (Mountain Aloe)			Containment berm required during construction
117	<i>Aloe maculata</i> (H) (Common Soap Aloe)	X		
142	<i>Aloe maculata</i> (H) (Common Soap Aloe)	X		
144	<i>Aloe maculata</i> (H) (Common Soap Aloe)	X		
145	<i>Aloe maculata</i> (H) (Common Soap Aloe)	X		
151	<i>Aloe maculata</i> (H) (Common Soap Aloe)	X		

C. ZEBRA HUERNIA Impala Sub-Nseleni Sub

Tower	Species	EKZNW	DAFF	Other sensitivity
117(188)	<i>Huernia zebrina</i> (H) (Zebra Huernia)	X		
120(191)	<i>Huernia zebrina</i> (H) (Zebra Huernia)	X		
121(192)	<i>Huernia zebrina</i> (H) (Zebra Huernia)	X		
124(195)	<i>Huernia zebrina</i> (H) (Zebra Huernia)	X		
127(198)	<i>Huernia zebrina</i> (Zebra Huernia)	X		

2.7.6 Planting and watering of relocated plants

Aloes and Zebra Huernia encountered along the powerline at the point of construction should be dug out and replanted in the nearest habitat away from the edge of the work area where they will not be disturbed during construction. Replanted plants are to be watered once to ensure survival in a new place. The replanting procedure will be demonstrated and explained during construction.

2.7.7 Permits to clear and disturb protected species

Appendix A

2.7.8 Disturbance to protected tree species

Protected tree species, mainly Marula, *Sclerocarya birrea*, occur along the powerline corridor. Only a few protected trees grow along access into the towers. It is recommended that disturbance to protected trees along access into tower sites be minimised by trimming extending branches or access to make means to avoid the tree.

2.7.9 Conditions in the tree cutting licence from DAFF

Conditions of cutting, trimming, damaging, removing and/or clearing of protected and indigenous canopy trees are stipulated in the attached license from Department of Agriculture, Forestry and Fisheries. Only twelve Marula, *Sclerocarya birrea*, are permitted to be disturbed along the entire powerline. Project ecologist will identify the Marula trees that can be disturbed. Disturbance includes, trimming, or cutting at stump level. Any additional disturbance beyond the identified 12 Marula trees is to be discussed with the project ecologist and the ECO prior to disturbance. Permit to disturb indigenous trees in a canopy has been applied for with DAFF.

2.7.10 Conditions in the plant disturbing permit from Ezemvelo KZN Wildlife

The ordinary permit provides provisions for:

Remove Damage or Destroy" The Special protected Plant Within Impala Substation to Mtubatuba Substation

2.7.11 Plants protected by the National Forests Act

A tree in proximity to routes through Zululand Coastal Thornveld is *Sclerocarya caffra* (Marula). It is sparse in its occurrence in vegetation within or close to routes through this vegetation type, probably because of cutting down of trees for firewood and because it is one of the most extensively harvested medicinal trees. As a result, numbers tend to reduce when near traditional settlement. With its shorter stature, scattered woody plants under powerlines would likely be unaffected by infrastructure construction. Although a common bushveld species it is protected by the National Forests Act and a permit from Department of Forestry and Fisheries will be require.

In terms of the National Forests Act of 1998 certain tree species are identified and declared as protected. In terms of the National Forests Act of 1998 forest trees or protected tree species may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold – except under license granted by the Department of Water Affairs and Forestry (or a delegated authority). Applications for such activities should be made to the responsible authority in each province. Each application is evaluated on merit (including site visits) before a decision is taken whether or not to issue a license (with or without conditions). Such decisions must be in line with national policy and guidelines. Sites visits were undertaken and permits issued.

Table 4 Protected trees

A. MARULA TREES Impala Sub-Nseleni Sub

Tower	Species	EKZNW	DAFF	Other sensitivity
56	<i>Sclerocarya caffra</i> (T) (Marula)		X	
58	<i>Sclerocarya caffra</i> (T) (Marula)			Must be avoided

B. MARULA TREES Nseleni Sub-Mtubatuba Sub (Disturbances to any Marula tree to be compensated as per DAFF permit to disturb)

Tower	Species	EKZNW	DAFF	Other sensitivity
24(95)	<i>Sclerocarya caffra</i> (T) (Marula)		X	
82(153)	<i>Sclerocarya caffra</i> (T) (Marula)		X	
Access to 88(159)	<i>Sclerocarya caffra</i> (T) (Marula)			Avoid
Access to	<i>Sclerocarya caffra</i> (T)			Avoid

89(160)	(Marula)			
89(160)	<i>Sclerocarya caffra</i> (T) (Marula)		X	
90(161)	<i>Sclerocarya caffra</i> (T) (Marula)			Avoid
91(161)	<i>Sclerocarya caffra</i> (T) (Marula)		X	
92(163)	<i>Sclerocarya caffra</i> (T) (Marula)		X	
117(188)	<i>Sclerocarya caffra</i> (T)			

2.7.12 Cutting of trees

Trees that are earmarked to be cleared should be marked prior to construction with danger tape by the project ecologist. Only trees that have been marked beforehand are therefore allowed to be removed. The ECO and project ecologist due to the existence of protected species must indicate and mark plant species that need to be relocated, destroyed, trimmed, cut or protected before construction work starts. The removal, relocation, pruning, destruction of protected trees must be authorised in writing by relevant authorities prior to such activity. If a permit is not required, in relation to indigenous trees, then the activity must be approved by the ECO and the project ecologist. Only trees marked to be cut or trimmed and no unmarked tree is to be cut or trimmed. Only Eskom approved herbicides are to be applied according to Eskom Herbicide Procedure. Eskom approved herbicides do not have residual effect on the soil and degrade without polluting underground aquifer. Herbicide prevent regrowth of shoots that will pose safety threats during the operation of the powerline.

Cut trees need to be further chopped into sizeable wood pieces. The chopped pieces need to be stored safely. The landowner needs to be informed about the cut wood for proper disposal or agreement in the storage of the wood along the property. Only trees that do not meet ground clearance specification are to be controlled. Where cutting is necessary the stump should be treated with Eskom Holdings approved herbicide to prevent further growth. Eskom Holdings has vegetation management standard that explain proper procedure for applying herbicides and Eskom Holdings approved herbicides. Effort is to be applied to prevent cutting of trees.

2.7.13 Compensation for disturbed protected trees

Damages or cut to both indigenous or commercial trees are to be compensated accordingly. Compensation for commercial trees has been discussed with the owner and will be done according to commercial tree compensation calculation table obtained from commercial forest companies. Compensation for cut or damaged protected indigenous trees will be done as stipulated in the permit from DAFF. Section of DAFF permit, licence number KZN 0033/08/18-19 states that the ratio of 3:1 should apply to *Sclerocarya birrea* subsp. *Caffra* tree removed should be planted at a community hall or at a church or school or tribal authority office where the place has a secured fence to ensure growth preventing livestock disturbance.

2.7.14 Bushclearing

Clearing will be limited within the designated work area. Only Eskom Holdings approved bush clearing contractors are to cut or trim protected and indigenous trees. Permits to cut or trim indigenous trees existing on site have been provided by the relevant authority.

2.7.15 Watercourses

Watercourse means--

- (a) a river or spring;
- (b) a natural channel in which water flows regularly or intermittently;
- (c) Drainage line

- (d) a *wetland*, lake or dam into which, or from which, water flows, and
- (e) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

Watercourses are characterised as wetlands and rivers. Both wetlands and rivers are forms of drainage lines and are afforded protection under National Water Act. Whereas wetlands and rivers display flow of water, drainage lines and riparian areas are still considered part of watercourses as they form part of the inter-connected ecosystem. Wetlands are characterised mainly by water saturated water conditions. The saturation may be permanent, seasonal or temporary. Soils associated with wetlands show distinctive water marks. Wetland vegetation is adapted to wetland conditions.

Disturbance to wetlands can change their characteristics and even change taxonomy and presence of water. Transformation can include replacement of wetland vegetation with terrestrial vegetation an indication of lack of water in the system.

2.7.15.1 Surface water

The surface water originating within the Usutu to Mhlathuze Water Catchment Area. The WMA is highly seasonal and variable and renders more surface water during summer months. A significant quantity of water is lost through alien plant infestation, especially along plantations, south of the powerline servitude. The main watercourses crossed and in close proximity to the powerline are Inseleni River, south of the powerline route (31°57'48.55"E, 28°40'34.72"S), the powerline crosses Umsunduze River (32° 5'35.82"E, 28°29'18.64"S) and lastly crosses Umfolozi River (32° 6'48.92"E, 28°26'10.22"S). Towers are located outside the 32m buffer from edge of the mentioned rivers. Tower 116 and 117 are located south and north of Umfolozi River, respectively. Tower 116 is located outside the floodline and is located upslope. Since the location is along an elevated terrain from the river, potential soil erosion management will be applied. These include placing soil bags at the edge of tower foundation work area to collect any silt that might run down the slope. Any collected silt is to spread thinly around the work area once work has been completed. Tower 117 is located on a koppie that rises from the steep river bank. The koppie located on an elevated terrain has eliminated the existence of a typical riverbank. The tower will therefore not be impacting on a riparian vegetation. Access to tower work areas is available along existing paths or along accessible contour lines. Driving is to be limited along existing paths. Driving during heavy rains is discouraged in order to prevent potential erosion associated with steep slopes. The rivers are impacted by various landuse and natural climate effects such as floodlines and drought through evaporation. Pollution of rivers is exacerbated by these factors as a result of sedimentation and pathogens. Construction of powerlines will not cause such impacts.

2.7.15.2 Wetlands

Water is distributed into wetlands from various sources, rain, streams or drainage lines. Water saturation of wetlands depends on a number of factors. Loss of water in a wetland can be attributed to drought, excessive evaporation, drainage of wetland for irrigation, destruction of wetland integrity and destruction of wetland ecosystem interconnectivity. Wetlands have unique plant and animal species which can act as indicator species. Other factors include sedimentation as a result of erosion. Presence or lack of indicator plants indicates the functionality of the wetland. Presence or lack of water in a wetland influences vegetation composition. Quality of water influences species composition and health of wetland. Spatial extent of impact of construction activities is assessed and the intensity of impact of each activity in the affected area is also assessed. Any significant disturbance to wetlands transforms the species composition of a wetland.

2.7.15.3 Types of wetland

Most wetlands observed in the area fall in the category of seep, flat channel and unchanneled valley bottom wetlands. 42 watercourses (river, drainage line and wetlands) were identified, out of which 19 were identified as National Freshwater Priority Area (NFEPA) as explained attached Sensitivity report, Appendix B. 3 are categorized as artificial wetland systems, such as impoundments, or dams. The rest are categorized as natural systems.

2.7.15.4 Definition of types of wetlands

Channeled valley bottom wetlands with visible channels are easily identified on the imagery as wetlands with a stream or river passing through it. The wetlands often appear as wetter, greener vegetation on one or both sides of the stream. Unchanneled-valley bottoms will have no clear stream. The absence of linear riparian vegetation following a stream is a good indicator that the wetland is unchanneled.

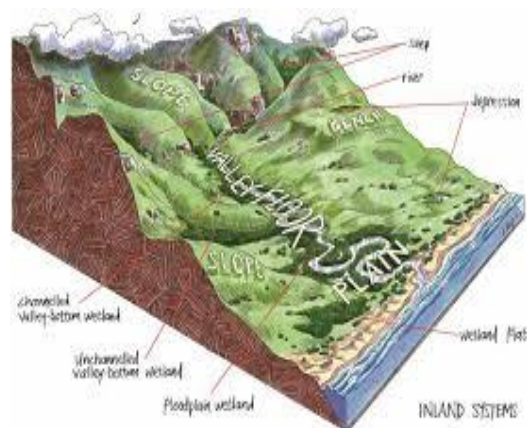
Valley bottom wetlands are fed by surface runoff along the slope, supplemented by rain. Water leaves the wetland by drainage, surface outflow and evaporation and the water flows into a joining streams or rivers. Inflows and outflows from valley bottom wetlands are controlled largely by water level in the river. Services also commonly associated with depression wetlands relate to water quality enhancement, e.g. removal of excess nutrients and inorganic pollutants. The valley bottom system connected to a riparian channel tend to have a higher degree of wetness and make little direct contribution to streamflow regulation, as they are directly connected to a stream channel.

Only wetlands in the vicinity of the powerline route are defined in table 1

Table 5 Wetland types (Sourced from BGIS Wetland Guidelines)

Type	Schematic Drawing	Explanation
Unchanneled Valley Bottom Wetland		Unchanneled valley-bottom wetlands are typically found on valley-floors. The straight channel tends to flow parallel with the direction of the valley, and no ox-bows or cut-off meanders are present in these wetland systems. These systems tend to be found in the upper catchment areas
Channeled Valley Bottom Wetland		Channeled Valley Bottom Wetland are associated with river channel.

An illustration of all wetlands



<p>Flat wetlands</p>	<p>In areas with weakly developed drainage patterns and flat topography, rainfall may not drain off the landscape very quickly, if at all, due to the low relief. In such areas (commonly characterized by aeolian deposits or recent sea floor exposures) the wet season water table may rise close to, or above, the soil surface, creating extensive areas of shallow inundation or saturated soils. In these circumstances the seasonal or permanently high groundwater table creates the conditions for wetland formation.</p>
<p>Seep wetland</p>	<p>Seepage wetlands are the most common type of wetland. These wetlands can be located on the mid- and footslopes of hillsides; either as isolated systems or connected to downslope valley bottom wetlands. Seeps with channelled outflow are similar to those without channelled outflow, only with direct flow out of the seep which ultimately connects the seep with watercourses within the valley. Seepages occur where springs are decanting into the soil profile near the surface, causing hydric conditions to develop.</p>
<p>Floodplains</p>	<p>Floodplains generally are formed during high flow events which subsequently cause water to overspill its banks. They are characterised by well-defined stream channels with floodplain features including oxbows, natural levees and meanders. These systems are gently sloped and are characterised by alluvial transportation and deposition of sediment. Water inputs for this system are from adjacent slopes as well as from the main channel, which occasionally causes overflows</p>

Riparian area

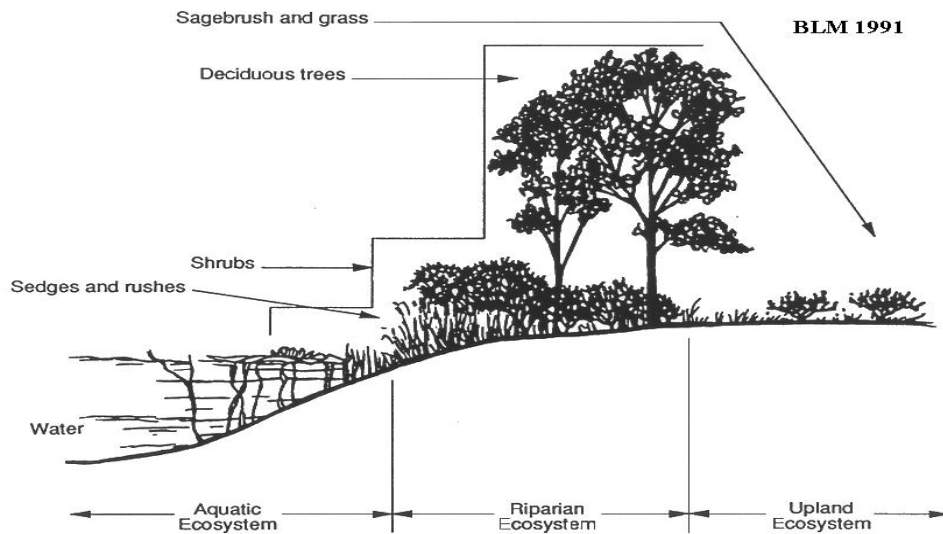


Fig 1 Showing riparian area in relation to a water course

2.7.15.5 Wetland functions

Potential impacts; Flood attenuation; Streamflow regulation; Sediment trapping; Phosphate trapping; Nitrate removal; Toxicant removal; Erosion control; Carbon storage; Maintenance of biodiversity; Water supply for human use; Natural resources; Cultivated foods; Cultural significance; Tourism and recreation and Education and research. Additional functions are, water purification, water supply, habitat for wildlife.

2.7.15.6 Wetland functionality

Wetland Functionality refers to the ability of wetlands to provide healthy conditions for the wide variety of organisms found in wetlands as well as humans. Eco Services serve as the main factor contributing to wetland functionality.

2.7.15.7 Wetland Disturbance and Impact

- Common direct impacts to wetlands include filling, grading, removal of vegetation, building construction and changes in water levels and drainage patterns.
- Indirect impacts result from disturbances that occur in areas outside of the wetland, Common indirect impacts include influx of surface water and sediments, fragmentation of a wetland, loss of recharge area, changes in local drainage patterns.
- Cumulative impacts are those impacts resulting from combined direct and indirect impacts to the wetland over time.

Human influences have resulted from alteration of the physical, chemical and biological components of wetland ecosystems. Increasing land development and clearing have caused increased erosion in adjacent areas leading to increased sedimentation in wetlands. This increased accumulation of sediment can alter the chemical and hydrologic regime of the wetlands in a relatively short time. Other human activities include stream channelization, dam construction, discharge of industrial wastes and municipal sewage and runoff urban and agricultural areas.

2.7.15.8 Potential powerline impacts to wetlands

The activities associated with the construction and operation of the powerline may impact any of the resource ecosystem drivers (flow regime, water quality, geomorphological) or responses (habitat, biota) and this may potentially have a knock-on effect on the other drivers and or responses.

2.7.15.9 Methodology

A desktop assessment, using existing map datasets, was undertaken to determine location of identified wetland habitats. During walkthrough of the powerline existence and location of wetland was conducted during 2018. Wetland edges were identified and marked on an aerial map as well as other watercourses including location of habitats with protected plant species. 42 wetland systems were identified onsite. Towers located in close proximity to wetlands and within riparian areas have been identified. Towers located along habitats with protected plant species have been identified. The major riparian system within the site is the Umfolozi River, Tower 116 is located outside the 1:100-year flood line of the river. The vegetation along tower 116 site is characterised by terrestrial vegetation.

The following information sources were considered for the desktop assessment:

- Information as presented by the South African National Biodiversity Institutes (SANBI's) Biodiversity Geographic Information Systems (BGIS) website (<http://bgis.sanbi.org>);
- Aerial imagery (Google Earth Pro);
- The National Freshwater Ecosystem Priority Areas (Nel, et al. 2011)

The towers located within close proximity to identified watercourses have a negligible potential to impact the watercourses during construction and operation of the powerline. This is mostly related to the construction phase where access to and construction of the pylons poses a potential risk of impacting the characteristics of the system.

The watercourses (NFEPA, rivers and drainage lines) were delineated at a desktop level and broadly verified in the field to obtain an extent of the wetland/riparian areas.

2.7.15.10 Determining Buffer Requirements

The wetland areas are delineated in accordance with the DWAF (2005) guidelines was used to determine the appropriate buffer zone for the proposed activity.

Table 6 Impact levels

Impact extent	Description
None	Unmodified, natural.
Small	Largely natural with few modifications. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place.
Moderate	Moderately modified. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact
Large	Largely modified. A large change in ecosystem processes and loss of natural habitat and biota and has occurred.
Serious	The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognizable.

2.7.15.11 Commonly found vegetation in identified wetlands

In some cases, terrestrial grasses and woody species occur indicating that saturation/inundation of the wetlands has been reduced (e.g. through artificial drains or reduced flooding from upstream or drought or structural

damage), then the vegetation is likely to indicate conditions less wet than what historically occurred. The basic approach to using vegetation to delineate wetland edges, or to verify the edges as indicated is to assess the site according to the presence of obligate wetland species, and the presence and dominance of facultative wetland species. There are a large number of seasonal and especially temporary wetlands that are characterised by the presence of facultative wetland plants or even terrestrial plant species.

2.7.15.12 NFEPA wetlands

According to SANBI BGIS, there are 19 NFEPA sites which interact with the powerline over its length. Various NFEPA wetlands have been identified via desktop studies, including channeled valley-bottoms, wetland flats, floodplains, seeps and unchanneled valley-bottoms. As part of the study and walk-down survey, an additional 23 drainage lines/watercourses were identified. The National Freshwater Ecosystem Priority Areas (Nel et al. 2011) were used to determine the presence of NFEPA wetlands.

2.7.15.13 Delineation methodology

The stated buffer radiuses for wetlands and other watercourses 500m and 32m respectively are regulated thresholds. The assessment (desktop and walkthrough) were undertaken to determine whether the proposed powerline might impact on the regulated area of a wetland, rivers and as defined in General Authorisation in Terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) for Water uses as Defined in GN 509 of 2016 (GENERAL AUTHORISATION IN TERMS OF SECTION 39 OF THE NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998) FOR WATER USES AS DEFINED IN SECTION 21(C) OR SECTION 21). The status of each watercourse was assessed and effects potential impacts of the proposed power line on the integrity, the functionality were identified and applicable mitigation measures provided. The significance of each potential impact was assessed and quantified.

2.8 Observations

Drainage lines

Drainage in most part of the study area occurs as disconnected pockets which either ends into house areas or into open fields. Prior to invasion of open fields drainage line networks were connected and linked to the greater network system most of the drainage lines linking up with river networks. The disconnection indicates that less water channelled into the rivers. Most drainage lines had trees growing along riparian areas.

Wetlands

Most identified wetlands in the vicinity of the powerline were found to be dry. A few had different levels of water in their channels. Most of the identified wetlands have been transformed by a number of factors such as, road networks, housing settlement, cultivated fields, overgrazing, over extraction, encroaching of alien water guzzling trees closer to wetlands. Wetlands that still retain water are devoid of plants adapted to wetlands (Obligate and Facultative Wetland Plants). Grass has become the ground cover for all transformed wetlands. Woody species were observed in some wetland which grow when saturation of wetland is temporary.

Rivers

Three rivers are crossed by the powerline and the powerline spans over the river system including over riparian areas. All the towers are located away from the riparian area except for one tower located near Umfolozi River. One tower, tower 116(187) is located outside the 1:100 floodline. At the crossing of each river the riparian vegetation is intact.

2.9 Access to tower sites

Access to each tower site is available from local tracks, roads and open fields. No new tracks will be established.

2.10 Assessment of impacts on sensitive habitats by powerline establishment

Potential effects of the Project on wetlands follow one of two pathways: (1) Project component interaction with wetland extent and function resulting in a loss of extent and function; and (2) Project component interaction with one or more wetland functions resulting in an alteration of one or more wetland functions. Hydrological effects are difficult to measure, but the effects of excavation and activities such as ditching can have substantial upslope and downslope effects alter water movement through a variety of methods.

The following table explains how potential impacts are assessed

Table 7 Effects on wetland functions

Aspects	Does the wetland have these aspects Yes/No	Does the project do the following
Hydrology	Y/N	Drain, pollute water
Vegetation	Y/N	Destroy or remove
Direct Human Benefits	Y/N	Destroy use wetland by locals
Rare & Endangered Species	Y/N	Affect rare & endangered species
Populations of Unique Species	Y/N	Affect unique species
Species/taxon Richness	Y/N	Reduce or destroy species richness
Ecological Integrity	Y/N	Destroy the structure, loss of extent and alteration of function

2.11 Ecological Integrity

Ecological integrity refers to the ability of an ecosystem to support and maintain ecological processes and a diverse community of organisms. It is the total sum of all the functions of a healthy and functioning watercourse/wetland system. Any of the above-mentioned aspects can lead to the transformation of the system. Most wetlands and other sensitive habitats have been transformed mainly by cultivation, housing and road network infrastructure.

2.12 Powerline construction activities

Table 8 Powerline activities

Activities	Recommendation	Responsible
Camp and office site location	Liaising with affected landowner to locate campsite or use of building for office space during the construction period All necessary connections such as water and electricity discussed with the landowner or contractor provides own water and power	Agreement between landowner and contractor
Construction parking	Contractor to indicate parking space for construction vehicles on plan. The plan should be approved by project engineer and coordinator	Contractor, project engineer and project coordinator
Material storage area	Usually located and demarcated within camp and office site	Contractor to set up storage area as per site plan so as to ensure that all safety requirements are met
Checking of all access tracks to each work area	Contractor to correspond access on land and on map Contractor to discuss access with project surveyor and project engineer prior to construction and indicate discussed access on map	Contractor and project coordinator

Activities	Recommendation	Responsible
	Contractor to discuss newly identified access with project engineer and project coordinator prior to using it Project coordinator and Eskom Lands & Rights to discuss use of new access on private property with affected landowner prior to its use	
Use of local access	No additional access is to be created Driving is to be limited to existing tracks and roads	Contractor & ECO
Demarcation of tower site area	Safety/danger tape to fence demarcated work area. To limit work within demarcated area	Contractor to demarcate each work area
Vehicle park area near demarcated work site area	Vehicles to be parked along safe area such as open fields. If parked along local roads all road by-laws to be adhered to	Contractor
Ground clearing for digging for pile foundations	Topsoil to be dug and stored separately from sub-soil. Topsoil to be stored where it will not be disturbed by construction. Access soil to be spread thinly around adjacent open area or be disposed off at nearby registered landfill sites. Contractor to request landfill site disposal receipt which is to be filed at site office	Contractor
Pouring of cement	No mixing of cement on site. All pre-mixed cement is to be used. Any excess concrete/concrete waste is to be removed from site and disposed at registered landfill site. Contractor to request landfill site disposal receipt which is to be filed at site office	Contractor
Stringing of conductor	Steel conductors are to be strung with minimal impact on indigenous trees Contractor to discuss stringing with ECO	Contractor & ECO
Disposal of hazardous waste	Each hazardous waste is to be disposed or recycled according to its requirement. Contractor to keep a waste register according to Contractor waste management plan	Contractor
Erection of tower	During construction danger tape is to be in place.	Contractor & Project Coordinator

2.13 General Recommendations

2.13.1 Contractor Environmental Induction

- To be undertaken by appointed ECO
- Contractor and staff to be familiar with the content EMP and Site-Specific EMP documents
- ECO to explain content of the documents during induction and during project meetings

2.13.2 Liaising with landowners about arrival and working in the area

- Contractor to inform all affected landowners about arrival and working in the area

- Contractor to first liaise with local authority structures about arriving and working in the area
- All manual labour processes are to be discussed with local authority structures in order to follow an approved hiring process and thus avoid potential conflicts relating to manual labour expectations from locals
- Discussions about use of locals for manual labour with local authorities is to be recorded and compiled into minutes

2.13.3 Pictures of work site area

- It is recommended that pictures of demarcated areas be taken before commencement of construction so as to show the state of the area prior to construction and also be taken upon completion of construction. This will show extent of damage

2.13.4 Disturbance of protected and indigenous trees

- Only 12 protected Marula trees have been permitted to be disturbed (cut or trimmed)
- Permit to disturb protected Marula trees has been received and is attached in Appendix A
- Any additional Marula trees requiring to be disturbed, their permit must be followed up with DAFF
- No additional Marula trees, more than 12 are to be disturbed without proper permit received from DAFF

2.13.5 Disturbance of protected plant and tree species

- Permit to disturb protected plant species has been received from EKZNW and is attached in Appendix A
- Aloes existing along the powerline route are to be relocated outside the work area
- **These aloe plants will be identified during construction as per encounter**
- Care to be exercised to dig almost full root cover of the reallocated aloe plant to increase survival
- Replanted aloe plants with a good root cover will not rot after watering
- Reallocated aloe plants are to be watered once immediately after planting
- Care to be taken to prevent or limit disturbance to trees along buffer areas during stringing of conductor
- Stringing of conductor across watercourses should be discussed with ECO and project coordinator to find ways to prevent or minimise disturbance to indigenous trees or protected Marula trees

2.13.6 Working during rainy days

- It is recommended that work should not take place during heavy rainy days to prevent damage to local tracks by heavy construction vehicles

2.13.7 Driving along farm and local roads

- Care to be taken not to damage existing farm tracks
- There are number of existing access tracks and roads and no new access is to be created

2.13.8 Crossing of rivers and drainage lines

- Crossing of rivers should only take place at local bridges
- No crossing is to be done along the river and across a drainage line

2.13.9 Digging of holes for pile foundations

- Tower site area should be demarcated with safety/danger tape so as to indicate the extent of the work area and limit disturbance
- Topsoil and sub-soil are to be separated and should not be mixed
- Topsoil is to be stored safely for reuse for growth of grass
- Empty holes are to be marked or have protection to prevent livestock falling into holes

- Water drained from the holes can be pumped into nearby open field and should not affect private property by causing water pools or muddy ground

2.13.10 Damaged fences

- All damaged fences are to be repaired or replaced depending on the extent of damage
- Affected landowner is to be satisfied with the repair or replacement of the damaged fence

2.13.11 Accessing or placing of tower within cultivated fields or fallow lands

- Eskom has received permission from affected landowner for driving across private property or for placing towers along private property such as cultivated or fallow fields

2.13.12 Safety tape

- All work area/sites are to have a danger tape around the perimeter of the work area

2.13.13 Dealing with none-permitted people around work area

- During construction none-permitted people are to be removed from the work area as per safety requirement
- Any request for manual labour to be directed to project coordinator

2.13.14 Removal of waste

- Upon completion of each tower all nuts and bolts and metal parts are to be picked and returned to storage area. All waste such as

2.13.15 Provision of waste bins

- All bins for general waste, recycle material, hazardous material should be labelled accordingly and their use be insisted

2.13.16 Mobile pit latrines

- Mobile pit latrines are to be placed within a reachable distance for contractor staff along construction area
- Waste in the mobile pit latrines is to be removed by a certified contractor to collect and dispose such hazardous waste

2.13.17 Rehabilitation

- All disturbed areas are to be rehabilitated accordingly
- Topsoil is to be reapplied around the tower to encourage growth of grass

3. ENVIRONMENTAL SETTING

3.1 Area, landuse and social character

The area is characterised by undulating and hilly terrain. Flatter terrain exists at the top of the hill. Hilly terrain is prevalent on the west of the tribal area. Most of the powerline is accessible and access to a few towers is along hilly areas. Rock outcrops are found at some tower sites. The area covered by the powerline between Impala substation and Nseleni river is owned by private individuals. North of Nseleni river land is under the administration of Ingonyama Trust and under the leadership of Traditional council led by amakhosi (chiefs). Three tribal areas are traversed by the powerline route, KwaBhejane, Mhlana and Mpukunyoni. Each tribal area is divided into areas, each under induna. The location of the powerline was discussed with each traditional council and shown to each induna. Landuse along the powerline route is characterised by commercial cane crops and timber plantation between Impala substation and Nseleni river. A railway line and Transnet pipeline run near Impala substation. Cultivated cane covers most of this area. The powerline crosses districts roads adjacent to cane fields. Rural settlements dominate the whole of the tribal area. Farming along tribal areas is characterised by small cane cultivated fields. A number of fallow lands exist along this area. Protected species grow along open areas within the tribal area. Occurrence of protected plant species is a result of existence of open areas that have not yet been transformed by establishment of homesteads or plants recovering from disturbance such as overgrazing or rampant fires. The foreseen development trend in the tribal areas is the occupation of open areas by houses. Grazing areas are progressively diminishing due to human habitation and construction of extended road networks, see figure 2 and figure 3. So protected plant species presently existing may not be existing in the near future. However, pressures on the existence of natural biodiversity threaten their survival and existence. Transformation of open areas is one of the biggest threats to biodiversity. Drought, overgrazing and fires contribute as additional pressures on stressed ecosystem.



Fig 2 Showing signs of over grazing and effects of fire on



Fig 3 Congestion of houses and few open areas near terminal towers

3.2 Biodiversity aspect

Species diversity along cane and timber plantations is none existing. Along tribal areas species diversity exists in pockets of various quantities, overall it ranges between low to moderate. The sites with moderate biodiversity could be a result of reduced overgrazing and lack of fire going through the sites. However, moderate biodiversity does not interpret into conservation potential or conservation plans for the sites as compared to areas with applied and maintained conservancy programmes.

3.3 Diminishing of open areas

Availability of services such as water, electricity and road networks cause migration to these areas which were once characterised by vast open areas. The tribal areas are progressively becoming congested with houses. The open plains that illustrate rural character are progressively replaced by peri-urban set-up which is less formal than spatially planned urban areas. Areas once allocated for cultivation are also replaced by houses. In some areas it is possible to meander a powerline route along a rural setting that is progressively becoming congested and the availability of open areas and adequate safe space between houses and the powerline servitude. In other areas where open areas are limited due to high density of houses, see figure 2 and the difficulty of changing the direction of the powerline route to avoid the houses, relocation of affected houses becomes inevitable. The need for relocation and the relocation process have been discussed with all affected families in consultation with local leadership. According to Eskom Holdings Lands and Rights department all the negotiations for relocation have been supported and completed. Relocation of affected houses is not part of this study. All the agreed and signed relocation forms are attached.

3.4 Preservation of natural biodiversity

Mitigation measures recommended in this report contribute to the preservation of biodiversity by reducing the effects of potential impacts associated with disturbances from construction of a powerline. Disturbance of ground cover can result to scouring of the ground which can lead to erosion. The effect of disturbance to the ground is reduced by applying less disturbing removal procedures of vegetation, rock outcrops or topsoil. Extended digging is discouraged. Excavation should be limited at bases of tower legs to limit disturbance to relatively smaller work areas. Disturbed ground needs to be rehabilitated after construction. Care during survey was taken into consideration to avoid sensitive habitats such as river systems (riparian areas), wetlands, drainage lines and riverine vegetation. Construction will be given strict mandate to minimise disturbance.

3.5 The following specific conditions are to be applied during construction:

- Sensitive areas such as riparian areas adjacent to watercourses, riverine vegetation, protected plant species are considered as No-disturb areas and are not to be disturbed. Only flagged protected plant or tree species and trees within sensitive areas are to be disturbed
- Where access to towers does not exist, driving is to be kept along single tracks. No multiple tracks are to be created to minimise disturbance along open grasslands to a single area
- Strictly no driving across wetlands, dry or wet, is to be done
- No activity is to be done 32m from the edge of a river, drainage line, or dam
- No activity is to be done 500m from edge of a wetland indicated in Table A, B, & C in Appendix A
- Clearing of vegetation is to be done according to recommendations in Table A, B, & C in Appendix A
- When in doubt about cutting of trees the contractor should discuss the cutting with the project ECO before cutting is done
- Only 12 (twelve) protected trees have been authorized to be cut. Any additional protected tree to be cut is to be discussed with project ecologist, via the ECO, who will seek relevant permit with relevant authority
- Where possible avoiding to cut trees should be applied otherwise trimming is encouraged
- Disturbance to indigenous trees should be kept to a minimum
- Only Eskom Holding approved herbicides are to be applied on tree stumps requiring permanent control
- Aloe plants are to be relocated about 20m away from the construction area. Relocation procedure will be provided by the project ecologist
- Disturbed areas are to be rehabilitated by loosening the applied topsoil and slightly compacting the applied area in order to encourage natural growth of grass
- No gathering of medicinal plant parts is to be done
- No harvesting of sugarcane or fishing on local dams or rivers is to be done
- No creation of fires is to be done, a mobile kitchen must be provided where necessary
- Smoking areas need to be designated and care taken to locate them away from combustible material
- Grass area designated for smoking should be cut to the ground to discourage spread of fire
- Fire extinguishers are to be provided and be quickly accessible for emergency use
- Biodiversity loss offsetting is to be done as per condition in the tree disturbance permit: *For every cut indigenous or protected tree, three locally suitable indigenous trees are to be planted within areas where growing of the planted trees will take place such as clinics, schools, community halls, tribal offices etc, with closed access.*
- Planting of such trees is to be discussed with relevant community structures who will give guidance to suitable locations.

3.6 Investigation Methodology

Investigation involved use of tower coordinates to locate towers and their associated servitudes. A total of 223 towers were investigated. Initial investigation of the tower positions involved dividing the total designated powerline route into two sections, the southern and northern sections. The two sections are bisected by Nseleni River. The first investigated section started from Nseleni substation terminating at Mtubatuba substation. The southern part of route was investigated last. The southern part of route starts at Impala substation, covers both commercial trees and sugarcane ending on Nseleni River. However, the tower numbers in the report are written from Impala substation to Mtubatuba substation. The southern part of the route involved discussions with sugarcane landowners for suitable final location of towers. It was decided to start on the northern section of the powerline route section as the negotiations for the final location of the powerline route had been completed. Each tower position was investigated by use of GPS device to locate a peg on the ground. The peg indicated the centre of the tower and the spread of the tower legs. The footprint of the tower includes the tower base and the

extent of work area, demarcated by safety tape, and also includes assembling of the tower. Each area occupied by the tower and the tower legs were investigated. The area where the length of each tower will be assembled was also investigated. Access roads to each tower area and associated servitude were investigated. Access was considered for the crane to reach each tower position and for construction vehicles to drive up to the tower positions. Conductors will be pulled by manually. In some areas pulling of conductors may break some branches. Each identified impact was noted and assessed for a correct mitigation methodology. A general permit for relocating and disturbing red listed, protected and threatened plant species will be sought through provincial conservation agency. Permit to trim or cut identified trees within a forest canopy will be sought through provincial Department of Agriculture, Fisheries and Forestry (DAFF). Each tower position and access road were assessed for mitigation measures that are suitable and applicable to mitigate against identified potential impacts. Observations were recorded and noted. Aspects of each tower position and associated servitude were discussed.

The following methodology entailed the following processes:

- Undertook a walkthrough on foot;
- Used Garmin device to locate tower bases;
- Took site photographs;
- Discussed with locals enquiring about ownership and confirming landuse;
- Used aerial maps to locate towers and to ensure location of coordinates as per landuse;
- Viewed Google earth time series to check past landuse systems; and
- Used plant identification books.

3.7 Location of Towers

Towers are initially located by a surveyor along an approved corridor to create a route to linearly locate the servitude, establishing individual micro-siting of towers. The initial siting attempts to locate towers along accessible areas, away from buildings, out of sensitive areas such as rivers, wet areas, away from road reserves, avoid foot tracks and vehicle tracks. The span between tower positions determines the suitable tower position. A span can stretch and cover up to 1000m and this distance can be influenced by terrain, local wind speeds, slopes etc. However, there are other electrical requirements that are considered for the length of a span. The span thus influences the positioning of a tower. Relocating a tower that is positioned at its maximum stretch can be done sideways, it cannot be stretched further, it can be shortened to take it out of a sensitive area. However, as mentioned above the length of a span involves a number of aspects. These aspects include survey calculations, presence of sensitive species and habitats, terrain, infrastructure, landuse, accessibility, powerline direction, availability of open spaces, presence of seepage, cultural significance of the area, landowners' consent and approval, approval by all concerned including witnesses where applicable, such as consent from community structures. Location of towers is influenced by all issues observed during walkthrough, as mentioned above.

3.8 Walkthrough Salient Issues

The following issues were identified during the walkthrough of the powerline route:

- Presence of protected plant and tree species along some tower positions and in between towers;
- Crossing of rivers, streams, drainage lines and wetlands;
- All identified wetlands have been destroyed or transformed by various landuse mainly farming and road;
- Towers located outside wetland and river buffer zones;
- No grading for construction of new roads is to be done, especially along contour lines upslope. This will prevent potential erosion;
- Construction of towers located upslope is to be accessed manually instead of driving upslope and cause damage which often lead to erosion;

- No construction of new access tracks upslope is to be done;
- Application for general destruction permit, where necessary, has been applied for to relevant authorities; and
- This will necessitate providing offsets. Offsets include planting destroyed protected plants and trees on sites where they will be protected.

3.9 Powerline Construction Activities

3.9.1 Planning phase

The planning phase is done to identify initial activities pertinent to the project. This stage involves the following:

- Desktop/preliminary design
- Desktop assessment of study area, GIS and other mapping methods
- Preliminary demarcation of study area
- Preliminary drawing of straight alternative powerline corridors from source to receiving end
- Initial site visit
- High level assessment of study area
- Initiation of stakeholders, affected and interested parties
- Fine tuning corridor alignment still at high level
- Production of initial map showing tentative corridors
- Compilation of background information document with a consent form
- Initiating the consultation process to solicit, record and respond to ideas, suggestions and concerns
- Various meetings with identified stakeholders
- Introducing the project, it's needs and purpose
- Discussing the alternative routes and corridor alignment
- Recording and responding to comments presented at meetings
- Repeated site visits with affected parties to align corridor according to recommendations
- Completing the consultation process for environmental assessment process
- Initiating compensation discussions
- Identifying access areas
- Identifying plants to be rescued and relocated
- Identifying trees that may need trimming or cutting
- Realigning servitude out of former wetland areas
- Geotech study to assess soil stratum stability including rock form and level of groundwater
- Pegging of preferred corridor
- Application for authorisation

3.9.2 Construction phase

Construction phase look at activities undertaken during construction and involves the following:

- Locating temporary office and camp site;
- Digging tower foundations;
- Cement filling of tower bases;
- Erecting of towers;
- Stringing conductors;
- Monitoring of construction activity;
- Quantifying level of disturbance;
- Rehabilitation; and
- End of construction

3.9.3 Operational phase

Operational is a phase involves functions provided by the development and involves the following:

- Energising of the powerline;
- Auditing of servitude status; and
- Rehabilitating where necessary.

3.9.4 Decommissioning phase

The phase is when the development ceases its operations. It involves the following:

- Dismantling of powerline
- Removal of powerline material for recycling and disposal
- Intact or demolishing of concrete tower bases depending on landuse

4. IDENTIFIED POTENTIAL IMPACTS

The following potential impacts were identified during the walkthrough exercise:

- Clearance of ground cover without rehabilitating disturbed areas after construction;
- Disturbance or relocation of protected species;
- Poor replanting of relocated protected plants;
- Cutting or trimming of protected trees;
- Disturbance to sugarcane and timber plantation;
- Lack of fitting bird flight diverters to prevent potential collisions with avifauna;
- Relocation of homesteads located within the powerline;
- Close proximity to houses;
- Cut and angling of steep access entrance into site area; and
- Location of towers on ploughed or fallow fields used for cultivation without consent from owner of the field
- Location of a tower along a football playground without establishing an alternative playground.
- Lack of fencing graves nearby the work area to prevent potential damage and to show respect
- Creation of new access track into the tower site area
- Lack of indicating contour lines along slopes
- Driving excessively along unstable tracks or gravel roads, particularly during rainy days
- Poor or lack of implementing berms and outlet drains where indicated to prevent potential scouring of the road and to facilitate channelling of run-off, off the track or road respectively
- Creation of tracks into veld area that had not been invaded thereby providing access into veld with high biodiversity
- Disturbing river systems such as riparian area or floodplain
- Poor implementation of recommended rehabilitation measures
- Poor inspection of implementation of mitigation measures
- Lack of inducting sub-contractors
- Removal of waste along the entire powerline route

Table 9 provides mitigation against identified potential impacts and people responsible for addressing the potential impacts

Table 9 Identified potential impacts, mitigation measures and persons responsible for each mitigation measure

Impacts	Mitigation	Responsible
Clearance of ground cover without rehabilitating disturbed areas after construction	<p>Ground is cleared to enable construction of the tower</p> <p>Work area needs to be demarcated and all work of digging and erecting the tower be limited to the demarcated work area</p> <p>All disturbed areas need to be assessed to ascertain the most effective rehabilitation method to be applied</p> <p>Disturbance beyond the demarcated work area needs to be rehabilitated to promote regrowth of grass to cover the bare area</p>	<p>Contractor to use locally sourced grass to be planted <i>sporadically</i> along bare disturbed areas</p> <p>This is the recommended method to stabilise disturbed areas and prevent potential loss of soil without using fresh purchased sods that are prone to drying and carry excessive costs that come with watering</p> <p>A procedure for locally sourcing the grass is attached</p>
Clearing of indigenous trees	<p>Disturbance to indigenous trees in a canopy requires permit from relevant authority</p> <p>Individual trees outside a canopy can be</p>	Contractor, ECO

Impacts	Mitigation	Responsible
	cleared if not flagged Effort to be applied to avoid disturbing protected or indigenous trees	
Poor replanting of relocated protected plants so as to offset loss of species	Depending on the type of permit granted, the application to destroy or disturb protected plant species will involve planting of the protected species at specified places such as schools, creches, tribal authority offices etc	Project ecologist responsible for the application process
Relocation of aloe plants	Relocation of aloe plants growing within work area should be done according to replanting procedure provided by the project ecologist	Contractor, ECO, Project ecologist
Lack of application for applicable permit to clear or disturb protected trees from relevant authorities	At some tower sites protected trees exist at either along access track or along tower base. Where avoiding the tree is inevitable it may require trimming or cutting	Project ecologist
Planted and fallow areas		
Disturbance to sugarcane and timber plantation	Sugarcane and timber planted areas are disturbed to provided access for tower bases Areas where disturbance to cash crops will occur need to be discussed with the affected owner to agree on the disturbance and compensation Entrance and disturbance to planted commercial trees need to be discussed with the owner of timber	Eskom Lands & Rights
Location of towers on ploughed or fallow fields used for cultivation without consent from owner of the field	Lack of communicating with the affected landowner or user may lead to the landowner or user stopping the project Fallow lands do not equate to open and unused land. These lands were once active and it is possible that they can become active again Eskom to liaise with owners of fallow lands including liaising with local induna to get more information on the fallow lands	Eskom Lands & Rights, Project coordinator, ECO
Collisions of birds with conductors		
Lack of fitting bird flight diverters to prevent potential collisions with avifauna	Fitting of bird flight diverters to prevent potential collision between birds and conductors or earth-wire Non-compliance with protection of avi-fauna species Design package needs to show the fittings on the line profile design for the contractor	Project engineer, Project coordinator, ECO
Relocation and proximity to rural homesteads		
Conflict resulting from relocation of homesteads located within the powerline	Relocation will happen should a house or part of a homestead is located within the powerline servitude. The relocation is done to comply with powerline safety standards The relocation need and process should be	Eskom Lands & Rights

Impacts	Mitigation	Responsible
	explained to the affected landowner and to local community structures. The aim is to ensure proper communication and avoid confusion	
Close proximity to houses, cultural sites and playgrounds	<p>In some areas due to lack of vast open areas location of the towers and the powerline is close to the homesteads</p> <p>Surveyor to maintain a safe distance along areas near houses. Where necessary relocation of houses should be undertaken</p>	Eskom surveyor
Lack of repairing fences cut for access	Fences cut to gain access to servitude and tower bases need to be repaired	Contractor, project coordinator, ECO
Location of a tower near a football ground/playground without liaising with local structures establishing an alternative playground	<p>One tower has landed on a football playground. Playgrounds may appear rugged and unkept however, they provide one of the few entertainments in the rural areas</p> <p>It is important that the contractor to liaise with local induna in consultation with the local community concerning the location of the tower in order to show that the tower does not affect the playground</p>	Contractor, project coordinator, ECO
Lack of fencing graves nearby the work area to prevent potential damage and to show respect	<p>It is important that grave sites nearer tower bases, even though located away from the tower base be fenced to protect them and to show respect</p> <p>Eskom to liaise with local induna to indicate family members of the graves. Eskom to explain the need to fence the grave for protection and as a sign of respect even though the grave will not be affected by construction</p> <p>The fencing process must be explained to the induna and to the family Consent to fence and how to do so must be obtained from the family and the discussions recorded for filing</p> <p>Family must be offered the opportunity to do fencing on their own so that they can do in accordance to their family method, unless the family gives consent to the contractor to fence and such consent must be recorded</p> <p>It is important that Eskom ensures that a proper and approved fencing process is sought and undertaken, unless the family agrees that the contractor can fence without any specific conditions</p>	Contractor, Project coordinator, ECO
Access		
Cut and angling of steep access entrance into site area	Access into some sites may be hindered by steep banks, commonly from the road. The banks need to be slanted to be able to allow heavy construction vehicles to access the tower base	Contractor, Project coordinator, ECO

Impacts	Mitigation	Responsible
	<p>The contractor needs slant and stabilise the bank to prevent scouring and erosion, including the sides of the slanted area to prevent sharp drop and potential breaking of the sides of the slanted area</p>	
<p>Creation of new access track into the tower site area</p>	<p>Creation of new tracks can be undertaken as follows</p> <ul style="list-style-type: none"> • Driving by construction vehicles be done along accessible terrain and along single tracks • No multiple tracks are to be created • Strictly no scraping of ground cover and topsoil to create a new track is to be done • Driving or creating a track up the slope is strictly prohibited, this is to prevent potential erosion associated with slopes • Towers located upslope and access available from downslope are to be constructed manually without creating new access upslope • Contractor to comply with the recommendations to avoid non-compliance and causing of erosion which will be costly 	<p>Contractor, Project coordinator, ECO</p>
<p>Lack of driving along contour lines along slopes</p>	<p>Contour lines along slopes to be indicated to the contractor Lower contour lines are drivable and pose no risk to heavy tracks Potential for erosion is drastically minimised along lower contour lines</p> <p>Eskom surveyor to indicate where contour lines downslope run</p> <p>Lack of indicating where the lower contour lines along slopes may lead to indiscriminate driving of heavy construction vehicles, leading to more damage</p>	<p>Surveyor, project Coordinator</p>
<p>Driving excessively along unstable tracks or gravel roads, particularly during rainy days</p>	<p>Driving along sugarcane tracks during rainy days may lead to erosion</p> <p>Cane tracks are not constructed to accommodate excessive driving by heavy vehicle particularly during days</p> <p>No driving along cane tracks during rainy days</p> <p>Construction is recommended during dry days</p>	<p>Contractor, Project coordinator, ECO</p>
<p>Poor or lack of implementing berms and outlet drains where indicated to prevent potential scouring of the road and to facilitate channelling of run-off, off the track or road respectively</p>	<p>Some access gravel tracks or roads had been indicated to be fitted with berms and outlet drains to help channel run-off away from the road thus prevent scouring and subsequent erosion</p> <p>Contractor to install berms and outlet drains where indicated</p>	<p>Project engineer, Project coordinator, ECO</p>

Impacts	Mitigation	Responsible
Creation of tracks into veld area that had not been invaded thereby providing access into veld with high biodiversity	<p>Creation of such tracks may be needed due to the location of the tower and the inability to relocate the tower</p> <p>Biodiversity offsetting lost biodiversity can be done to compensate for lost biodiversity</p> <p>Eskom to discuss offsetting and process with local traditional council in order to get permission to do so</p> <p>Offsetting has to be discussed with Eskom to provide the plants and trees to be planted at specified locations</p>	Contractor, ECO
Watercourses & riparian areas		
Disturbing river systems such as riparian area or floodplain	<p>No towers are located inside riparian area, wetland and buffer areas and within a demarcated floodline</p> <p>No driving along riparian or within wetland buffer areas is to occur</p>	Contractor, Project coordinator, ECO
Waste		
Removal of waste along the entire powerline route	<p>To comply with the conditions and recommendations pertaining to waste</p> <p>Contractor to remove waste from construction area</p> <p>Waste must be separated for recycling and for reuse</p> <p>Only registered landfill sites to be used for disposing waste</p> <p>Proof of liaisons with local municipality and receipts for using registered landfill sites are to be obtained for auditing purposes</p>	Contractor, ECO
Implementation of rehabilitation measures		
Poor implementation of recommended rehabilitation measures	<p>This can happen if monitoring and auditing are not undertaken and the contractor fails to implement recommendations</p> <p>Appointed ECO needs to ensure implementation of recommendations and procedures</p>	Eskom Land development, Project coordinator
Poor inspection of implementation of mitigation measures	<p>This will happen if the ECO has not familiarised with the project conditions</p> <p>It is important that the project ECO ensures monitoring and auditing of the construction of work and after construction has been completed</p>	ECO, Contractor
Induction		
Lack of inducing sub-contractors	<p>This happens when sub-contracted team joins the construction later after the initial induction has been done</p> <p>The ECO and project ecologist as well as the project coordinator to ensure that induction</p>	ECO, Project coordinator

Impacts	Mitigation	Responsible
	of all appointed sub-contractors is done It is recommended that training of sub-contractors be featured in the main contract as one of the important compliances	

4. REHABILITATION STATED IN THIS REPORT

The following activities undertaken to return land that had been damaged to some degree of its former state or stable state which will be intact and not become degraded. Some of the activities involved are:

- Rehabilitation of disturbed areas
- Clearance of debris to prepare disturbed ground for rehabilitation
- Allowing grass to grow back naturally
- Using locally sourced grass sods to plant along disturbed areas, where necessary
- Fitting recommended flight diverters along specified spans
- No creation of new tracks by scrapping of ground cover and topsoil
- Where there are no existing tracks, driving to be done over grass cover along single tracks to tower positions
- Investigating of vehicle tracks after construction to identify tracks with heavy compaction
- Loosening of heavily compacted access areas to encourage natural growth of grass
- No creation of new tracks to access towers located upslope particularly if the tower is accessed from downslope
- Indicating lower lying contour lines for driving particularly along slopes
- Relocation of threatened or protected or preferable offsetting lost biodiversity by planting it at places which will provide safety for growth
- Managing vegetation within servitude according to Eskom procedure

5. PROCEDURES

5.1 Rehabilitation

Appendix D provides a detailed recommended rehabilitation procedure. The most recommended activity involved in the rehabilitation of disturbed areas is to clear them of construction debris, apply thin stored topsoil, rake and compact topsoil slightly and allow natural growth of grass. Weeds may quickly invade a disturbed area but become overtaken by naturally occurring grass overtime if disturbance to the area no longer takes place. Since no major cutting and filling along slopes will take place, planting of grass along the cut and filled areas will not be needed.

5.2 Grievances/Complaints register

5.2.1 The grievance register needs to show the following:

- All grievances brought forward must be channelled to the right person and entered in the grievance register;
- Process to attend and address grievances need to be filled in the site environmental file for environmental monitoring and auditing purposes, for maintaining consistency with addressing grievances;
- The nature, date and time of the activity;
- The precise location of the activity, if possible;
- The name of the person responsible for the activity; and
- If available, a photograph showing the damages.

5.2.2 Fitting of bird flight diverters and aviation spheres

- Fitting of both bird flight diverters and aviation spheres is to be done according to approved Eskom standard
- The project designing engineer to provide the bird flight diverters and aviation spheres

5.2.3 Vegetation management

- Cutting of trees is to be done according to Eskom Vegetation Management standard

5.3 General Conditions

General conditions to be undertaken over and above conditions provided in the EMP submitted with the Basic assessment for Application for Authorisation and they involve the following:

- The Contractor shall comply with all the conditions specified in the EMPr during construction;
- The contractor shall comply with conditions stipulated in the Environmental Authorisation;
- Work should be limited to designated areas to avoid extending disturbance to areas outside designated work areas;
- The Contractor shall comply with the conditions expressed by the affected landowner;
- There shall be no littering in the veld;
- Construction waste and litter should be disposed of appropriately. Waste collection systems should be in place such as waste separation and disposal;
- No fires shall be allowed on site under any circumstances;
- The Contractor is to provide portable toilet facilities for the use of his workforce at all work sites. Use of veld for sanitation needs is strictly prohibited; and
- Environmental incidents such as oil spills or damage to erosion berms shall be dealt according to specifications in the EMPr.

6. LEGAL FRAMEWORK

A number of legal requirements apply to activities involved in this development at local, provincial and national level. The following legislations apply directly to potential impacts associated with the development and require conforming to:

6.1 National Environmental Management: Biodiversity Act, 2004 (Act.10 2004)

In terms of the Biodiversity Act, the contractor and Eskom Holdings SOC have a responsibility for:

- Promote the application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all activities within the area are aligned to ecological protection and management of biodiversity
- The conservation of endangered ecosystems and restriction of activities according to the categorisation of the area (not just by listed activity as specified in the EIA regulations)
- Limit further loss of biodiversity and conserve threatened ecosystems

According to section 57 of the Act: Restricted activities involving listed threatened or protected species

- A person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7

National Environmental Management: Biodiversity Act (Act 10 of 2004)

The National Environmental Management: Biodiversity Act ([NEMBA] Act 10 of 2004) provides for the management and conservation of South Africa's biodiversity within the framework of the NEMA, 1998; and provides for and includes:

- The protection of species and ecosystems that warrant national protection;
- The sustainable use of indigenous biological resources;
- The fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources;
- The establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith; • Biodiversity planning and monitoring;
- Protection of threatened or protected ecosystems;
- Protection of threatened or protected species;
- The control of alien species, invasive species and genetically modified organisms. Species that are classified as threatened and/or protected are listed in Government Gazette 151 of February 2007 and the regulations are included in Government Gazette 152 of February 2007, with the most recent amendment in Government Notice 576 of July 2011.

Threatened ecosystems in need of protection are listed Government Notice 1002 of December 2011. The National Environmental Management: Biodiversity Act (10/2004): Alien and Invasive Species Lists, 2016 (No 864) was published on 29 July 2016 in GN 40166. In conjunction with these Regulations, the following Notices and Lists were also promulgated in terms of Sections 66(1), 67(1), 70(1)(a), 71(3) and 71A:

- Notice 1: Notice in respect of Categories 1a, 1b, 2 and 3, Listed Invasive Species, in terms of which certain Restricted Activities are prohibited in terms of section 71A(1); Exempted in terms of section 71(3); require a Permit in terms of section 71(1);
- Notice 2: Exempted Alien Species in terms of Section 66(1);
- Notice 3: National Lists of Invasive Species in terms section 70(1);
- Notice 4: Prohibited Alien Species in terms of section 67(1).

The study area is located outside a protected ecosystem listed in NEMBA (Act 10 of 2004)

6.1.1 Mitigation

Necessary applications for permits to disturb or destroy protected plant species has been lodged with relevant authorities. Biodiversity offsetting for disturbed or destroyed protected species will be undertaken. No threatened ecosystems such as riparian areas, wetlands and their associated buffers, drainage lines, sensitive habitats will be impacted by construction of the powerline. Line design profile diagrams show the location of towers outside these sensitive areas

6.2 National Forest Act (Act 84 of 1998)

Regulations published for the National Forest Act (Act 84 of 1998) as amended, provide a list of protected tree species for South Africa. According to this Act, the Minister may declare a tree, group of trees, woodlands or species of protected trees. The prohibitions provide that “No person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister”

6.3 KZN Nature Conservation Ordinance, No 15 of 1974

The KZN Nature Conservation Ordinance ([KZN NCO] No. 15 of 1974) relates to nature conservation and concerns in the province. The ordinance lists the protected and specially protected plants in the province and prohibits the picking, sale, export or removal of protected plants. The ordinance also lists invader weeds, which must be controlled on study area and may not be sold or donated. Schedule 12 is a list of protected indigenous species which requires a permit from EKZNW for their removal, destruction or prior to being exported from or imported into the Province. However, in terms of Section 216A of the KZN NCO, the applicant, which is an organ of State, is not bound by the Ordinance.

6.3.1 Protected plant species

Plant species that are:

1. Evaluated as Near Threatened according to the IUCN 2001 Red List system (regional assessments) AND threatened by direct use;
2. Evaluated as Least Concern/ Data Deficient (or not evaluated) according to the IUCN 2001 Red List system (regional assessments) but in need of regulation/management as current utilization may result in a significant decline in wild populations.

Protected tree occurring within the powerline route



Fig. 4 *Sclerocarya caffra* (Marula)

Sclerocarya caffra (Marula) is the only protected tree, found and existing within the preferred powerline route. The tree is not registered within the Red Data species.

In terms of the National Forests Act of 1998 forest trees or protected tree species may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold – except under license granted by the Department of Water Affairs and Forestry (or a delegated authority).

Applications for such activities should be made to the responsible official in each province. Each application is evaluated on merit (including site visits) before a decision is taken whether or not to issue a license (with or without conditions). Such decisions must be in line with national policy and guidelines.

6.3.2 Mitigation

Construction of the powerline will not lead to the loss of habitat as only a designated work area will be utilised. Clearance of vegetation above ground will be limited to the designated area. The disturbed area will be rehabilitated accordingly. Disturbance of the ground will not lead to take over by weeds or alien plants as the disturbed areas will be rehabilitated to minimise the invasion by alien species. Digging for tower foundations will not lead to degradation of the work area as the work is limited to the designated area and the digging is not intrusive like blasting or extensive digging. No extensive or massive removal of vegetation will take place and hence will not impact on the affected habitat. Work will be limited within designated tower bases. Vegetation restoration often occurs through natural growth of plant species. Human activities such as transformation of the natural vegetation as a result of human habitation, harvesting, over grazing, excessive burning, farming practices have reduced some of the biodiversity in the area. Construction of the powerline will not cause significant loss of species nor cause add significantly to cumulative impact that increase the severity of the impact. Work is limited within a designated area and impacts minimised by less intrusive construction methods that involve digging and restoration of disturbed areas around tower bases.

7. ENVIRONMENTAL AUTHORISATION CONDITIONS and EXPLANATIONS

Table 10 provides explanation on conditions appearing in the environmental authorisation (DEA Ref: 14/12/16/3/3/1/1505) document.

Table 10. Environmental Authorisation conditions and explanations

Scope of authorisation	Explanation
<p>1. The corridor alternative 1 (preferred alternative yellow line for the construction of +/- 56km Impala to Mtubatuba 2nd 132kV powerline connecting at the existing Mtubatuba 132/22/11kV substation and Nseleni 132/22kV substation and establishment of a 2nd +/- 100m 132kV powerline (Tee line) connecting from the existing 1st Impala to Mtubatuba powerline to the existing KwaMbonambi 132/22kC substation.</p>	<ul style="list-style-type: none"> • The definition and extent of the corridor needed to be defined accordingly especially between Impala substation and Nseleni substation. • The extent of the corridor was shown and explained to authorities, stakeholders and landowners. • On the map appearing on the authorised BAR the yellow corridor between R102 and Nseleni River, is indicated as two lines in essence they are representing a single corridor (yellow and blue), yellow line located east of the farms and blue line located west of the farms. The description in the BAR concerning this section of the corridor did not explain that both lines represent a single corridor, which covers predominantly the cane fields. • The yellow and blue lines were drawn as such to show the extent of the corridor and investigated area between R102 and Nseleni River • The extent starts from R102 east of the farm boundaries along R102 and extends westerly over the sugarcane area and ends along the farm boundaries west of R102. • Figure 1 shows the representation of the extension of the corridor • The extent of the corridor was a suggestion from famers to provide enough area to locate a suitable powerline route • DEA was shown the corridor. • Application for deviation (or in this case clarity) will require attachment of signed Option Forms by affected landowners as an indication that they have approved the location of the route and hence the extent of the corridor (this is binding as no signed landowner can appeal the "deviation").
<p>2. Authorisation of the activity is subject to the conditions contained in this environmental authorisation, which form part of the environmental authorisation and are binding on the holder of the authorisation.</p>	<ul style="list-style-type: none"> • Conditions Noted.
<p>3. The holder of the authorisation is responsible for ensuring compliance with the conditions contained in this environmental authorisation. This includes any person acting on the holder's behalf, included but not limited to, an agent, servant, contractor, sub-contractor, employee, consultant or person rendering a service to the holder of the authorisation.</p>	<ul style="list-style-type: none"> • Eskom Holdings is responsible for compliance. • From providing environmental induction to monthly monitoring and audits. • Investigations, monitoring and audits due to the length of the project need to be done on separate dates in order to provide comprehensive and thorough reporting at project meetings.
<p>4. The authorised may only be carried out at the property as described above.</p>	<ul style="list-style-type: none"> • It is important that the route is located within the approved corridor • Work areas, tower positions and newly constructed access roads need to be demarcated and all work limited within demarcated work areas.
<p>5. Deviations in the project description set out in the EA need to be communicated in writing to and approved by DEA. Granting of such changes DEA may request information to evaluate significance and impacts of such changes or deviations.</p>	<ul style="list-style-type: none"> • Clarity on the description of the extent of the preferred corridor, yellow line between R102 and Nseleni River will be communicated with affected landowners and DEA (signed Option Forms needed to support application for "Deviation"). • Attached will be: <ul style="list-style-type: none"> a. Amended map; and b. Signed option forms to provide necessary information to support clarification of the extent of the yellow corridor between R102 and Nseleni River. • There is no deviation from the preferred corridor. The description in the BAR needs to be clarified properly. Therefore, there is no need to apply for new EA. • There are no deviations in the EA.
<p>6. The holder of an environmental authorisation must</p>	<ul style="list-style-type: none"> • Application for amendment to be done by Eskom together with the project

Scope of authorisation	Explanation
apply for an amendment of the environmental authorisation with the competent authority for any alienation, transfer or change of ownership rights in the property on which the activity is to take place	EAP.
7. Commencement of the project within five years of the date of issue of this environmental authorisation. Authorisation lapses if activity does not take place within 5 years	<ul style="list-style-type: none"> Project will be commenced within the specified period. Any change of construction date beyond the specified period to be communicated with the department in writing.
8. Construction to be completed within a period of five years	<ul style="list-style-type: none"> Project will be commenced within the specified period
9. Commencement of one activity listed in terms of this EA constitutes commencement of all authorised activities	<ul style="list-style-type: none"> Noted
Notification of authorisation and right to appeal	
10. Notification of registered I&AP about the EA	<ul style="list-style-type: none"> Done by the EA September 2016
11. Appropriate content of the EA notification	<ul style="list-style-type: none"> Done as per 10 above
12. Informing stakeholders about the decision by publishing a notice	<ul style="list-style-type: none"> Eskom Holdings is responsible for compliance
Commencement of the activity	
13. The authorised activity shall not commence until the period for the submission of appeals	<ul style="list-style-type: none"> No appeals were received or the holder of the EA was made aware of. The period has therefore lapsed
Management of the activity	
14. Amendment of the EMPr submitted as part of the application for Environmental Authorisation in order to update it, as per the findings, recommendations and mitigation measures of the walkthrough, must be incorporated in the amended/updated EMPr and submitted to the Department as part of the BAR and for EA and attachment of the layout of the final route to the Site Specific EMPr Copy of the final layout of the powerline route (micro siting of towers) must be incorporated into the amended/updated EMPr	<ul style="list-style-type: none"> Findings and recommendation of the Site Specific EMPr will be added as an addendum to the EMPr No commencement of construction until the EMPr has been approved by DEA Survey to provide the final layout of the powerline route for inclusion as per condition 14
Frequency and process of updating the EMPr	
15. Updating EMPr based on the findings of the investigation and monitoring for the environmental audit	<ul style="list-style-type: none"> As per new information and recommendations suffice
16. The updated EMPr must contain recommendations as per the findings of the walkthrough to rectify the shortcomings identified in the Site-Specific Report and in the environmental audit reports	<ul style="list-style-type: none"> Findings and recommendations included in the Site Specific EMPr will be added to the EMPr and additional findings in the audit reports will be included in the Site Specific EMPr
17. The updated EMPr must be submitted to the Department for approval and updated EMPr must be subjected to the public participation process	<ul style="list-style-type: none"> To be submitted with Site Specific EMPr as an addendum as well as monthly audit reports Newspaper adverts for the updated EMPr Library adverts of the updated EMPr Distribution of the updated EMPr to I&AP I&AP to sign for receiving the report
18. The public participation process must be approved by the department prior to the submission of the EMPr The updated EMPr must be submitted together with environmental audit report	Noted
19. The holder of the authorisation may apply for an amendment of an EMPr, if such an amendment is required <u>before</u> an audit is required. The holder must notify the Department of its intention to amend the EMPr at least 60 days prior to submitting such amendments to the EMPr to the Department for approval. In assessing whether to grant such approval	<ul style="list-style-type: none"> Will be applied for when the need arises Presently the EMPr is being updated

Scope of authorisation	Explanation
or not, the Department will consider the process and requirements prescribed in Regulation 37 of GNR 982	
Monitoring	
20. Appointment of experienced independent ECO for the construction phase of the development to ensure compliance to the EA, approved EMPr and applicable legislation	<ul style="list-style-type: none"> Eskom will appoint an ECO and will inform the department of the appointment within specified timeframe
Recording and reporting to the Department	
21. Submission of all documentation such as audit/monitoring/compliance reports and notifications to the Department in terms of EA must be submitted to Director: Compliance Monitoring at Directorcompliance@environment.gov.za	<ul style="list-style-type: none"> Submission to be done by the project ECO. Reports to be compiled according to department guidance or template
22. The holder of the EA must for the period during which the EA and EMPr remain valid, ensure that project compliance with the conditions of the EA and the EMPr are audited and that the audit reports are submitted to the Director: Compliance Monitoring of the Department at Directorcompliance@environment.gov.za	<ul style="list-style-type: none"> Eskom to ensure compliance with specified recommendations
23. The frequency of auditing and of submission of the environmental audit reports must be as per the frequency indicated in the EMPr, taking into account the processes for such auditing as prescribed in Regulation 34 of GNR 982	<ul style="list-style-type: none"> The EMPr indicated undertaking of auditing and monitoring of construction activities to take place at least once a month and when necessary All auditing and monitoring observations and findings will be recorded in the auditing and monitoring reports
24. The holder of the EA must submit an environmental audit report to the Department within 30 days of completion of the construction phase (within 30 days of site handover) and a final environmental audit report within 30 days of completion of rehabilitation activities	<ul style="list-style-type: none"> The final auditing and monitoring report comprising of all the auditing and monitoring done during the course of construction and observations and findings post construction, particularly the status of the area after construction has been completed
25. Compilation of environmental audit reports in accordance with appendix 7 of the EIA Regulations, 2017 as amended. The report must indicate the date of the audit, name of the auditor and the outcome of the audit in terms of compliance with the EA conditions as well as the requirements of the approved EMPr	<ul style="list-style-type: none"> Auditing and monitoring reports will comply with appendix 7 of the EIA Regulations, 2017 as amended
26. Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development	<ul style="list-style-type: none"> Noted
27. A written notification of commencement must be given to the Department no later than fourteen (14) days prior to the commencement of the activity. Commencement for the purpose of this condition includes site preparation. The notice must include a date on which it is anticipated that the activity will commence, as well as a reference number. This notification period may coincide with the notice of intent to appeal period	<ul style="list-style-type: none"> EA to comply with providing the written notification of commencement to the Department no later than fourteen (14) days prior to the commencement of the activity
Operation of the activity	
28. A written notification of operation must be given to the Department no later than fourteen (14) days prior to the communication	<ul style="list-style-type: none"> EA to comply with providing a written notification of operation must be given to the Department no later than fourteen (14) days prior to the communication
Site closure and decommissioning	
29. Should the activity ever cease or become redundant, the holder of the EA must undertake the required actions as prescribed by legislation at the time and comply with all relevant legal requirements	<ul style="list-style-type: none"> Decommissioning of the powerline will comply with all relevant legal conditions prescribed in the EIA regulations and in the EMPr

Scope of authorisation	Explanation
administered by any relevant and competent authority at that time	
Specific conditions	
30. To minimise the loss of listed species and species of special concern a 'Walkthrough' must identify sensitive areas or where species require permits for their removal or translocation. The findings of the final walkthrough must be integrated into the amended EMPr	<ul style="list-style-type: none"> Walkthrough has been undertaken and observations, findings and recommendations provided in Site Specific EMP report
31. Towers should be positioned outside CBA3 area during the survey of the corridor to establish tower positions, during walkthrough	<ul style="list-style-type: none"> The project is not located within CBA3 area
32. A final layout with the micro siting of the tower positions must be appended to the amended EMPr to be submitted to this Department for review and approval	<ul style="list-style-type: none"> Map with final route location appears in Appendix L
33. No activities encroaching into a water resource without a water use authorisation being in place from the Department of Water and Sanitation	<ul style="list-style-type: none"> Towers have been located outside water buffer areas, outside 32m from river banks and drainage lines and 500m either side of identified wetlands
34. Avifaunal input from an avifauna specialist is required for fitting anti-collision devices along sections of the line where it is required	<ul style="list-style-type: none"> Avifaunal study is part of the ecological study attached in Appendix M of this report Conductor spans crossing over water bodies, such as wetlands, rivers and wetlands have been indicated on design pack Spans to be fitted with flight diverters are to be marked on the design pack
35. Vegetation clearing must be kept to an absolute minimum. Mitigation measures as specified in the specialist studies/BAR dated August 2016 must be implemented to reduce the risk of erosion and invasion of alien of alien species	<ul style="list-style-type: none"> Clearing of vegetation will be limited within demarcated work area This condition will be emphasised during induction and during daily toolbox talks
36. Contracted bush-clearing staff must be briefed and educated regarding indigenous vegetation and must trim or remove only those that interfere with the installation of the powerline	<ul style="list-style-type: none"> All sub-contractors will be inducted on the EMP and Site Specific EMP conditions and recommendations
37. The extent of the construction site must be demarcated on site layout plans and no construction personnel or vehicles must leave the demarcated work areas except those authorised to do so	<ul style="list-style-type: none"> Demarcation of work areas need to include the full extent of the work area including areas where construction vehicles will be parked during construction and area demarcated as a temporary storage area for construction material and safety material To reach work areas vehicles will drive outside demarcated work areas and should driving along open areas Temporary access track, depending on the state of the access track slight ripping of the track maybe necessary to encourage growth of grass Any weeds invasion along slightly ripped vehicle tracks will be outgrown by the grass An audit of temporary created tracks will be undertaken to assess necessity of rehabilitation All work to be limited within demarcated work areas. Any disturbances outside demarcated areas need to be rehabilitated to nearly the original state The affected landowner must accept the status of the disturbed area after application of mitigation measures An audit report must record the rehabilitated areas outside the demarcated areas and indicate proof of consent from the affected landowner or community representative
38. Those areas surrounding the construction site that are not part of the demarcated development area must be considered as "no-go" areas for employees and machinery in order to reduce unnecessary habitat loss and disturbance, especially in proximity to wetlands	<ul style="list-style-type: none"> All work to be limited within demarcated work area ECO to monitor such compliance

Scope of authorisation	Explanation
39. Checks must be carried out at regular intervals to identify areas where erosion is occurring. Appropriate remedial action, including the rehabilitation of eroded areas must be undertaken	<ul style="list-style-type: none"> • All disturbed areas will be marked and indicated on the map per tower • Rehabilitation procedure to be implemented
40. An on-going monitoring programme must be implemented to enforce the continual eradication of alien and invasive species during and post construction	<ul style="list-style-type: none"> • ECO to monitor rehabilitation of disturbed areas during construction. • Eskom Holdings to monitor post construction
41. No exotic plants may be used for rehabilitation purposes. Only indigenous plants, found within a ten (10) km radius of the route may be utilised	<ul style="list-style-type: none"> • Only indigenous plants species will be used for grassing disturbed areas • Only indigenous plants will be used for replacing destroyed plants as offsets
42. During construction sensitive habitats must be avoided by construction vehicles and equipment wherever possible in order to reduce potential impacts	<ul style="list-style-type: none"> • Sensitive habitats identified during a walkthrough will be marked on final layout plan • Any inevitable disturbances to these areas, mitigation measures will be implemented • An audit to investigate and report on such areas will carried out to ensure that rehabilitation measures have been applied
43. Construction must include design measures that allow surface and sub-surface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of storm water run-off	<ul style="list-style-type: none"> • No disturbance of natural drainage lines will take place • Conductors will be spanned across drainage lines • No tower will be located along drainage lines • No driving of construction vehicles along drainage lines
44. An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate reduction, recycling and disposal where appropriate. Any solid waste, which will not be recycled must be disposed of at a licensed landfill site in terms of section 20 (b) of the National Environment Management Waste Act, 2008 (Act No.59 of 2008)	<ul style="list-style-type: none"> • Construction waste will be removed from site • Waste will be placed on provided waste bins suitable for placed waste • Waste will be separated for recycling and for disposal at local registered landfill sites
45. Before construction commences the holder of the authorisation must ensure that construction workers are educated with regards to the prevention of littering, veld fires and dumping of waste material	<ul style="list-style-type: none"> • Induction will be undertaken with the main contractor and sub-contractor • Contractor and sub-contractors will be informed about the EMP and the updated EMP conditions and recommendations
46. A copy of the EA, the audit and compliance monitoring reports, and the approved EMP, must be made available for inspection and copying at the site of the authorised activity; to anyone on request and where the holder of EA has a website, on such publicly accessible website	<ul style="list-style-type: none"> • All necessary environmental documents including recommended procedures will be filed at the site office in the environmental file • ECO and project coordinator will check if the file exists and that all necessary environmental documents are in the environmental file
47. National government, provincial government, local authorities or committees appointed in terms of the conditions of the EA or any other public authority shall not be held responsible for any damages or losses suffered by the holder of this EA or his/her successor in title in any instance where construction or operation subsequent to construction be temporarily or permanently stopped for reasons of non-compliance by the holder of this EA with the conditions of authorisation as set out in the EA document or any other subsequent document emanating from these conditions of authorisation	<ul style="list-style-type: none"> • Noted

8. CONSTRUCTION SITE CLOSURE

All remaining construction infrastructure, building rubble, all imported materials and waste shall be removed from the site as directed by the ECO.

- All construction rubble and waste to be removed off site, disposed in clearly marked provided bins
- Where possible all waste to be recycled
- Hazardous substances to be disposed at registered landfill sites that allow hazardous substations
- Any pollution within the camp site is to be checked and cleaned
- Gravel within the campsite is to be removed and disposed off at registered landfill sites
- Harden areas within the campsite are to be ripped/loosened and slightly compacted to facilitated binding of topsoil and organic matter in order to support natural re-emergence and growth of grass within affected area
- Perimeter fence to be removed from campsite
- Areas identified as disturbed or hardened will be checked by the ECO during auditing and monitoring exercise
- Post construction of rehabilitated areas to be audited in order to report on their status

9. EXPLANATION OF TERMS

9.1 Biodiversity offsetting

A system used to compensate for biodiversity impacts associated with economic development, through planning process. The aim of biodiversity offsetting is designed to result in an overall biodiversity gain. Use indigenous species naturally occurring within 10km of the project area to comply with the environmental authorisation condition. The permit to disturb protected trees and indigenous trees provides a condition for biodiversity offsetting. The process involves for every cleared protected or indigenous tree, three locally suitable indigenous trees are to be planted within locations where growth will be protected areas such as local schools, creches, tribal authority offices, local community halls and local clinics or places where the community can suggest. These places should be fenced and have closed gates. Planting of the trees should be discussed with landowners or local community structures. It is recommended that once biodiversity offsetting has been done proof of having planted is to be sent to relevant authority that provided the permit.

9.2 Groundcover

Groundcover entails all biological material covering or growing above ground level. The most widespread groundcover are grasses of various types. Groundcover also involves herbaceous layer, shrub and tree layer. Construction of the powerline involves working above and below ground level.

9.3 Vegetation cover

Vegetation holds the soil, slows the flow of runoff, and infiltrates into the soil. It also reduces soil erosion from adjoining ecosystems caused by wind and water. Stabilising soil around tower foundations will also protect the area around the tower foundations, preventing loss of soil.

9.4 Sensitivity of the affected area

Sensitivity includes:

1. If the area is protected under conservancy, or protected area
2. Susceptible to disturbance and becomes affected by disturbance
3. Disturbance can cause irreversible damage
4. Mitigation measures unable to restore to original or stable state

9.5 Flagged towers

Towers were flagged if they had significant impact on the environment. They are flagged so as to draw attention to specific mitigation measures that need to be implemented. These towers may require final walkthrough by the project ecologist to ensure that the specific mitigation measures are implemented correctly and to support the construction crew in case they are not sure how to implement specified mitigations measures.

9.6 Liaisons with affected landowners and stakeholders

The construction contractor and Eskom Holding need to liaise with affected landowners to explain activities that will be taking place along their respective properties. Prior to locating towers along cane fields, fallow or active fields it is important that consents for locating the towers be received and confirmed. If the field owner cannot be found it is important that the local community structures, induna and local tribal authority give consent to the location of the tower on cane fields on behalf of the untraceable owner.

9.7 Location of camp site

Camp site to be located in an area approved by landowner, or local structures. Agreements with the landowner or local structures to be recorded and filed accordingly. Camp site to be fenced to provide security and controlled access. Security to be available at all times at campsite. Gravel stones to be applied within the campsite to

prevent potential erosion resulting from bare ground caused by driving and walking over grass cover. Vehicle parking area to be demarcated. Storage area to be demarcated. Hazardous containers to be placed over an impervious surface, preferable collecting trays. Campsite to be provided with a water tank. The water tank to be filled by transported water. Drawing of water from nearby watercourse is strictly prohibited. Permit to draw water from local watercourse is to be sought with relevant authority.

9.8 Relocation of houses

Agreements regarding relocation of houses must be attended to and finalised in order to ensure roll out of construction without glitches. Eskom Holdings must involve local traditional structures including the house owner to ensure proper consultation so that relocation of houses takes places with their approval. The relocation process must be explained clearly to the affected house owner. It is suggested that the relocation process must be written and the affected landowner sign to indicate that the relocation process was clearly explained and the owner has understood and supported the relocation process. The demolition of the houses currently located within the proposed servitude and building of new house in a new location must be part of the relocation process explained to the affected homestead owner. There should be supporting documents to show consent. Conditions of relocation must be fully explained to the affected house owner. These conditions must appear in the supporting relocation documents. It is important that local structures including affected individuals are consulted about all relevant legal processes concerning relocation.

9.9 Parking of vehicles

Area to park construction vehicles along the entire length of the powerline during construction needs to be identified prior to construction. Area earmarked for parking should be determined as suitable for parking. Parking on private spaces needs to be negotiated with affected landowners/landusers. Construction vehicles are not to block movement of other vehicles. All road safety procedures to be adhered to.

9.10 Post rehabilitation auditing

The quality of rehabilitation after its completion should be accepted by affected landowners or stakeholder

9.11 Designation of work area

Work areas need to be designated in order to indicate the extent of work area thereby limiting disturbance within the designated area. A safety danger tape to be used to mark the perimeter of the work area. No disturbance to be done outside the safety danger space. This is to prevent extending disturbance to larger areas and thereby reduce rehabilitation costs. Disturbance extending beyond demarcated area should be rehabilitated as soon as possible, i.e. use suitable methods to restore the natural state of the affected environment.

9.12 Construction phase

Areas outside work area must not be disturbed. All disturbed areas need to be rehabilitated accordingly.

Rehabilitation must be executed in such a manner that surface runoff will not cause erosion of disturbed areas during and after rehabilitation.

- All remaining construction infrastructure, building rubble, all imported materials and waste shall be removed from the site as directed by the ECO.
- Construction office site and camp site is to be checked for spills of substances such as oil, paint and fuels, etc. and these must be cleaned up.
- All waste material including scrap, rubble and tyres, shall be removed from contractor's camp and disposed of at a registered landfill site.

- The contractor's camp site shall be cleaned and rehabilitated to its pre-occupation condition and the rehabilitated site must be approved by the owner.
- Where applicable, all hardened surfaces within the construction camp area must be ripped, and the area shall be top-soiled and re-vegetated using locally occurring indigenous grass and tree species.
- All trimmed and / or compacted areas must be left rough to facilitate binding of topsoil and vegetation.

9.13 Creation of new access roads

Towers legs established along flatter terrain occupy the same ground level. Tower legs on a slope occupy different ground level. Disturbance is limited within a demarcated work area to minimise extent of disturbance.

- No new access track should be constructed without a proper and approved access road construction specification designed by the project civil engineer;
- Access roads constructed on steep slopes should be fitted with water diversion berms where necessary to prevent potential erosion;
- Water outlets shall be made at intervals where berms are placed, as per road construction specification suitable for the specified terrain;
- Temporary roads are to be constructed as per advice from project civil engineer. After construction they should be ripped, raked and slightly compacted to prevent potential erosion; and

9.14 Crossing of streams or rivers

No crossing of streams or rivers is to be done. Crossing must be done using existing bridges. Accessing tower foundations across streams or rivers should be done from local roads and tracks.

9.15 Disturbance to catchments and ecosystem services

The area along the powerline route is characterised by terrain with gradual slope and hills with steep slopes. Some areas lie along flat terrain. Most of the slopes form small catchment areas connected to either streams downslope or to rivers running along valley bottoms. Locating of towers along various terrains will not impact on the nature of the terrain. Since no carving of slopes will be done, no eroding of the slopes will happen and hence no potential erosion. Driving along slopes will be along contour lines. Vertical driving is not permitted and is not safe for heavy construction vehicles. Vegetation cover along various terrain provides various habitats that support a number of species. Locating a powerline will not disturb nor impede ecological services provided by various terrains. Establishing of tower foundations and stringing of conductors will not impend movement of run-off, movement of livestock, movement of people and movement of vehicles. Vegetation around disturbed tower bases will regrow and become part of the microhabitat around the tower bases.

9.16 Clearing of vegetation cover for locating towers

Digging of the ground for pile foundations will disturb the ground cover. Prior to digging, the work area must be demarcated and fenced with a safety danger tape to indicate its extent. All work is to be limited within the demarcated area. Dug topsoil is to be placed aside and not mixed with subsoil for later use. Topsoil contains nutrients required to promote growth of grass used to rehabilitate disturbed areas. Dug subsoil should also be set aside. This soil is to be spread thinly along adjacent areas.

9.17 Clearance of commercial trees

Clearance of commercial trees is to be discussed with Mondi Forest so that correct procedures are adhered to.

9.18 Damage to crops

Damaged crops are to be compensated. It is recommended that pictures of existing crops be taken prior to disturbance and after completion of construction to show the level of damage. Compensation for damaged crops is to be discussed with the owner.

9.19 Locating towers along fallow lands or ploughed fields

The use of fallow lands or ploughed lands is to be negotiated with the rightful owner prior to entering the place. The contractor should ensure that the local induna is informed about the use of such locations and liaise with the owner of the field to get consent about use of the field. The induna will be in a position to provide information about the fallow fields and the user and how to contact the user. All liaisons with affected landowners need to be documented for evidence.

9.20 Access along slopes

It is recommended that accessing sites along areas with slopes, driving should be strictly kept along contour lines, along single tracks to prevent potential erosion. Figure 4 shows a schematic representation of a contour lines on a steep slope. Contour lines are critical to understand the elevation profile of your terrain or a particular land formation. One of the biggest problems with disturbing terrain with slopes is indiscriminate driving which leads to soil erosion. If water falls on steep land with little vegetation, it can lead to soil erosion. To prevent potential erosion accessing towers located along the slope it is recommended that driving be done along accessible contour lines which minimises damage to vegetation.

9.21 Use of farm roads

Farm roads are susceptible to erosion during rainy days. Heavy trucks may impact on the farm roads. Construction may need to be stopped during rainy days to prevent damage to farm roads.

9.22 Driving along local roads

All road laws are to be adhered to. No speeding above speed limit is allowed. Parking of construction vehicles along the road should not impede use of the road. A suitable parking area should be used should the local road or track be small.

9.23 Access to the tower sites

Where necessary access to tower positions should be discussed with the affected landowner, particularly where access to tower sites or stringing of conductors requires going through private properties. Heavy vehicles may require that existing access into the site be widened. Where tracks or road to tower positions do not exist access across flatter terrain can be created by vehicle driving. Such access should be strictly limited to single vehicle tracks. No multiple tracks are to be created. Access along slopes is to be strictly limited along lower contour lines. Driving up the slope is strictly prohibited. Towers located upslope are to be constructed manually. No access track is to be opened up the slope to the tower position. No scrapping of the ground to create a new road is to be done. No cut and fill along upper contour lines is to be done.

Access shall not necessarily be continuous along the line, understanding of the physical access restrictions such as rivers, wet areas is important. Along hilly areas access to the site area shall follow the contour line as opposed to driving straight or zig zagging down the slope. If a track exists construction vehicles can follow it and deviate if there is obstruction. All entrances must avoid causing disturbance to the ground. No multiple tracks must be created on a flatter or hilly terrain. Any resulting disturbance is to be rehabilitated immediately after construction has been completed. Creation of multiple tracks is prohibited.

Heavy construction vehicles are not to damage existing local roads, especially driving excessively during heavy rains. Status of all used private tracks and roads are to be assessed after construction. Damages appearing after being used by construction vehicles should be rehabilitated.

9.24 Driving along slopes (smaller catchment)

It is recommended that construction vehicles including cranes should drive along contour lines. Only single vehicle tracks should be established. No construction of tracks and roads should be done. This means no scrapping of vegetation and topsoil to create a new track. Vehicle tracks must be created by driving along the terrain. This type of track has minimal impact on the ground. When driving has stopped vegetation grows back. Cutting and scrapping will cause unnecessary damage to the ground.

9.25 Flattening of steep road banks

Flattening means cutting a steep bank and compacting it to provide access into the tower base area. Access through steep road banks will require flattening of the steep road bank to enable construction vehicles to reach the tower site. The slanted road banks will be compacted to prevent collapse of the road bank. The bank can be slanted at a suitable angle with the guidance from the project engineer. The sides of the slanted road bank should be stabilised to prevent potential collapse. Upon completion of the tower construction, the slanted road bank will be restored to original state to protect the road bank from potential damage and scouring.

9.26 Excavation for towers



Fig 5 Clearance of ground cover and excavation of tow

Excavation of foundations involves demarcation of the tower area. Figure 5 shows the excavation and extent of disturbance around the tower base. All work is limited within a demarcated work area. Access to the tower site is needed to get a heavy vehicle the tower site. Digging involves excavation of top soil and subsoil. These two layers are to be placed separately. Topsoil is suitable for growth of grass needed to prevent scouring of soil around tower bases. Work area needs to be fenced off until foundation is poured and the tower erected. Foundation holes are to be open for a short time as possible. The open holes are to be secured with danger tape. The foundation holes are to be checked for animals which may have fallen in. The animals are to be removed out of the hole. For livestock, local Induna or farmer should be notified of animals that had fallen in the hole and got injured or died from falling. Alive animals fallen into the holes are to be safely released.

Work area for foundations excavations needs to be barricaded to prevent injury to humans and to livestock. Extra material removed during excavation which will not be required for backfilling may be spread evenly over adjacent areas. Topsoil and subsoil are to be kept separately in order to preserve the topsoil for application along areas to be rehabilitated. All construction waste must be removed and disposed appropriately. Only ready-mix cement should be used to establish foundations. Mixing of cement on site is strictly prohibited. All other construction waste, nuts, bolts, surplus concrete, etc. shall be removed from the tower sites and servitude. No washing of cement pouring devices in nearby watercourses should be done.

9.27 Establishing pile foundations



Fig 6 Pouring of cement into the tower foundation

An area is demarcated for establishing pile foundations. Vegetation on top of the site is removed accordingly. It is recommended that grass on the site, preferably without weeds be dug with 30mm topsoil covering roots and be placed aside and protected by covering it with cut grass to prevent drying of roots. This grass can be used to grass bare areas resulting from clearing of vegetation. This is recommended particularly on slope areas. On flatter grounds, once topsoil is applied around the cemented tower legs the soil can be cleared of debris, raked and compacted slightly. This will encourage growth of grass. Grass will slowly cover any emerging weeds and cover the area cleared of vegetation. This involves digging of holes to accommodate tower legs. Topsoil and sub-soil will be dug out and placed aside separately. Ready-mix cement is poured. Figure 6 shows pouring of ready-mix cement. No mixing of cement on site. Figure 7 shows area disturbed during construction of the tower and growing of grass after rehabilitation of disturbed area. Area to be excavated is to be clearly demarcated. All excavation to be limited within the demarcated work area. All foundation excavations shall be covered or barricaded accordingly. Underground material excavated for foundations when not needed should be spread evenly over or adjacent to the tower positions. Subsoil can be used for rehabilitation and is not to be mixed with topsoil. Concrete waste to be removed from site and taken to a registered landfill site.



Fig 7 Showing established tower foundations with extent of disturbed area and completed tower and rehabilitate disturbed area showing grass growing at and around the tower base

9.28 Establishing a tower on a steep slope

Cut-banks are to be trimmed to an angle that ensures stability of the slope. When the ground is loose, berms are to be built on the top of the slope and downslope. Disturbed area to be rehabilitated accordingly.

9.29 Bird Flight Diverters

Bird flight diverters will be fitted along sections of conductor spanning across rivers, or streams. Towers will be located beyond 32m either side of the river or stream. The designing specification of the project will indicate to spans to be fitted with bird flight diverters. The common bird flight diverter is shaped as a large pigtail shaped - structure. The usual specification for fitting bird flight diverters alternating black and white colours every 10m and along the middle 50% of the earth span. The bird flight diverters specification is included in the project design package. Any subsequent reports of unmarked lines of bird collision with unmarked lines, the problem spans need to be fitted with bird flight diverters.

9.30 Fitting of aviation spheres

When a powerline crosses a national road or river course or a known aeroplane flight path, the conductor spans need to be fitted with aviation spheres, a round luminescent ball to make the powerline visible to aeroplanes in some instances they act as bird flight diverters. Fitting of aviation spheres is a legal requirement. Birds often use roads and river courses as flight paths.

9.31 Fitting bird spikes on tower 116 (187) and tower 117(188)

Spikes are fitted at the top of the tower to prevent raptors from landing and nesting on the top of the tower. The specification for fitting spikes is included in the project design package.

9.32 Driving during rainy days

Most farm roads are susceptible to erosion. Therefore, driving during rainy days is strictly prohibited to prevent damage to the roads. It is suggested that construction be done in other areas less susceptible to erosion along open gravel roads and return to areas with roads susceptible to erosion when it's not raining.

9.33 Disturbing or relocation of protected plants

The location of protected species should be discussed with the project ecologist. The project ecologist will explain whether protected plants can be disturbed or need to be relocated. The project ecologist will indicate whether to disturb the plant by digging it out or whether to dig it out and relocate it to a safer place. The digging and replanting procedure will be explained by the project ecologist. It is important that the contractor liaise with the project ecologist about towers flagged according to the presence of protected or Red Data Listed species.

9.34 Fencing of graves

Graves identified near or in close proximity to the work area need to be fenced. The contractor needs to first with the help of local induna, meet with the owners or family of the identified grave. The contractor needs to explain the need for the fencing of the grave to provide extra care and not to disturb the gravesite. It is important to liaise with the owner in order to get guidance on fencing of the graves. Fencing should not be done without consultation and proof of consultation. However, identified graves are located at a distance from tower base area, minimising chances that they may be disturbed.

9.35 Location of the contractor camp site

The location of construction site office and construction camp must be discussed with the ECO and affected landowner. The landowner must give consent to the use of the site.

9.36 Use of registered landfill site

The contractor must liaise with the local municipality with regard to disposal of waste at registered landfill site. The contractor must write a letter enquiring about disposing general waste at local registered landfill site. The copy of the letter kept in the environmental file. Certificates of safe disposal received at registered landfill sites are to be retained for auditing purposes.

9.37 Rehabilitation of disturbed grounds

All disturbed grounds by construction need to be cleared of debris, the ground loosened, topsoil applied thinly, raked and compacted slightly. Levelled and slightly compacted grounds will encourage regrowth of grass. Normally the initial emergent will be weeds and grass. However, grass grows slowly but eventually overgrows weeds and thus prevent their growth. Height of grass is maintained by fires or mowing along selected servitude areas such as along sugarcane and plantations. All areas disturbed due to construction activities are to be rehabilitated appropriately. Locally occurring indigenous vegetation must be sourced from locally based nurseries who will offer guidance on suitable species and their agronomy. Vegetation rescued from footprints can be used to rehabilitate disturbed areas. Rehabilitation will aid in the protection of soil substrate, protection of local biodiversity, as well as preventing potential erosion along the powerline. Figure 8 shows the ability of grass to grow back along an area once disturbed during construction of the tower foundation.



Fig 8 Showing grass growing back along tower foundation

9.38 Operational

The minimum distance between plantation trees and the powerline must be maintained to comply with safety standards. Weeds can be controlled through mechanical mowing. Eskom Holdings has a vegetation management procedure for maintaining vegetation within the servitude¹. Alien plant growth must be controlled constantly. Hand pulling is the preferred technique, but herbicides may be used in cases where infestation is dense or cut stumps need treatment. Rehabilitated areas must be monitored to ensure that grass cover has established and there is no eminent erosion. Any construction waste left on along the servitude must be removed and disposed of at registered landfill site

9.39 Filing of important documents

The following documents need to be filed in the site environmental file;

- Environmental authorisation;
- Environmental management plan report;
- Site specific environmental management plan report;
- Permit to cut or trim indigenous trees;
- Permit to destroy and/or relocate protected plants; and
- Induction register.

9.40 Integrated waste management

As per EA condition

- Removal of construction waste from site
- Inspection of cleanliness of work area
- Sorting of waste for recycling
- Use of different waste bins
- Disposal of hazardous material
- Liaisons with local municipality for use of registered landfill sites
- Filing of receipts from landfill sites for auditing purposes
- Packing of cut wood

¹ Vegetation Management and Maintenance Within Eskom Land, Servitudes and Rights of Way

10. UPDATING/AMENDING EMPR PRIOR TO CONSTRUCTION

Condition 14 in the EA mentions that the EMPr submitted for application for EA must be amended and submitted to the Department for approval prior to construction of the powerline. The amendment is based on the findings of the stipulated walkthrough. Included in the amended EMPr is the final layout of the powerline.

Condition 15 states that the EMPr must be updated where the findings of the audit report indicate insufficient mitigation of environmental impacts associated with the undertaking of the activity or insufficient levels of compliance with the EA or the EMPr. Environmental audits are undertaken during construction phase. Condition 14 mentions that amended EMPr be submitted prior to construction.

There is an updated EMPr through walkthrough as per condition 14 and amended as a result of environmental audits as per condition 15

Condition 17 mentions subjecting the updated EMPr to public participation process, process to be approved by the Department prior to the submission of the updated EMPr to the department for approval

Condition 19 mentions that the holder of authorisation, the applicant MAY apply for an amendment of the EMPr, if such amendment is required. The holder is to notify the department of the intention to amend the EMPr at least 60 days prior to submitting the amendments to the EMPr to the department for approval. The department prior to the approval will consider Regulation 37 of GNR 982.

11. ANALYSIS OF TOWERS POSITIONS AND ROUTE BETWEEN TOWERS

Analysis of environmental aspects and social situations was mainly observed at tower bases as along the route between towers. Analysis of route between towers is done where it will have an impact on the environment or social effect such as impacting on indigenous trees or protected trees or on a house along the powerline route. Stringing of conductors between towers has minimal impact on the vegetation and on the environment. Tables in this section provide a summary of issues and activities of towers in each section.

11.1 Impala- Nseleni substation

Tower 1-4

Figure 9 shows location of tower 1, tower 2 and tower 3. Tower 1 will be a new tower and is located outside Impala substation. The towers connect the out-going line with substation electrical connections. The site is located along scrub woodland scattered with trees, mostly indigenous. A cluster of trees grow along the railway line reserve forming a continuous hedge. Tower 2 and tower 3 are located within and alongside commercial trees within property owned by Mondi respectively. Tower 2 is located within a plantation area while tower 3 is positioned at the edge of eucalyptus plantation. Access is available along existing plantation gravel road. The natural area is transformed. Natural biodiversity has been replaced by alien commercial trees. Clearance of commercial trees to accommodate towers foundations and powerline should be negotiated with Mondi Forest. There will be less ground disturbance. The terrain is flat. Only disturbance will be cutting of timber and digging for pile foundations.

Only trees within the tower base area are to be cleared. Access into the site area is available from local roads. Tower site does not encroach on the Railway line reserve. Eskom Lands and Rights has liaised with Transnet Railway for crossing over the railway line with a powerline. Table 5 shows identified impacts associated with construction of towers 1-3



Fig 9 NFEPA 1 & 2

Slope	Flat terrain
Landuse	Open space Between Eskom, Railway line, timber plantation
Special habitats	Scrub woodlands with scanty trees, commercial trees
Protected species	None
Permit to disturb protected plants species	N/A
Permit to trim/cut disturb protected trees	N/A
Bushclearing	Required at tower 1. Cutting of trees at tower 2 & 3 to be discussed with Mondri
Heritage	None
House relocation	None
Line markers	N/A
Liaisons with Commercial Forest company and Railway	Undertaken by Eskom Lands and Rights
Access	Available from local roads

NFEPA 1 & 2

The wetland is classified as unchanneled valley bottom. Upon inspection no wetland indicator species were observed. Tree plantation had transformed the entire wetland. The wetland area has been delineated, however its habitat has been transformed.

Designation	Type	Specific type	Origin	Status	Area
NFEPA 1 Towers 3 28°45'54.98"S 31°56'34.67"E	Indian Ocean Coastal Belt Group 1	Unchanneled Valley Bottom Wetland	Natural	<ul style="list-style-type: none"> Highly modified Intense landuse along adjacent areas has contributed to the status of the wetland 	<ul style="list-style-type: none"> Tower 3 located near the modified wetland 3 Local road runs past the wetland
Aspects	Aspect present	Impacts			
Hydrology <ul style="list-style-type: none"> Intercepting of water flow Draining of wetland Destruction of drainage into wetland 	<ul style="list-style-type: none"> None Critically Modified 	<ul style="list-style-type: none"> None Powerline runs over the wetland Tower position will not impact on the wetland 			
Typical wetland vegetation	<ul style="list-style-type: none"> None Vegetation modified by intense adjacent landuse 	<ul style="list-style-type: none"> None 			
Direct Human Benefits	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Rare & Endangered Species	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Populations of Unique Species <ul style="list-style-type: none"> Destruction of uniqueness 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Species/taxon Richness <ul style="list-style-type: none"> Change to biodiversity (plant, fauna, and aquatic) and species richness 	<ul style="list-style-type: none"> Very low 	<ul style="list-style-type: none"> None 			
Ecological Integrity <ul style="list-style-type: none"> Altering of physical structure Disturbance of wetland 	<ul style="list-style-type: none"> Negligible and highly transformed 	<ul style="list-style-type: none"> None 			

intact	
Wetland ecological system	<ul style="list-style-type: none"> Highly transformed Affected by adjacent intense landuse
Issues	<ul style="list-style-type: none"> None
Impact level	<ul style="list-style-type: none"> Negligible

Designation	Type	Specific type	Origin	Status	Area
NFEPA 2 Between tower 3 and 4 28°45'56.70"S 31°56'27.69"E	Indian Ocean Coastal Belt Group 1	Unchanneled Valley Bottom Wetland	Flat	<ul style="list-style-type: none"> Highly modified Intense landuse along adjacent areas has contributed to the status of the wetland 	<ul style="list-style-type: none"> Located between plantation Access runs past the wetland
Aspects	Aspect present	Impacts			
Hydrology	<ul style="list-style-type: none"> None Critically Modified 	<ul style="list-style-type: none"> None Powerline runs over the wetland 			
Typical wetland vegetation	<ul style="list-style-type: none"> Terrestrial grass grows along the wetland Wetland vegetation modified 	<ul style="list-style-type: none"> None 			
Direct Human Benefits	<ul style="list-style-type: none"> Non-functional due to lack of wetland vegetation types and water Most subsurface and underground recharging water has been taken up by commercial trees 	<ul style="list-style-type: none"> None 			
Rare & Endangered Species	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Populations of Unique Species	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Species/taxon Richness	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Ecological Integrity	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Wetland ecological system	<ul style="list-style-type: none"> Negligible and highly transformed 	<ul style="list-style-type: none"> None 			

Issues	<ul style="list-style-type: none"> Highly transformed Affected by adjacent intense landuse 	<ul style="list-style-type: none"> None
Impact level	<ul style="list-style-type: none"> None 	
Hydrology	<ul style="list-style-type: none"> Negligible 	
<ul style="list-style-type: none"> Intercepting of water flow Draining of wetland Destruction of drainage into wetland 		

Powerline servitude between Tower 1 and Tower 4

The servitude between tower 1 and tower 2 crosses a railway and pipeline. The terrain along tower positions and between towers is relatively flat and has a gradual gentle slope. Crossing of the railway line is to be negotiated with Transnet. The conductor spans between tower 1 and tower 3 run parallel to a pipeline and across commercial tree plantation. The length and height of the conductor is influenced by terrain and other technical factors. Depending on the distance and terrain pulling of the conductor between towers can be done manually (by hand) or mechanically. Any damage to sugarcane must be compensated accordingly. Lots of lantana weed was observed along the railway reserve. Stringing of conductors will not disturb the infested railway reserve. No protected species were observed along the servitude.

Tower 5–Tower 7

Figure 10 shows towers from tower 2 to tower 7 to be located predominantly within sugarcane plantation and stand parallel to a timber plantation. The area between the towers is highly transformed. The terrain has a gradual slope. Access tracks can be susceptible to erosion, particularly on rainy days. Tracks were created for sugarcane farming operations and may not be able to withstand heavy trucks especially during rainy days. It is recommended that no driving should take place during rain. Construction should preferably be done during dry season. Location of towers will destroy growing sugarcane. Destroyed sugarcane should be compensated accordingly. Table 6 shows identified impacts associated with construction of towers 2-7

Towers 5-7

Slope	Flat terrain
Landuse	Sugarcane, Line parallel to existing powerline, land owned by Eskom
Special habitats	None
Protected species	None
Permit to disturb protected plants species	N/A
Permit to trim/cut disturb protected trees	N/A
Bushclearing	N/A
Heritage	None
House relocation	None
Line markers	N/A
Liaisons with Eskom Transmission	Undertaken by Eskom Lands and Rights
Access	Available from local roads

Table 11 Summary of impacts Tower 4 – Tower 7

Identified potential impact	Causes of potential impacts	Significance of impacts	Ecological sensitivity of the area	Mitigation measures	Effect of mitigation measures
Damage to sugarcane	Damage to cane during stringing	Low if damaged cane will be compensated	None	Minimise damage to disturbed areas	Rehabilitation of disturbed areas will prevent

Identified potential impact	Causes of potential impacts	Significance of impacts	Ecological sensitivity of the area	Mitigation measures	Effect of mitigation measures
		accordingly			potential erosion
Clearing ground to weed invasion	Disturbed ground cover will become bare and thus susceptible to weed invasion	Low. Cleared sugarcane area will be replanted Servitude and areas around tower bases along plantation will be maintained as tree-free servitude area Eskom will liaise with Mondi about servitude maintenance	None	Areas becoming bare as a result of disturbance during construction need to be cleared of debris and construction material, raked and compacted slightly and rehabilitated accordingly	Disturbed grounds need to be cleared of debris, raked, topsoil applied thinly, raked and compacted slightly. Levelled and slightly compacted grounds will encourage regrowth of grass.

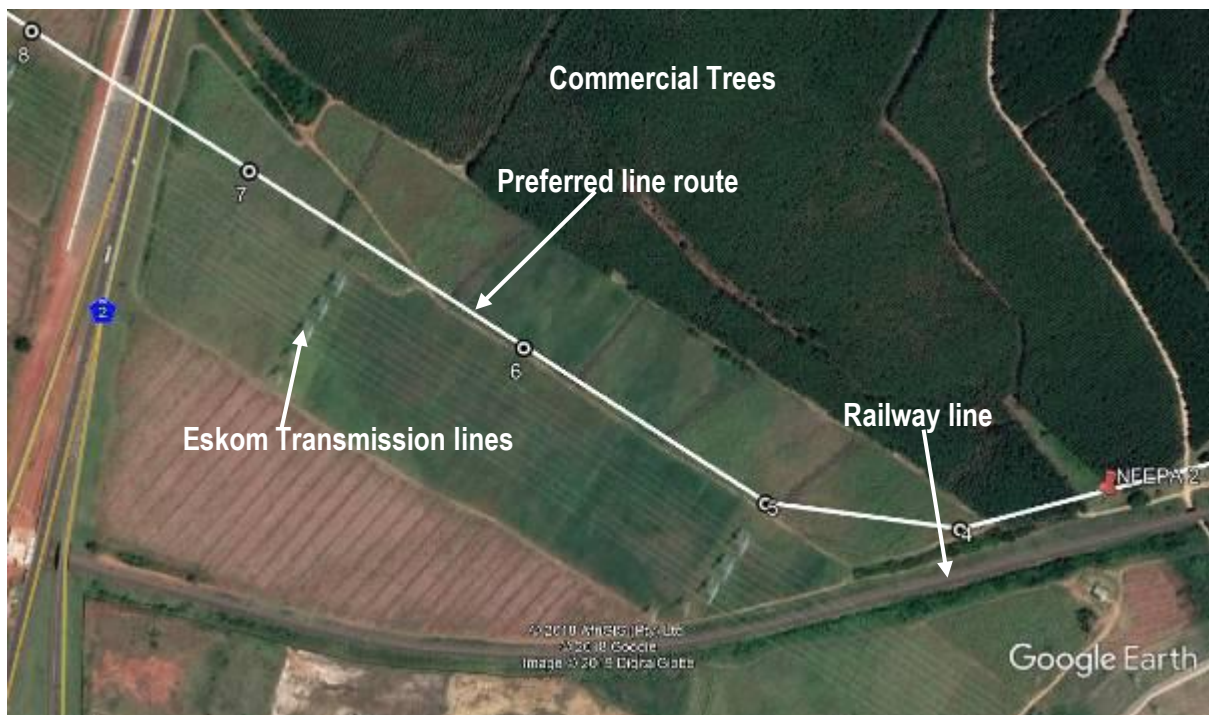


Fig. 10 Showing towers 2-7

Towers and servitude 8-12

Towers from tower 8 to tower 12 are located within a growing crop of sugarcane. Clearance of sugarcane is needed to locate the towers. Damages to sugarcane to be compensated accordingly. Access is available from existing tracks and roads including footpaths. Where these access lack, the tower sites the terrain is drivable. The area shows weed infestation. Towers are situated along open grasslands and over woody areas growing along drainage lines. The conductor span between tower 9 and tower 10, figure 11 crosses over a National Freshwater Environmental Priority Areas (NFEPA) wetland. The wetland is covered by mixed trees. Stringing of the conductors should not impact on the riverine vegetation growing within the wetland area and its associated riparian area. When pulling the conductor care should be exercised to minimise damage to branches of indigenous trees. The wooded area comprises of indigenous trees and some alien species. Only trees that pose safety threat to the powerline once operational are to be cleared. Effort must exercise to minimise or prevent damage to the wetland riverine vegetation. It is suggested that a selective herbicide be applied to the cut weeds to prevent seed germination. Conductor between tower 8 and 9 runs parallel to Eskom Transmission line. Tower

9 and 12 borders eucalyptus plantation which is not affected and Eskom Transmission substation. However, the eucalyptus tree near tower 12 may need cutting to create a safe distance. Weed infestation at tower 10 will be cleared to accommodate the tower. No permit is required to cut the trees. Table 7 shows identified impacts associated with construction of towers 8-12.

Highlights

- Fit aviation spheres between towers 7 and 8, crossing N2;
- Fit bird diverters between towers 9 & 10 and to be shown on the line design package;
- Care should be taken when stringing the conductor across the drainage line with wooded trees to prevent or minimise damage to the trees;
- No cutting is to be done along the wetland, even for clearing for stringing
- Any need for cutting is to be discussed with ECO and project ecologist
- Removed weeds can be sprayed with a selective herbicide to prevent its seeds from germinating. Application of herbicide on cut weeds to be discussed with the ECO

Span between tower 9 and tower 10

The conductors span across a NFEPA wetland. No tower is located within a riparian area of the wetland. No clearing of the trees. Any ground clearance issues it is recommended that only the problem tree should be trimmed, if necessary. Bird flight diverters to be fitted along the span because of the wetland. Tower 10 is located on an elevated ground above the wetland drainage area. A road intercepts the wetland. Span between tower 10 and tower 11 runs along the existing road and in front of a substation. The powerline is located at safe distance between the road and the substation. The powerline will not impact on road users.

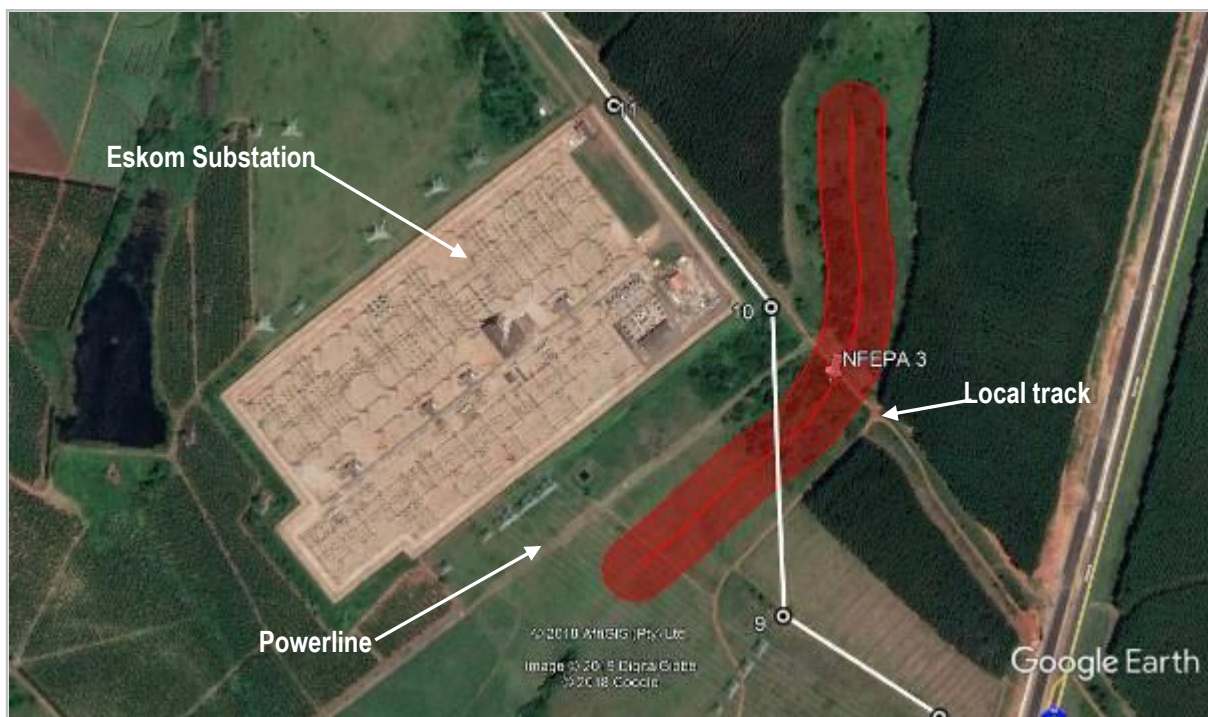


Fig. 11 NFEPA 3

Towers 8-12

Slope	Flat terrain
Landuse	Sugarcane, Line parallel to existing powerline, land owned by Eskom
Special habitats	Riverine vegetation before Athene substation
Protected species	None
Line markers	Fit aviation spheres towers 7-8, line crosses the road
Permit to disturb protected plants species	N/A

Permit to trim/cut disturb protected trees	Required
Bushclearing	Yes, between towers 9 and 10
Heritage	None
House relocation	None
Liaisons with Eskom Transmission	Undertaken by Eskom Lands and Rights
Access	Available from local roads

Table 12 Summary of impacts Towers 8 - 12

Identified potential impact	Causes of potential impacts	Significance of impacts	Ecological sensitivity of the area	Mitigation measures	Effect of mitigation measures
Damage to sugarcane	Damage to cane during stringing	Low if damaged cane will be compensated accordingly	None	Minimise damage to disturbed areas	Rehabilitation of disturbed areas will prevent potential erosion
Clearing ground to weed invasion	Disturbed ground cover will become bare and thus susceptible to weed invasion	Low. Cleared sugarcane area will be planted Servitude and areas around tower bases along plantation will be maintained as tree-free servitude area Eskom will liaise with Mondi about servitude maintenance	None	Areas becoming bare as a result of disturbance during construction need to be cleared of debris and construction material, raked and compacted slightly and rehabilitated accordingly	Disturbed grounds need to be cleared of debris, raked, topsoil applied thinly, raked and compacted slightly. Levelled and slightly compacted grounds will encourage regrowth of grass.

Designation	Type	Specific type	Origin	Status	Area
NFEPA 3 Between tower 9 and 10 28°45'34.92"S 31°55'47.50"E	Indian Ocean Coastal Belt Group 1	Unchanneled Valley Bottom Wetland	Flat	<ul style="list-style-type: none"> Highly modified Intense landuse along adjacent areas has contributed to the status of the wetland 	Located between tree and sugarcane plantation and substation Existing access runs through the wetland
Aspects	Aspect present	Impacts			
Hydrology <ul style="list-style-type: none"> Intercepting of water flow Draining of wetland Destruction of drainage into wetland 	<ul style="list-style-type: none"> No water Highly transformed 	<ul style="list-style-type: none"> None The powerline runs over the drainage line 			
Typical wetland vegetation	<ul style="list-style-type: none"> Terrestrial plants and weed infestation grow within the wetland 	<ul style="list-style-type: none"> None 			
Direct Human Benefits	<ul style="list-style-type: none"> High Road cuts through the wetland Commercial trees affect the groundwater recharging 	<ul style="list-style-type: none"> None 			
Rare & Endangered Species	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Populations of Unique Species	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			

• Destruction of uniqueness		
Species/taxon Richness • Change to biodiversity (plant, fauna, and aquatic) and species richness	• None	• None
Ecological Integrity • Altering of physical structure • Disturbance of wetland intact	• Low	• Little
Wetland ecological system • Disruption of the capability of wetland to perform its functions	• Low and transformed	• None
Issues	• Highly transformed • Affected by adjacent intense landuse	• None
Impact level	• None	
Hydrology • Intercepting of water flow • Draining of wetland • Destruction of drainage into wetland	• Negligible	

Tower 13 -53

Towers 13 – 15 are located mainly along sugarcane fields. Figure 12 shows the location of the towers 13-53. The area along the towers has been transformed by farming. Sugarcane will need to be cleared to access tower sites. Sugarcane damaged during construction will need to be compensated accordingly. In most area access into tower sites is along existing farm roads. The landscape has a gentle slope. Between towers 24 and 25 bird flight diverters are required as the powerline conductors cross near a wetland, see Fig. 14. The wetland has been transformed by sugarcane and farm tracks. Alien plants grow along the transformed wetland. Some erosion exists along access to towers 28 and 29. Berm construction across the road to is suggested to prevent potential erosion. Driving along the access roads during rainy days may lead to slippery and subsequent erosion. Driving during rainy days is strictly prohibited. Powerline conductor between towers 28 and tower 29 to be fitted with flight diverters as the powerline conductors span across a water body. A cane track crosses the valley where the water flows thus cutting through a water drainage line impacting on the functionality of the watercourse. Between tower 33 and tower 36 a line of trees exists and may need clearing. The trees are mainly alien trees and may be grown as a windbreaker. A few indigenous trees grow along this line of trees. The trees will affect the powerline and they need to be removed. No permits are need to remove the trees. Cutting of the trees should be done is sizeable lengths and stacked neatly and given away to the farmer. Cutting of the trees is to be discussed with the affected farmer. Span between tower 44 and 45, figure15, crosses over a drainage line and is to be fitted with bird flight diverters. Towers 51-52 span across a valley and will need to be fitted with bird flight diverters. Sugarcane plantation end at tower 53 and the powerline between tower 53 and tower 54 span crosses Nseleni river. Tower 53 is located along a slope that drains towards the river. The tower will be located away from the 32m from the river bank. The span between tower 53 and tower 54 is to be fitted with bird flight diverters. It was mentioned that Nseleni river may have crocodiles. Construction workers therefore need to be on

the alert when stringing across Nseleni river. Vehicle crossing should be done across existing bridges. No crossing of river anywhere along the river except along bridges. Table 8 provides a summary of identified impacts between towers 13-53

Highlights

- The contractor is to liaise with ECO and project Ecologist before damaging, disturbing or cutting of the protected Marula Tree for the section between tower 55 and tower 58
- At tower 28 and 29 access is steep from the road. The road is eroded in some places. Berms are recommended to minimise damage to the road. Driving during rainy days is strictly prohibited
- Cutting of trees need to be discussed with the affected farmer
- Span between tower 44 and tower 45 figure 16, crosses over a drainage line with riverine vegetation
- The riverine vegetation is not to be disturbed by stringing of conductor, or driving. Towers 44 and 45 are located away from the buffer zone adjacent to the drainage line
- Fit bird flight diverters between towers 24-25 (crosses a drainage line)
- Span between tower 53 and tower 54 crosses Nseleni River and is to be fitted with bird flight diverters, Fig 17

Towers 13-53

Slope	Gentle slope
Landuse	Sugarcane
Special habitats	None
Protected species	None
Line markers	Fit bird flight diverters between tower 24 and tower 25 line passes near wetland, 28-29 near a wetland, 53-59 crosses stream and near drainage lines
Permit to disturb protected plants species	N/A
Permit to trim/cut disturb protected trees	N/A
Bushclearing	N/A
Heritage	None
House relocation	None
Liaisons with landowners	Undertaken by Eskom Lands and Rights
Access	Available from local farm roads

Table 13 Summary of impacts Towers 13 - 53

Identified potential impact	Causes of potential impacts	Significance of impacts	Ecological sensitivity of the area	Mitigation measures	Effect of mitigation measures
Damage to sugarcane	Damage to cane during construction	Low if damaged cane will be compensated accordingly	None	Minimise damage to disturbed areas	Rehabilitation of disturbed areas will prevent potential erosion
Extending work outside demarcated work area	Extending area of disturbance	Low – Medium	None	Limit disturbance to demarcated work areas	Disturbance to crop and landuse will be limited within demarcated work area
Use of farm roads during rainy season	Excessive use of farm roads	Medium to high	None	Less driving on rainy days	Reduces damages to the road
Entering private property without notifying	Safety threat to contractor and landowner	High	None	Contractor to notify all landowners prior	Lack of notifying may lead to conflicts and

Identified potential impact	Causes of potential impacts	Significance of impacts	Ecological sensitivity of the area	Mitigation measures	Effect of mitigation measures
				to entering private properties	safety issues
Accidental spread of fire	Lack of indicating safe smoking areas	Low – High	None	Contractor to identify and prevent any potential fire hazards	Prevention will prevent damages and liabilities
Clearing ground to weed invasion	Disturbed ground cover will become bare and thus susceptible to weed invasion	Low. Cleared sugarcane area will be planted Servitude and areas around tower bases along plantation will be maintained as tree-free servitude area Eskom will liaise with Mondi about servitude maintenance	None	Areas becoming bare as a result of disturbance during construction need to be cleared of debris and construction material, raked and compacted slightly and rehabilitated accordingly	Disturbed grounds need to be cleared of debris, raked, topsoil applied thinly, raked and compacted slightly. Levelled and slightly compacted grounds will encourage regrowth of grass.

NEFPA 4

The wetland appears as a strip of narrow drainage line. The wetland networks have been intercepted and destroyed by sugarcane plantation. These wetlands presently work as isolated pockets which are rain and run-off fed. The wetland was observed to be significantly dry and not connected. An increasing number of terrestrial plants were observed to grow within the channel of the wetland.



Fig. 12 NFEPA 4

Designation	Type	Specific type	Origin	Status	Area
NFEPA 4 Between tower 21 and 22 28°43'53.92"S 31°55'12.54"E	Indian Ocean Coastal Belt Group 1	Seep	Artificial	<ul style="list-style-type: none"> Modified Intense landuse along adjacent areas has contributed to the status of the wetland 	<ul style="list-style-type: none"> Located along sugarcane plantation Powerline conductor spans parallel to wetland
Aspects	Aspect present	Impacts			
Hydrology <ul style="list-style-type: none"> Intercepting of water flow Draining of wetland Destruction of drainage into wetland 	<ul style="list-style-type: none"> None Dry wetland channel 	<ul style="list-style-type: none"> None Powerline located away from the wetland 			
Typical wetland vegetation	<ul style="list-style-type: none"> Indigenous trees and weeds Adjacent landuse involves intense land cultivation 	<ul style="list-style-type: none"> None Powerline and towers located away from the wetland 			
Direct Human Benefits	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Rare & Endangered Species	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Populations of Unique Species <ul style="list-style-type: none"> Destruction of uniqueness 	<ul style="list-style-type: none"> Low 	<ul style="list-style-type: none"> None 			
Species/taxon Richness <ul style="list-style-type: none"> Change to biodiversity (plant, fauna, and aquatic) and species richness 	<ul style="list-style-type: none"> Low 	<ul style="list-style-type: none"> None 			
Ecological Integrity <ul style="list-style-type: none"> Altering of physical structure Disturbance of wetland intact 	<ul style="list-style-type: none"> Highly transformed Affected by adjacent sugarcane plantation 	<ul style="list-style-type: none"> None 			
Wetland ecological system <ul style="list-style-type: none"> Disruption of the capability of wetland to perform its functions 	<ul style="list-style-type: none"> Highly transformed Affected by intense adjacent landuse 	<ul style="list-style-type: none"> None 			
Issues	<ul style="list-style-type: none"> None 				
Impact level	<ul style="list-style-type: none"> Negligible 				

Span between tower 24 and tower 25

The conductors between tower 24 and tower 25, figure 9, span parallel to an irrigation dam. The span is to be fitted with bird flight diverters. NFEPA 4 wetland appears as a circular wetland. The wetland networks have been

intercepted and destroyed by sugarcane plantation. These wetlands presently work as isolated pockets which are rain and run-off fed. The wetland was observed to be significantly dry and not connected. An increasing number of terrestrial plants were observed to grow within the channel of the wetland.

NFEPA 5

The channelled valley bottom wetland has no output as the connecting drainage has been cut off and destroyed by cultivation of sugarcane. The powerline lies west of the wetland. Tower 24 is situated away from wetland buffer area. A few bush clumps grow sporadically around the wetland



Fig 14 NFEPA 5

Designation	Type	Specific type	Origin	Status	Area
NFEPA 5 Between tower 24 and 25 28° 43'39.39"S 31° 54'50.38"E	Indian Ocean Coastal Belt Group 1	Flat	Artificial	<ul style="list-style-type: none"> Moderately modified Intense landuse along adjacent areas has contributed to the status of the wetland 	<ul style="list-style-type: none"> Located along sugarcane plantation Powerline conductor spans parallel to wetland Access to towers is away from wetland
Aspects	Aspect present		Impacts		
Hydrology <ul style="list-style-type: none"> Intercepting of water flow Draining of wetland Destruction of drainage into wetland 	<ul style="list-style-type: none"> Water is available Water bounded within wetland No sign of inlet and outlet drainage lines It is artificial water impound 		<ul style="list-style-type: none"> None Powerline runs past the wetland No access to be used near the wetland 		
Typical wetland	<ul style="list-style-type: none"> Scanty, indigenous and 		<ul style="list-style-type: none"> None 		

vegetation	<ul style="list-style-type: none"> modified Clump of trees grow along edge of wetland Natural habitat replaced by sugarcane 	<ul style="list-style-type: none"> Powerline and towers located away from the wetland
Direct Human Benefits	<ul style="list-style-type: none"> Potential use for irrigation 	<ul style="list-style-type: none"> None
Rare & Endangered Species	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None
Populations of Unique Species <ul style="list-style-type: none"> Destruction of uniqueness 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None
Species/taxon Richness <ul style="list-style-type: none"> Change to biodiversity (plant, fauna, and aquatic) and species richness 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None
Ecological Integrity <ul style="list-style-type: none"> Altering of physical structure Disturbance of wetland intact 	<ul style="list-style-type: none"> Low 	<ul style="list-style-type: none"> None
Wetland ecological system <ul style="list-style-type: none"> Disruption of the capability of wetland to perform its functions 	<ul style="list-style-type: none"> Highly transformed Affected by intense adjacent landuse 	<ul style="list-style-type: none"> None
Issues	<ul style="list-style-type: none"> None 	
Impact level	<ul style="list-style-type: none"> Negligible 	

Span between tower 44 and tower 45 – Flight diverters

The span between tower 44 and tower 45, figure 15 runs over a drainage line with riverine trees along the edge of the drainage line. No tree is to be cut or trimmed in order to prevent potential erosion along riverine vegetation protecting the riparian area. Bird flight diverters to be fitted between tower 44 and tower 45. Birds often use riverine habitats for foraging.

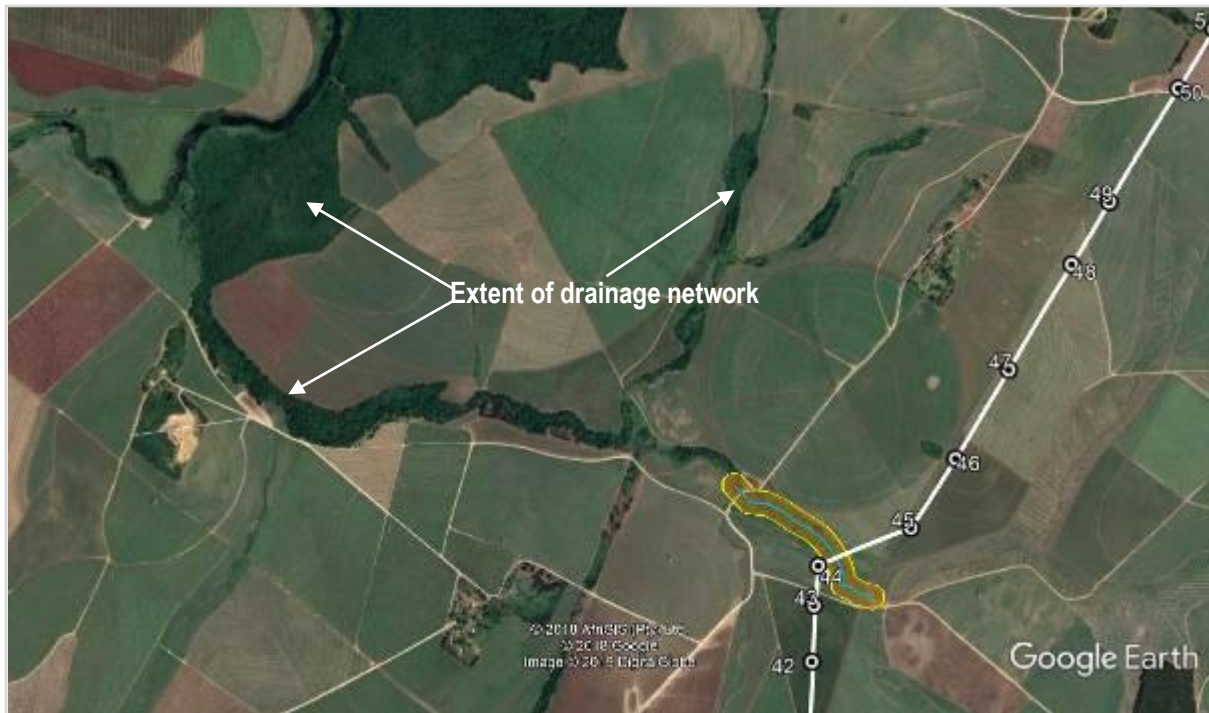


Fig 15. Span across drainage line between towers 44 & 45. No unnecessary cutting to be done to the trees along the drainage line

<p>44 & 45</p>	<ul style="list-style-type: none"> • The powerline spans across the drainage line between towers 44 and 45 • No vegetation observed along the buffer of the drainage line • Adjacent area is used for cultivating sugarcane • The extent of the drainage line has been disconnected from drainage network by sugarcane and local roads mostly on the south-east of the drainage line • The north-west of the drainage line is connected to the drainage network extending west 	
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Span between towers 53-54 – Aviation markers

Figure 16 shows the span between towers 53 and 54 running across Nseleni Rivers. No clearing or disturbance of the trees/riverine vegetation along 32m of riparian area is to be done. Effort should be applied when stringing to avoid damaging riparian vegetation. Trees protect riparian areas and thus protect the river system. The span is to be marked with aviation spheres to make the powerline visible to planes as planes navigate down river ways.

Spans across drainage lines

Figure 16 shows spans between towers 51-58 crossing over drainage lines and NFEPA wetland. Damage to riparian areas adjacent to drainage lines is prohibited. No damage will occur along the drainage lines as a result of locating towers and stringing the conductor.

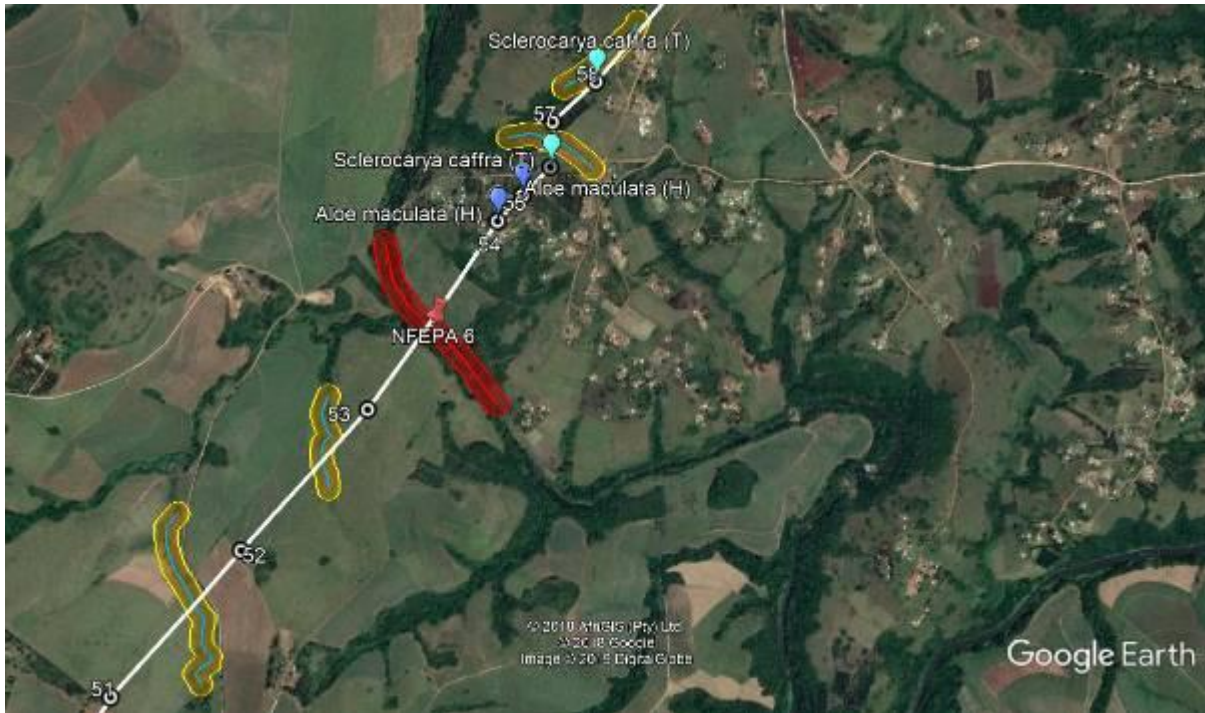


Fig. 16 Showing towers between tower 51 – 59 crossing drainage lines

Span between Towers 53 and 54 NEFPA 6 Nseleni River



The powerline servitude crosses the Nseleni River perpendicularly. The river, also classified as NEFPA in order to offer rivers legal protection. Water flow in the river is permanent. Riverine vegetation dominates the buffer areas along the banks of the river. The powerline spans across the river. There will be no disturbance to riverine/riparian vegetation. Protected aloe plant between tower 53 and 54 should be relocated. The span between tower 53 and 54 enters KwaBhejane tribal area. Protected aloe plant and protected Marula tree exist between towers 53 and 57. Aloe plant should be relocated and not destroyed. Care should be taken to avoid disturbance to the Marula tree during stringing of the conductor where possible.



Fig 17 NEFPA 6 Nseleni River

Designation	Type	Specific type	Origin	Status	Area
NEFPA 6 Between tower 53 and 54 28°40'35.90"S 31°57'47.75"E	Indian Ocean Coastal Belt Group 1	Floodplain Wetland	Natural	<ul style="list-style-type: none"> Intact Riparian vegetation covers the river buffer area Adjacent landuse has minimal impact on the status Water flows through river channel 	<ul style="list-style-type: none"> Tower 53 and tower 54 are located away from Nseleni River and its buffer area Access to towers is away from the river
Aspects	Aspect present	Impacts			
Hydrology <ul style="list-style-type: none"> Intercepting of water flow Draining of wetland Destruction of drainage into wetland 	<ul style="list-style-type: none"> Water flow is fairly throughout all seasons Flow of water is permanent 	<ul style="list-style-type: none"> None The powerline will be strung over the drainage line 			
Typical wetland vegetation	<ul style="list-style-type: none"> Fairly thick vegetation along riparian area Mostly indigenous 	<ul style="list-style-type: none"> None Towers located away from the wetland and its buffer area The powerline will be strung over the trees 			
Direct Human Benefits	Water used for	<ul style="list-style-type: none"> None 			

	irrigation and other extraction needs	
Rare & Endangered Species	<ul style="list-style-type: none"> Moderate 	<ul style="list-style-type: none"> None
Populations of Unique Species <ul style="list-style-type: none"> Destruction of uniqueness 	<ul style="list-style-type: none"> Fairly moderate 	<ul style="list-style-type: none"> None
Species/taxon Richness <ul style="list-style-type: none"> Change to biodiversity (plant, fauna, and aquatic) and species richness 	<ul style="list-style-type: none"> Moderate 	<ul style="list-style-type: none"> None
Ecological Integrity <ul style="list-style-type: none"> Altering of physical structure Disturbance of wetland intact 	<ul style="list-style-type: none"> Moderate-High 	<ul style="list-style-type: none"> None
Wetland ecological system <ul style="list-style-type: none"> Disruption of the capability of wetland to perform its functions 	<ul style="list-style-type: none"> Intact 	<ul style="list-style-type: none"> None
Issues	<ul style="list-style-type: none"> None 	
Impact level	<ul style="list-style-type: none"> Negligible 	

51 & 52	<ul style="list-style-type: none"> The powerline spans across the drainage line between towers 51 and 52 The section of the drainage line crossed by the powerline has scant trees growing along the riparian area The area is used for cultivating sugarcane The extent of the drainage line has been disconnected from drainage network by sugarcane and local roads 	
52 & 53	<ul style="list-style-type: none"> The powerline spans across the drainage line between towers 52 and 53 The section of the drainage line crossed by the powerline has scant trees growing along the riparian area The extent of the drainage line has been disconnected from drainage network as a result of cultivated lands The adjacent area is used for cultivating sugarcane 	

KwaBhejane Tribal area

Towers 54 – 70 special conditions

Figure 18 shows the location of towers 54-70. These towers are located within KwaBhejane tribal area. The tribal area is predominantly characterised by rural homesteads and subsistence farming. The area is characterised by rural settlement and is intercepted by pockets of open spaces between houses, open spaces spread mainly along west of the tribal area. The western area is characterised by hilly terrain. The powerline route traverses undulating terrain and areas with slopes within small catchments. The route crosses streams, rivers and drainage lines. The route also traverses in between homesteads. Access is available from local tracks and roads. Access along terrain with slopes is to be done along contour lines. No signs of erosion were observed along the powerline route. Relocation of houses is imperative due to safety requirements. Protected species were observed at some towers. Protected succulent plants are recommended to be relocated and replanted away from work area. Underground protected bulb species are able to regrow in the following growing season in the instance of them being damaged during construction. Because of the ability to regrow it was recommended by the project ecologist that there is no need to dig up the protected bulbs for relocation and replanting. However, application to disturb the underground protected bulbs is done with the relevant authority. Relocation of houses will require liaisons with local community structures such as the traditional council, local indunas and the affected owners. Proof that discussions including agreements or further clarification regarding the relocation process with affected landowners and local community structures is to be made available when requested. Tower 54, first tower on tribal area is situated on the northern bank across Nseleni River. Tower 54 is situated above 32m riparian buffer and will therefore not impact on the riparian area. Figure 18 and 19 shows a span between towers 53-54 over Nseleni River, which is to be fitted with aviation spheres to make the conductors visible to aeroplanes applying herbicides to sugarcane. Table 14 shows summary of impacts between tower 54-70.

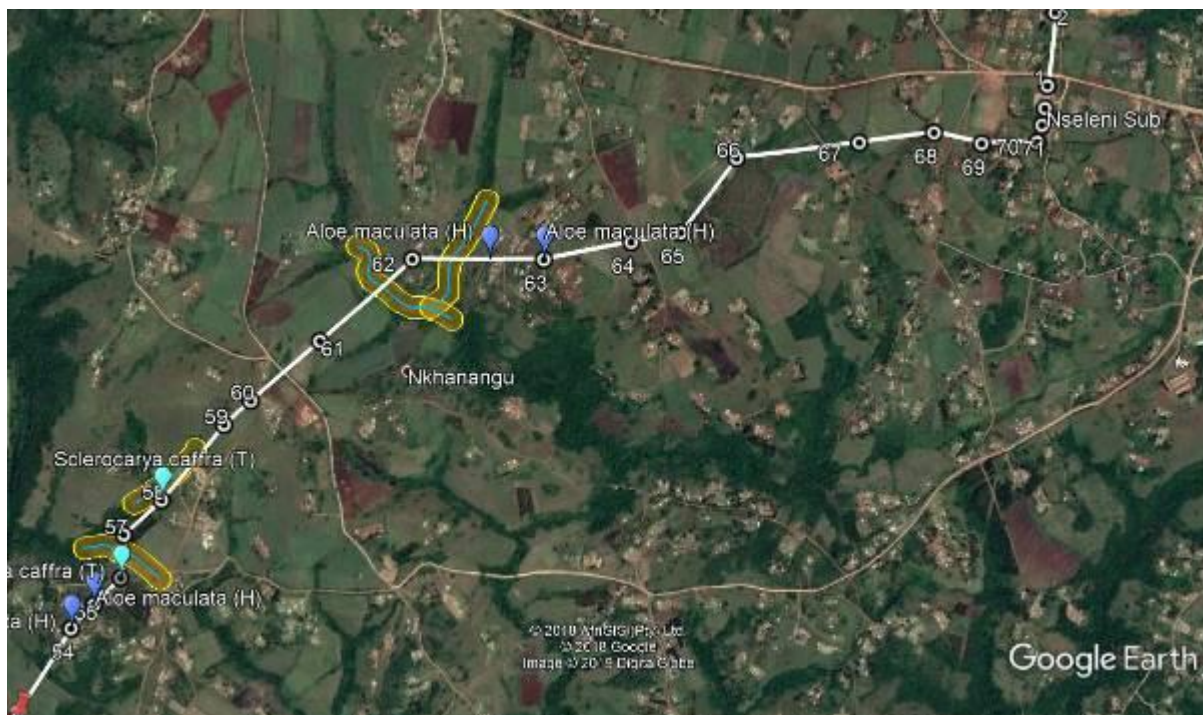


Fig. 18 Showing towers 54-70 before Nseleni substation

Highlights

- The span crosses drainage lines. No cutting is to be done
- Marula trees exist between tower 55 to tower 58. Where possible avoid cutting the protected trees. Where cutting is unavoidable consult the project ecologist and ECO

- For every cut protected tree, the license from DAFF stipulates that three locally suitable indigenous trees are to be planted within locations which will ensure successful establishment and long-term survival. Planting of the indigenous trees is to be discussed with local structures such as induna and traditional council.
- Span between tower 61 and tower 63 cross over drainage line. The span should not disturb the riparian area
- Towers with specially protected plant species can be disturbed or cut as per permit from Ezemvelo KZN Wildlife. Where possible avoid disturbing specially protected species. Where it is unavoidable to damage, disturb or cut, damage, disturbance or cutting should minimal
- No cutting of trees growing within 32m of the edge of riparian areas of drainage line, river course, natural and man-made dams and within 500m from the edge of a wetland

Table 14 Summary of impacts Towers 54-70

Identified potential impact	Causes of potential impacts	Significance of impacts	Ecological sensitivity of the area	Mitigation measures	Effect of mitigation measures
Disturbance to protected underground bulbs	Digging for tower foundations.	Low because only a few bulbs will be affected by digging the tower foundation in comparison to the number of bulbs occurring per tower area and surrounding. The tower foundations will occupy a small area	None because the habitat and substrate where the plants are occurring is not disturbed.	Minimise damage to disturbed protected areas	Only a few bulbs will be affected by digging Limiting disturbance to work area will prevent disturbance of bulbs outside the work area Bulbs will grow in the following growing season
Disturbance to herbaceous protected plants	During driving, walking, placing heavy equipment and digging	Low because only a few plants will be affected in comparison to the rest of the plants growing on the disturbed site and immediate surrounding area Permit to disturb has been sought with relevant provincial authorities	None. The habitat where the species are growing is not disturbed	Application for disturbance has been done with relevant authority	Only a few protected plants will be affected
Disturbance to protected tree species	Driving along access roads	Low because protected trees occur along access to tower bases The tree can be avoided by locating access away from the protected trees or trimming the extended branches	None	Avoid or trim extended branches where avoiding the protected tree is not possible A few trees may be affected Permit to disturb the trees lodged with relevant authorities	Disturbance to protected trees will be minimised
Access along terrain with slopes	Driving upslope or vertical leading to potential erosion	Low as driving upslope is restricted along contour lines minimising potential erosion	Carving of roads and excessive driving can lead to erosion	Minimise excessive driving, only when delivering material and	Limiting driving upslope and driving during dry days will minimise

Identified potential impact	Causes of potential impacts	Significance of impacts	Ecological sensitivity of the area	Mitigation measures	Effect of mitigation measures
				driving is to be kept to a minimum Towers located upslope to be built manually No carving of access tracks along slopes Driving to be done during dry days	damage along the slope. Vegetation will regrow along vehicle tracks once driving is stopped
Cutting of indigenous trees which affect conductors	Trimming of indigenous trees at some places is needed	Low. Only trimming will be done No cutting of trees will be done creating bare patches exposing the bare ground to weed invasion	Some of the trees grow along drainage lines and protect the banks of the drainage lines Trimming of extending branches will not disturb the drainage line as no cutting or uprooting of the tree will be done	Only trimming of extending branches Application to disturb indigenous trees in a canopy has been done with relevant authority	Trimming will minimise damage to the tree and will ensure the presence of the tree in the canopy thus protecting the drainage line
Locating towers on sugarcane	Damage to sugarcane	Low if consent to disturb is sought and received	None	Liaisons with the farmer is important Consent to damage sugarcane should be sought Compensation process should be discussed with the farmer	Liaisons with the farmer and getting consent to damage sugarcane will prevent conflict which might affect the project

Span between tower 54 and tower 57

Tower 54 is located on a slope draining towards Nseleni river. Stringing of the conductor will not impact on the riparian area. Tower 54 is located on top of hill near a dilapidated house. The dilapidated house will need to be demolished as it is within the powerline servitude. Ground cover consist of open grasslands. A few aloes grow scattered along the open grasslands. Any affected aloes will need to be relocated to another area. Permit to relocate them will be sought from the relevant authority. It is unlawful to cut or relocate aloes without proper permits as aloe species are protected. Access is available through local tracks in between rural houses. The site is characterised by low biodiversity. There are rock outcrops near tower 54 indicating existence of sub-terranean rocks. The powerline spans over drainage line between tower 56 and 57. Protected aloe plant and protected Marula tree may be affected by the stringing of the powerline. The aloe plant should be relocated and care must be taken to avoid or minimise disturbing Marula tree.

54- 57	<ul style="list-style-type: none"> • <i>Aloe maculata</i> (H) (Common Soap Aloe) at T54, T55 • <i>Sclerocarya caffra</i> (T) (Marula), T56 • Permits to disturb both protected plants and tree have been obtained 	
56-57 & 58-59	<ul style="list-style-type: none"> • The drainage lines crossed by spans from tower 56 to tower 59 form part of drainage system that fed water into Umsunduzi River • The section of the drainage lines spanned by the powerline has trees growing along the buffer of the drainage line • Tower 57 is located within a eucalyptus stand • The extent of the drainage line 	

Towers 54-70

Slope	Gentle slope
Landuse	Rural settlement with homesteads and open areas. Ploughed, fallow fields and grazing fields
Special habitats	None
Line markers	
Protected plant species	Tower 54; 62;
Permit to disturb protected plants species	To be sought with relevant authority
Permit to trim/cut disturb protected trees	Tower 56; 58; 69; 70;
Bushclearing (canopy and alien trees)	Eucalyptus at tower 57; 66-67 and 67-68
Heritage	None
House relocation	Demolish a dilapidated house near tower 54; to relocate a dwelling or homestead between towers 56 and 57; between tower 62 and 63
Line markers	Fit bird flight diverters between towers 62-63;
Heritage sites	
Cultural sites	Grave near tower 56;
Fencing needed to protect graves	
Liaisons with tribal structures	For the overall project on the tribal area yes For the tower there is no need
Access	Available from local roads

Span between tower 54 and tower 56

Figure 19 shows that tower 54 is located next to a kraal but away from it. While tower 55 is located close to a platform for building which is privately owned. The platform will be affected by the location of the tower and crossing of the servitude over the house. Levelling of the existing access track and ensuring that the protected plant species are not affected, the project ecologist must monitor the creation of the track and also inspect it. To prevent scouring or erosion the cut access track needs to be compacted and its edge slanted slightly to prevent collapse of the of the edge which can lead to erosion.



Fig 19 Shows Span between towers 54 & 56

Tower 56

Figure 20 shows tower 56 located within a bushy area overlooking a local road. A transmission powerline runs diagonal to the proposed powerline. Tower 56 is located within Marula seedlings. Care is to be exercised to minimise clearing a great number of Marula seedlings. Project ecologist to monitor the clearing of Marula seedlings. Aloe plants exist at tower 54 and tower 55. The plants should be relocated and planted away from the work area. There is a pile of stones, indicating a grave site some distance from tower 56. However, the grave site is located away from the tower position, servitude and work area. The grave site will not be affected by the establishment of the tower base and stringing of conductor. It is recommended that fencing of the grave site be discussed with local induna and affected family. Accessing the site, establishing of the tower foundations, erecting of the tower and working within the tower radius will not affect the graves.

Tower 57

Access to tower 57 needs to be created. Compensation for loss of timber is to be negotiated with the owner of the timber. Affected eucalyptus trees are to be cut and chopped into sizeable wood pieces and stacked neatly without blocking movement of livestock or people or vehicles. Nearby families can be told to use the wood for fire.

Span between tower 56 and tower 57

Figure 20 shows part of the servitude traverses across a homestead. A house within the homestead needs to be relocated. Eskom Holdings SOC is negotiating with the homestead owner about the affected dwelling. Bushclearing required at tower 57

- Road deviation
- Transmission line

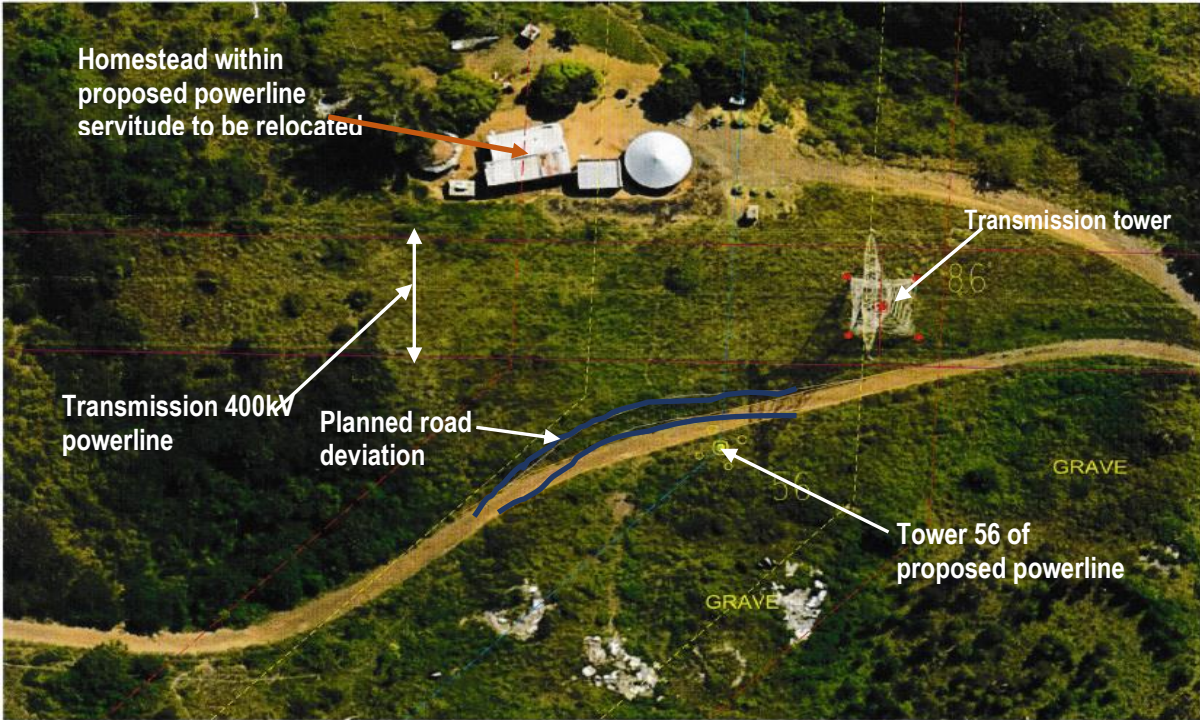


Figure 20 Shows Planned road deviation, proposed powerline servitude and Transmission 400kV powerline



Fig. 21 Drainage line, crossing existing powerline and homestead

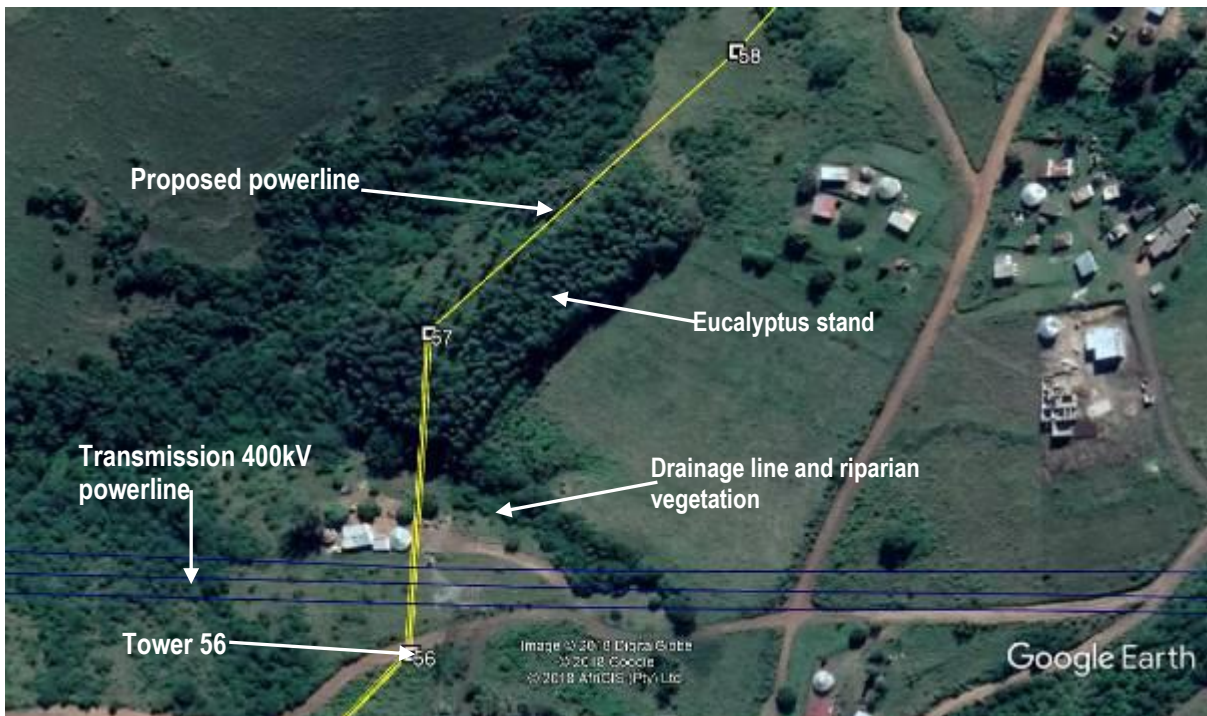


Fig. 22 Shows tower 56, drainage line and eucalyptus stand



Fig. 23 Shows meeting with Induna Mr Mthethwa, yellow T-shirt discussing proposed road deviation

Road deviation

Figure 20 shows location of tower 56, located south of Nseleni substation and within KwaBhejani tribal area, will have one of its legs sitting on the local road. The deviation of the local road was discussed with the local induna (yellow t-shirt), Mr Mthethwa, figure 21. Mr Mthethwa accepted the explanation of the need to deviate the road in order for the exiting road to accommodate the tower leg. Informing the local community and traditional council was also mentioned.

One of the legs of tower 56 sits on the existing farm road. It has not been possible to technically relocate the tower position. It was then suggested that this section of the road be deviated, see Fig.19. Deviation of the road is proposed to be done in order to accommodate the tower leg. Reporting the deviation to the local community and to the traditional council was also discussed and induna will provide input. The deviation will be located along a terrain with a slope and hence construction of berms and gabions and outlet drains to retain the road and prevent potential erosion will be implemented as stipulated in the project design specification.

Disturbance to Marula trees

There are Marula seedlings at tower 56. It is recommended that a tall Marula tree within the tower base work be avoided, if possible. The work area is to be demarcated and disturbance limited within the demarcated work area. Disturbance to Marula seedlings should also be avoided to minimise the number of disturbances to protected Marula trees. The permit to disturb Marula trees from Department of Forestry and Fisheries (DAFF) permits disturbance to 12 Marula trees along the entire length of the powerline.

Relocation of a homestead

A homestead exists below tower 56, located between tower 56 and the drainage line. The homestead is located within the proposed servitude. Relocation of the homestead has been discussed with owner. Local structures have been contacted for the relocation.

Cutting of Eucalyptus trees

A relatively small eucalyptus stand grows north-west of the homestead situated within the proposed powerline servitude. The owner of the Eucalyptus stand was consulted about cutting of the trees to accommodate tower 57 and the servitude. Compensation for cutting of trees and loss of use of land as a result of the height of the trees was explained to the owner. Packing and locating of cut logs is to be discussed with the owner.

Towers 57 and 58



Tower 57 within a eucalyptus stand. Compensation for loss of commercial trees has been discussed with the owner. Tower 58 is located near the edge of the drainage line.

Tower 58

Tower 58 is located on a site within open grasslands with short low and sparse bush. Grass grows in clumps and is short indicating over grazing and/or rampant fires. The site is located on a steep slope. A Marula tree grows on the site. Permit to disturb the Marula tree has been obtained. Care should be taken to minimise or avoid damage to the protected Marula tree where possible. Access is available from local roads.

Tower 59

Tower 59 is located on a hill which is covered by Ngongoni grass, bristle grass a sign of intense grazing. A few woody species occur within the site. Rock outcrops appear above ground at the top of the hill indicating presence of rocks beneath the ground. A few protected species grow at the tower site and will require a permit to disturb or relocate from relevant authority.

Tower 60

Tower 60 is on the same hill as tower 59. Ngongoni grass dominates the vegetation on the site. Access to the tower driving should be kept along the contour line located under the existing 11kV powerline. There is enough clearance under the 11kV powerline for construction vehicle to be driven under the powerline. Access to the site up the slope is to be kept along contour lines.

Tower 61

Tower 61 is located within burnt sugarcane. Contractor to liaise with owner of sugarcane field to locate tower within cane field.

Tower 62

Tower 62 is positioned on open grassland. Ngongoni grass grows predominantly within the site indicating intense grazing. Aloes were found to grow along access to tower 63. Care to be taken to avoid or minimise disturbance to the aloe plants. The tower is located opposite a house but at a safe distance from the house. A row of trees forms a hedge at the edge of the site indicating possibly an old homestead. A clump of bush grows left of the tower site. Access is clear and available from local road and tracks. To disturb or relocate aloes a permit should be sought from relevant authority.

Tower 63

Tower 63 is located on a hill. Ground cover is dominated by grassland and aloes. Access into the site is by driving along a contour line along the slope. Rock outcrops are scattered at the top of the site.

Span between towers 61-63

The powerline spans across a watershed and bird diverters need to be fitted. No riverine trees within 32m riparian boundary area are to be cleared. Aloe plants grown along access to tower 63 and at tower 63. Aloe plants are to be relocated and replanted away from the work area.



The drainage lines crossed over by the powerline are part of the drainage system supplying water to Umsunduzi river. Houses located east of the drainage lines has intercepted the extension of the drainage lines. Whiles sugarcane fields have destroyed the drainage lines. Protected plants were identified along acceee and at towe 63

Tower 64-66

Towers 64-66 are located within sugarcane field. Access is available from local roads. Tower 65 is located near a 11kV woodpole powerline within sugarcane field however at a safe distance from the 11kV powerline.

Tower 67

Tower 67 is located in an open grassland near eucalyptus woodlot. The grass is short indicating heavy grazing. Access is along local roads.

Servitude between tower 66- 67 and between 67-68

There is bush growing between towers 66-67 and between towers 67-68, figure 24, which may require trimming. No permit is required.



Fig. 24 Bush to be cleared between tower 67 and 68

Tower 68

Tower 68 is located within a private yard. Access into the yard should be discussed with the property owner.

Tower 69

Tower 69 is located on open grassland. Ngongoni grass covers the site. A few protected species grow within the site. Disturbing protected plant species require a permit which has been sought from relevant authority.

Tower 70

The site for tower 70 is characterised by wet area indicated by hygrophilous grasslands. A protected plant was observed at the tower and may be disturbed during construction. A permit to disturb protected plants has been received from relevant authority.

Tower 71

Tower 71 is situated a few meters and south of Nseleni substation along scrub bush. Trees are scattered within the site area. The site has a gentle slope. Access is from local tracks.

11.2 Nseleni substation to Mtubatuba substation Towers 1(72) – 153(234)

The towers between Nseleni and Mtubatuba Substations are located within KwaBhejane tribal area. The area is characterised small scale sugarcane, grazing lands, fallow lands and rural homesteads. There is no formal spatial planning. Towers are mostly placed along open area. Relocation will be done where houses are within the servitude. Relocation of houses should involve not only the owner of the dwelling but also the local induna and the tribal authority must be informed. Ground cover comprises predominantly of grass. The area has been transformed from grasslands to bush encroachment. Bush and trees grow in small or dense pockets. In some areas bush clumps and trees occur in isolated pockets of protected plants species. Grasslands are overgrown with bush and weeds. Some of the trees making up the bush are protected and some form a canopy. The canopies are relatively small in extent. Due to high transformation biodiversity is low. Construction of the powerline will not cause significant disturbance to the present vegetation, landuse and homestead setup. Permit to disturb or destroy protected plant or tree species will be sought from relevant authorities. Offsetting of lost protected tree species is to be implemented as per recommendations in the licence and is to be discussed with the local tribal authority.

Highlights

- The contractor to liaise with ECO and project Ecologist before damaging, disturbing or cutting of the protected Marula Tree for the section between tower 89(160) and 92(163).
- For every cut protected tree, the license from DAFF stipulates that three locally suitable indigenous trees are to be planted within locations which will ensure successful establishment and long-term survival. Planting of the indigenous trees is to be discussed with local structures such as induna and traditional council.
- Towers with specially protected plant species can be disturbed or cut as per permit from Ezemvelo KZN Wildlife, attached Appendix F. Where possible avoid disturbing specially protected species. Where it is unavoidable to damage, disturb or cut, damage, disturbance or cutting should minimal
- No cutting of trees growing within 32m of the edge of the watercourse (edge of the bank) such as drainage line, river course, natural and man-made dams and within 500m from the edge of a wetland

Table 15 Aspects for towers 1(72) to 152(223)

Slope	Undulating and hilly slopes
Landuse	Rural settlement with homesteads and open areas. Ploughed, fallow fields and grazing fields
Special habitats	None
Protected species and permit to disturb, relocate protected plants species	Present at towers 69 & 70; 14(85); 17(88); 30(101) and 31(102); Tower 35-36 (106-107); 35 (106) and 36(107); 38(109); 39(110); 48 (119); 50(121); 51(122); 53(124); 55(126); 58(129); 60(131); 66(137); 70(141); 71(142); 78(149); 79(150); 86(157); 88(159); 93(164); 95(166); 96(167); 97(168); 98(169); 99(170); 100(171); 104(175); 105(176); 106(177); 107(178); 109(180); 110(181); 111(182); 114(185); 116(187); 118(189); 119(190); 120(191); 121(192); 122(193); 123(194); 124(195); 126(197); 127(198); 128(199); 131(202); 132(203); 133(204); 134(205); 135(206); 143(214); 145(216); 150(221); 152 (223)
Permit to trim/cut disturb protected trees	Required at tower 58; 24(95); 42(113); 66 – 68; 82(153); 83(154); 84(155); 88(159); 89(160); 91(162); 92(163);
Cutting canopy trees	Span between towers 5(76) and tower 6(77); 12(83) and 13(84); entrance into 39(110), 45(116)
Bird flight diverters	Fit bird flight diverters at towers 62-63; 5(76)-6(77); 8(79)-9(80); 12(83) – 13(84); 32(103) and 33(104); 40(111)-41(112); 51(112); 53(124)-54(125); 77(148)-78(149); 83(154)-84(155); 112(183)-113(184); 123(194)-124(195); 140(211)-141(212); 145(216)-146(217); 146(217)-147(218)
Aviation spheres	Fit aviation spheres between towers 20(91) and 21(92)
Heritage	None

Cultural	Graves like structures to be fenced near tower 87(158); 92(163); 96(167); 113(184); 121(192); Place of worship to be moved near tower 124(195); 130(201);
House relocation	Required between towers 2(73) and 3(74); 109(180) and 110(181);
Access into site	Fit berms on existing access road to access towers 42(113) and 43(114); fix road edge tower 52(123)
Consent to enter properties	Required at tower 6(77)
Access	Available from local roads Driving in hilly areas suggested to take place along contour lines
Liaisons with tribal structures	For the overall project on the tribal area yes For the tower there is no need
Special feature	Tower 67(138) on a soccer field. Eskom and contractor to suggest levelling a new soccer field with local induna Place sandbags below tower 116(187) Fit berms at edge of tower 117(188)

Table 16 Summary of Towers 72 to 223

Identified potential impact	Causes of potential impacts	Significance of impacts	Ecological sensitivity of the area	Mitigation measures	Effect of mitigation measures
Relocation of houses along the powerline route	Lack of liaison with affected homesteads and receiving necessary approvals Lack of proper relocation signed agreements may lead to delays on the project	Low. Good consultation and receipt of signed consent papers may help fast track the project	None	Involving local induna as mediator and help with the discussion on relocation may help fast track the discussion	Received consent to relocate will facilitate construction of the powerline
Disturbance to sugarcane by locating towers within active sugarcane	Poor consultation and lack of clarity on the compensation process	May delay the project	None	Receiving consent from owner of the crop to disturb the crop Filling the consent records and informing local induna about the consent from the owner of sugarcane	Will fast track the project, prevent conflict and project delays
Lack of liaising with homestead owners or cultivated fields for access through homestead and field properties	Lack of communicating for access through private property may lead to conflict and delay on the project	Low if liaison with owners of homesteads is done and consent to access their properties is sought and received	None	It is recommended that local induna is informed about access through private properties and liaisons with affected homestead owners done Consent from homestead	Effective liaison even with local community structures will help with construction of the powerline

Identified potential impact	Causes of potential impacts	Significance of impacts	Ecological sensitivity of the area	Mitigation measures	Effect of mitigation measures
				owners must be noted and filed appropriately	
Not fitting bird flight diverters and aviation spheres along conductors spanning across streams or rivers	Collisions of birds with conductors	Low. Bird flight diverters increase the visibility of the conductors along common flight paths especially during low visibility	None	Fitting aviation spheres across Umfolozi river has been recommended	Better visibility of the conductors will prevent potential collisions with the birds which are often fatal to the birds and may disrupt supply of power
Disturbance to herbaceous protected plants	During driving, walking, placing heavy equipment and digging	Low because only a few plants will be affected in comparison to the rest of the plants growing along the disturbed site and immediate surrounding area Permit to disturb has been sought with relevant provincial authorities	None. The habitat where the species are growing is not disturbed	Application for disturbance has been done from relevant authority	Only a few protected plants will be affected
Disturbance to protected tree species	Driving along access	Low because protected trees occur along access to tower bases The tree can be avoided by locating access away from the protected trees or trimming the extended branches	None	Avoid or trim extended branches where avoiding the protected tree is not possible A few trees may be affected Permit to disturb the trees lodged with relevant authorities	Disturbance to protected trees will be minimised
Non-installation of berms along steep access road to tower position	Slippery and potential erosion and scouring of the road	Low. Impact will be reduced if berms and outlets drains are constructed along the steep access road to channel run-off off the road and thus prevent slippery and erosion during driving	None	Construction of berms is recommended	Prevent erosion and scouring
Presence of graves	Potential disturbance to grave sites during construction			Graves are to be fenced to prevent work extending to the grave site Fencing of the grave to be discussed with the family of the	Discussing fencing of the graves in order to protect them will minimise damage and will provide guidance form the family

Identified potential impact	Causes of potential impacts	Significance of impacts	Ecological sensitivity of the area	Mitigation measures	Effect of mitigation measures
				grave site and consent must be sought and received	how they prefer the fencing to be done
Access along terrain with slopes	Driving upslope or vertical leading to potential erosion	Low as driving upslope is restricted along contour lines minimising potential erosion	Carving of roads and excessive driving can lead to erosion	Minimise excessive driving, only when delivering material and driving to the tower site to be kept to a minimum Towers located upslope to be built manually No carving of access tracks along slopes Driving to be done during dry days	Limiting driving upslope and driving during dry days will minimise damage along the slope. Vegetation will regrow along vehicle tracks once driving is stopped

Tower 1 (72)

Tower 1 (72) is an existing tower. The tower is located outside the substation yard, along a sugarcane patch. The tower is next to existing powerline. Figure 18 shows location of tower 1(72) and tower 2(73).

Tower 2 (73)

Tower 2 is an existing tower and will be replaced by a taller tower.



Fig. 25 Shows existing towers 1(72) and 2(73) and Nseleni substation

Tower 3 (74)

Figure 26 shows tower 3 (74) sits on private property and a house will be affected by the tower and the powerline route. The house will be relocated and existing house will be demolished. The tower is located near an existing 132kV tower. The site has a gentle slope. Access is available from local road. Biodiversity on site is low due to transformation of the site

Bird flight diverters on span between towers 2 (73)-4(75)

Powerline conductors between towers 2-4 across fallow cane field. The site has a gentle slope. The conductors will run parallel to a man-made open waterbody. Bird flight diverters need to be fitted along the span.



Fig. 26 Shows servitude over a homestead near tower 3(74)

Relocation of houses between towers 2(73) and tower 3(74)

The conductor will run over a house, which needs to be relocated. Negotiations to relocate the house to be discussed with the owners. Figure 24 shows servitude between tower 2(73) and 3(74) going over part of a homestead.

Tower 4 (75)

Tower 4 (74) is situated on fallow sugarcane field with secondary grasslands. The area has a gentle slope. Access is from a local road.

Tower 5 (76)

Tower 5 (76) is located on active sugarcane field. The contractor and Eskom Holding needs to talk to the respective owners of both canefields for approval or consent to locate the towers and disturb sugarcane. The sugarcane owner must be informed that the field can still be used for planting cane. Biodiversity density is poor due to transformation of the sites from natural state to monoculture or due to intense grazing.

Tower 6 (77)

Tower 6 (77) is standing along an open field area infested with weeds. The tower is parallel to an existing 11kV powerline. The field belongs to a local person whose consent to locate the tower has to be sought prior to locating the tower. Access into the field is from local road.

Span between towers 5(76)-6(77)

Figure 27 shows powerline conductors suspend adjacent to a drainage line and bird flight diverters need to be fitted along the span. The towers are located beyond the buffer area of the drainage line. No clearing of trees within buffer area.



NFEPA 7 and NFEPA 8

The wetland is part of the river network comprising of drainage lines and streams. Bush grows sporadically along the buffer area of the wetland area. The powerline crosses over the wetland. NFEPA 7 wetland drainage line appears in a form of a drainage line lined by clumps of bush. The bush helps to cover the edge or buffer zone of the wetland drainage line. The drainage is part of the drainage network in the area. However, the extent of NFEPA 7 drainage line has been intercepted by roads and houses. The wetland is connected to a river network. However, at certain points the network is intercepted by houses and roads cutting off water flow. Due to disturbance to the flow of run-off downslope most of the wetlands are rain fed and partly fed by adjacent slopes.



Fig 27 NFEPA 7 & NFEPA 8

Flight diverters

Figure 27 shows powerline span between tower 8(79) and 9(80) spanning over a drainage line and over buffer area of the drainage line with trees growing along the buffer area. The tower positions are outside the buffer area of the drainage line. It is recommended that the section of conductor be fitted with bird flight diverters. No clearance of trees at tower 10(81).

NFEPA 7

Designation	Type	Specific type	Origin	Status	Area
NFEPA 7 Between tower 8(79) and 9(80) 28°38'42.18"S 31°59'12.76"E	Indian Ocean Coastal Belt Group 1	Channeled Valley Bottom Wetland	Natural	<ul style="list-style-type: none"> • Low • Cultivated fields adjacent to the wetland has affected the status 	<ul style="list-style-type: none"> • The wetland is part of the drainage system of Mbabane river • Powerline spans across wetland part of the Mbabane river system • Access to towers is away from the wetland
Aspects	Aspect present	Impacts			
Hydrology <ul style="list-style-type: none"> • Intercepting of water flow • Draining of wetland • Destruction of drainage into wetland 	<ul style="list-style-type: none"> • No channelled water flowing along the channel of the wetland • Drain could be fed by rain • The drainage line has been intercepted and appears disconnected from previously connected drainage lines 	<ul style="list-style-type: none"> • None • The powerline runs over the drainage line 			
Typical wetland vegetation	<ul style="list-style-type: none"> • Riparian vegetation grows scantily along the edge of the drainage line 	<ul style="list-style-type: none"> • None • The powerline will be strung over the trees • Towers are located away from the buffer area 			
Direct Human Benefits	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 			
Rare & Endangered Species	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 			
Populations of Unique Species <ul style="list-style-type: none"> • Destruction of uniqueness 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 			
Species/taxon Richness <ul style="list-style-type: none"> • Change to biodiversity (plant, fauna, and aquatic) and species richness 	<ul style="list-style-type: none"> • Low 	<ul style="list-style-type: none"> • None 			
Ecological Integrity <ul style="list-style-type: none"> • Altering of physical structure • Disturbance of wetland intact 	<ul style="list-style-type: none"> • Negligible 	<ul style="list-style-type: none"> • None 			
Wetland ecological system <ul style="list-style-type: none"> • Disruption of the capability of wetland to perform its functions 	<ul style="list-style-type: none"> • Modified 	<ul style="list-style-type: none"> • None 			

Issues	<ul style="list-style-type: none"> • None
Impact level	<ul style="list-style-type: none"> • Negligible

NFEPA 8

Designation	Type	Specific type	Origin	Status	Area
NFEPA 8 Between tower 12(83) and 13(84) 28°38'17.07"S 31°58'47.18"E	Indian Ocean Coastal Belt Group 1	Channeled Valley Bottom Wetland	Natural	<ul style="list-style-type: none"> • Moderate • Parts of the drainage still connected to the drainage network • Affected by cultivation along adjacent fields 	<ul style="list-style-type: none"> • Tower 12(83) and 13(84) are both located away from edge of wetland • The wetland is part of the drainage system of Mbabe river • Access to towers is away from the drainage line
Aspects	Aspect present	Impacts			
Hydrology <ul style="list-style-type: none"> • Intercepting of water flow • Draining of wetland • Destruction of drainage into wetland 	<ul style="list-style-type: none"> • Water is present 	<ul style="list-style-type: none"> • None • Powerline runs over the drainage line 			
Typical wetland vegetation	<ul style="list-style-type: none"> • Riverine vegetation and riparian area appear is intact • A bit of weed infestation 	<ul style="list-style-type: none"> • None • Powerline will be strung over the trees 			
Direct Human Benefits	<ul style="list-style-type: none"> • Irrigation 	<ul style="list-style-type: none"> • None 			
Rare & Endangered Species	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 			
Populations of Unique Species <ul style="list-style-type: none"> • Destruction of uniqueness 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 			
Species/taxon Richness <ul style="list-style-type: none"> • Change to biodiversity (plant, fauna, and aquatic) and species richness 	<ul style="list-style-type: none"> • Low 	<ul style="list-style-type: none"> • None 			
Ecological Integrity <ul style="list-style-type: none"> • Altering of physical structure • Disturbance of wetland intact 	<ul style="list-style-type: none"> • Low 	<ul style="list-style-type: none"> • None 			
Wetland ecological system <ul style="list-style-type: none"> • Disruption of the capability of wetland to perform its functions 	<ul style="list-style-type: none"> • Modified 	<ul style="list-style-type: none"> • None 			
Issues	<ul style="list-style-type: none"> • None 				
Impact level	<ul style="list-style-type: none"> • Negligible 				

Tower 7 (78)

The tower is situated along fallow lands. Weeds occur on the field. The site is relatively flat with a gradual slope. Access is along existing roads. Fallow lands have poor biodiversity density and value

Tower 8 (79)

The tower is situated along edge of fallow lands. The site is highly transformed as a result of cultivation.

Tower 9 (80)

Tower 9 (80) is located within sugarcane. Location of the tower will impact on the sugarcane. The owner is to be consulted for the use of the field for location a steel tower structure.

Tower 9(80)-10(81)

The towers will be standing on canefields. Few weeds grow sporadically along the field.

Tower 10(81)

Tower 10 (81) is located within a fallow cane field. Access is from existing tracks.

Tower 11(82)

Tower 11 (82) is situated is in the middle of old fallow lands with secondary grasslands. The site has a gradual slope. Use of the site has to be discussed with local induna to ascertain locating a tower along old ploughing fields.

Tower 12(83)

Tower 12 (83) is located within a sugarcane field. The location of the tower has to be discussed with the owner of the crop. It is important that all negotiations be documented, dated and filed appropriately for evidence. Access is along existing tracks and road. Protected species were observed at the site. Disturbing or relocation of the protected species requires a permit from relevant authority. The site slopes towards a drainage line which runs between tower 12 and tower 13. Shrubs occur along the site. The contractor should liaise with project ecologist to determine the proper procedure to undertake whether to disturb or relocate the species.

Tower 13(84)

Tower 13 is located in between houses but away from the houses. Grass on the site is short indicating signs of overgrazing. The tower and the powerline will not impact on the nearby houses. The ground has a flat terrain. The ground is covered by grass. The grass is scanty indicating overgrazing and rampant fires. Access is available from local tracks and roads. Access is available and tower 12 and 13 share the same access.

Bird flight diverters between tower 12(83) and tower 13(84)

Bird flight diverters are to be fitted between tower 12 and tower 13 since the powerline will span across a drainage line. Figure 20 shows towers 5(76) to tower 13(84) and spans across the drainage line. The section of the conductor across the drainage line are to be fitted with bird flight diverters, between towers 8(79) and 9(81) and tower 12(83) and tower 13(84). Towers are located along open areas such as fallow lands or crop lands or grasses. Figure 27 shows towers 5(76) – 13(84).

Bush-clearing between tower 12(83) and tower 13(84)

Figure 28 shows bush between tower 12(83) and tower 13(84). The bush may need to be cleared for stringing purposes near tower 13(84). No clearing of bush within the buffer of the drainage line.

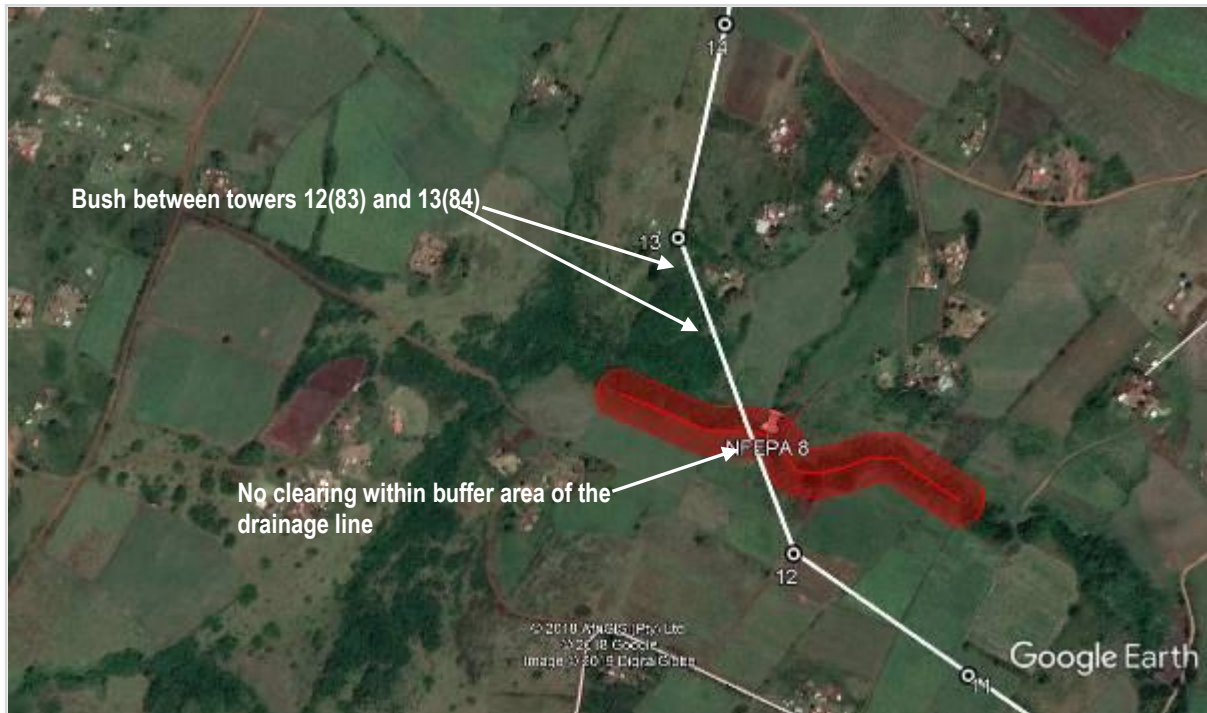


Fig. 28 Showing bush between tower 12(83) and tower 13(84)

Tower 14 (85)

Tower 14 (85) is located within alien infested site. The infested site lies parallel to ploughed fields and an open veld lies adjacent to both areas. Protected plant species occur within the weeds and disturbing or relocating the protected species requires a permit from relevant authority. Access is from local tracks.

Tower 15 (86)

Tower 15 (86) is located within an old cane field. The site is covered in grass and herbaceous plants which are infested with alien plants.

Tower 16 (87)

Tower 16 (87) is located within an old sugarcane field. Ground cover consists of aliens and herbaceous species. The tower can be accessed from local road. The site has a gently slope.

Tower 17 (88)

The site for tower 17 (87) is on fallow land and has secondary grassland. Threatened species were observed along the site. The site can be accessed from local roads. Use of fallow lands to locate towers has to be discussed with local induna and the user

Tower 18(89)-19(90)

The towers are located on old cane fields. The sites comprise of secondary grasslands and increased weed infestation as a result of heavy grazing. Access is available from local tracks and roads.

Towers 20(91)-24(95)

The span between tower 20(91) and 21(92) cross over a railway line. Tower 21(92) is located in scrubby thicket, growing parallel to the railway line. The vegetation is infested with varying degrees of weed infestation as a result

of disturbance resulting from over grazing. Both the sites are accessible. Access to tower 22 is to be kept along contour lines to prevent potential erosion.



Fig. 29 Showing span between towers 20(91) and 21(92) over a railway line

Tower 24 (95)

Protected Marula tree was identified within tower 24 site. Permit to disturb the Marula tree has been obtained.

Tower 25 (96)

The tower 25 (96) is situated within a sugarcane crop. To locate the tower Eskom Holding and the contractor must liaise with the owner of sugarcane to get consent to locate the tower.

Towers 25(96)-28(99)

The towers 25(96)-28(99) are located on old fields and these tower sites are mostly infested with varying degrees of weed infestation resulting from over grazing. All the sites are accessible.

Tower 29 (100)

The tower is located near a house, however, there is safe distance between the tower and the house. There is a footpath to the house which should not be disturbed.

Tower 30(101) and 31(102)

At tower 30(101) and 31(102) protected species were observed and permit to disturb protected plants has been awarded.

Tower 32 (103)

Tower 32(103) is located along cleared cane


Span between tower 32(103) and tower 33 (104) – Bird flight diverters

Tower 33 (104) tower is located between cane fields in an open field. A drainage line in the valley between towers 32(103) and 33(104). The drainage line is fed by run-off from a hillslope seep. The grass downslope shows ability to hold water due to siltation and water accumulating downslope. Bird flight diverters are to be fitted between towers. The stream riparian area is infested with weeds. Indigenous trees form a hedge parallel and

above the stream, however, the indigenous hedge will not be affected by the tower. Access to tower 33(104) is from the local road and is easier through the area where there is a dry pole. The pole can be removed.

Bird flight diverters on span between tower 32(103) and 33(104)

The conductors between tower 32(103) and tower 33(104), figure 33 span over a seasonal stream and therefore the span is to be fitted with bird flight diverters. No clearing of trees within 32m of riparian area from edge of seasonal stream.

<p>32(103)-33(104)</p>	<ul style="list-style-type: none"> • The powerline suspends over the drainage line • The drainage line supports permanent flow of water • Vegetation along the powerline cross is intact • The drainage line supplies water into a wetland • The drainage line forms part of the • Cultivated lands are outside the drainage buffer area • Location of towers and stringing of the powerline conductors will not impact on the drainage line 	
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Tower 34 (105)

Tower 34(105) is located on a hill opposite tower 35 (106). Both towers share same access. The site is located within open grassland. The grass is short indicating overgrazing. The site has a gradual slope.

Span between towers 35(106)-36(107)

Both towers 35(106)-36(107) are situated within fallow fields. Tower 35(106) is infested with weeds resulting from heavy grazing. Access to the tower is from the nearby footpath. A protected plant species grows at the tower area and requires to be relocated. Permit to disturb has been received.

Tower 37 (108)

Tower 37 (108) is located within a thicket of Acacia Thorn and is infested with weeds as well. It was suggested that tower be moved to the other side where there is less infestation.

Tower 38 (109)

Tower 38 (109) is located within old fields and is overgrazed as indicated by very short grass. Access is along a footpath. A few protected species occur within the area of the site and a permit to disturb has been provided by relevant authority.

Tower 39 (110)

Tower 39 (110) is located within old canefields. Access is from existing roads. Bush exists at the entrance to the site and needs to be cleared. No permit is needed to cut or trim the acacia trees as they do not form a canopy. A protected plant needs to be relocated and thus requires a permit from relevant authority. Trucks to reach tower 39(110) need to drive along a contour line and watch out for bulbs. Bulbs within a tower footprint need to be relocated. A permit to relocate the bulbs should be requested from relevant authority. Weeds are found at the tower site.

Span between tower 38(109) and tower 39(110)

<p>38(109)-39(110)</p>	<ul style="list-style-type: none"> • The powerline spans across the drainage line • The drainage line connects to drainage lines in the area • Most of the drainage line is still intact • Cultivated lands exist south of the drainage line • Bush occurs north of the drainage line • Water in the drainage lines is used for cultivation 	
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Tower 40 (111)

Tower 40 (111) is located within an old open fallow field. Grass over the field shows signs of overgrazing. The tower is located at the top of the slope which connects with a stream downslope. The banks of the downslope stream are covered with riverine vegetation. The combination of old ploughed fields, weeds and shrubs are a classic indication of past and present disturbance to the site. Access to the tower is along the contour line.

Tower 41 (112)

Tower 41 (112) is situated within old fields upslope. Downslope there is a seasonal stream. Shrubs and grass provide the ground cover at and around the tower site. Weeds are found at the tower site and the areas is transformed.

Bird flight diverters on spans between tower 38(109)-41(112)

The powerline spans over two drainage lines and runs parallel to a section of a drainage line. The spans are to be fitted with bird flight diverters. The towers are located beyond the drainage line buffer zone. No disturbance to trees along the buffer area. Access available from local roads and tracks. Figure 34 shows the spans to be fitted with bird flight diverters between tower 40(111) and 41(112).

<p>40(111)-41(112)</p>	<ul style="list-style-type: none"> • The powerline route spans over the drainage line • Towers are located away from the drainage line buffer • Scanty bush grows along the buffer area of the drainage line • The drainage line is part of the drainage network that has been broken up by houses, roads and cultivated fields • Location of towers and stringing of the powerline conductors will not impact on the drainage line 	
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Tower 42 (113)

Figure 30 shows tower 42(113) located within a bush thicket and grass as groundcover. Wider access needs to be cleared due to thicket. The thicket has formed a canopy and hence a permit will be required to clear indigenous trees. The tower and the powerline run parallel to houses. The gradient of the existing access road is steep and will require construction of berms and outlet drains to prevent scouring of the road during rainy days.

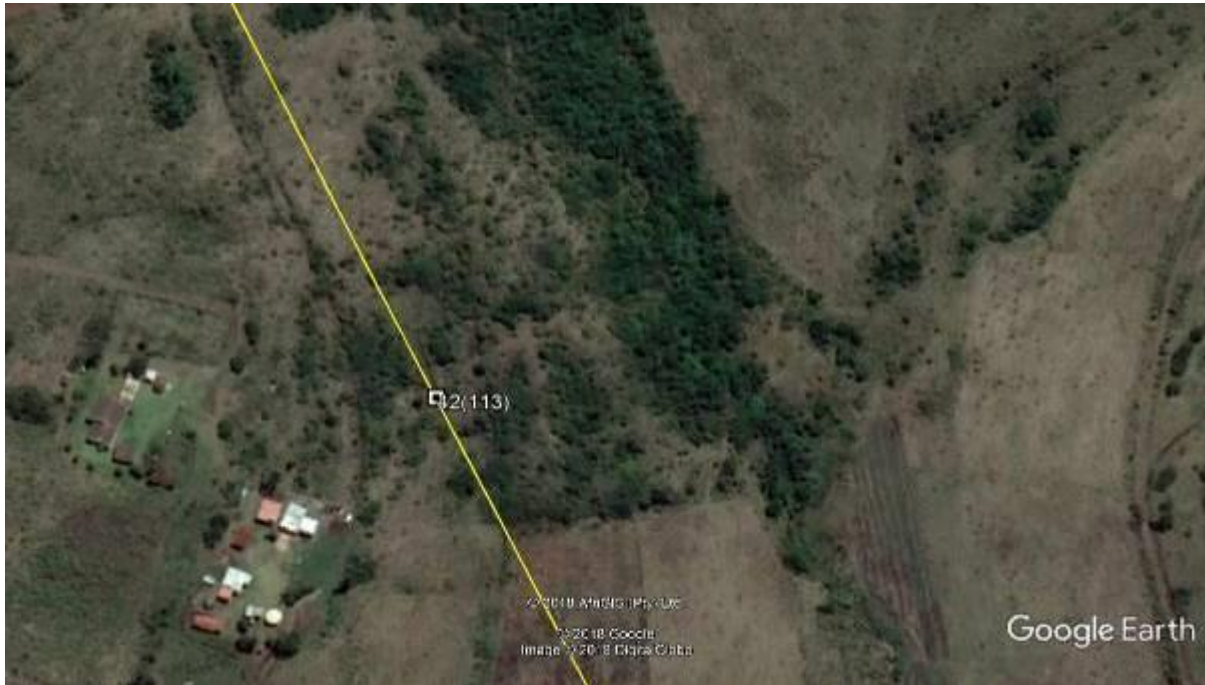


Fig. 30 Showing tower 42(113) within a bush thicket which requires clearing

Tower 43 (114)

Figure 31 shows tower 43(114) positioned within scattered shrubs which are burnt, with grass as groundcover. The grass is short indicating heavy grazing. Access road has a steep slope. It is recommended that road berms and outlet drains be constructed to prevent erosion on the road especially during rainy days.



Fig. 31 Shows existing road with a steep slope and roads berms to be fitted along the road near tower 43(114) and trees within riparian area adjacent to a perennial stream 97

Tower 44 (115)


Tower 44 (115) is situated along scattered shrubs on an open field and old cane field. The shrubs appear burnt. The site has a gradual slope towards a drainage line. Access into the tower site is through a make-shift gate from the main road. The tower is positioned near a house. A proper gate may need to replace the makeshift gate.

Tower 45 (116)

The tower is positioned along thornveld bush with an open thicket and grass as ground cover. Shrubs grow scattered and as pockets of small canopies. The bush clump does not exist in a canopy. The indigenous trees will need to be cut to provide open area for the tower bases. Access exists along footpath. The tall grass indicates little grazing. The site slopes towards a stream. The shrubs show burnt dried leaves indicating fire having gone through the site.

Span between tower 44(115) and tower 45(116)

The span is above a 32m within riparian area of a seasonal drainage line, no disturbance to this area.

44(115)-45(116)	<ul style="list-style-type: none">• The powerline route spans over the drainage line• Towers are located away from the drainage line buffer• Thick bush grows along east of the buffer area of the drainage line, while on the left trees are scanty• The drainage line is part of the drainage network that has been broken up mainly by cultivated fields	
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Tower 46 (117)

Tower 46 (117) is in cane field. Access is from existing farm tracks. Need to liaise with cane owner to locate tower on cane fields.

Tower 47 (118)

The site for tower 47 (118) is located within cane fields. Shrubs growing on the site are short and scattered. Access to the tower bases site is along farm track used to collect cane harvest.

Tower 48 (119)

The site for tower 48 (118) comprises of scattered scrubby bush and grass cover. The site has a flat terrain and the tower is located behind a bush cluster. A protected species growing on the site should be relocated and the relocation will require a permit from relevant authority.

Span between tower 47(118) and tower 48(119)

Permit to clear bush has been received from relevant authority



Fig. 32 Showing crossing of a drainage line

Tower 49 (120)

Tower 49 (119) will be standing on new fallow land, near a homestead. Grass predominantly covers the area and access to the site is from existing roads.

Tower 50 (121)

The site for tower 50 (1120) has a gradual slope and is within old cane fields. Grass covers the site as well as scattered shrubs. Grass is taller indicating little grazing. Overtime shrubs will grow into trees. A protected plant grows at tower 50 and requires necessary permit from relevant authority, which has been obtained.

Tower 51 (122)

Tower base for tower 51 (122) is located within fallow cane. To reach the site a fence needs to be cut and a make-shift gate constructed. After construction, the fence must be fixed to its original state. Liaison with the owner of the field needs to be arranged for permit to locate the tower along the field

Tower 52 (123)

The site for tower 52 (123) is within fallow cane field. Grass is the dominant vegetation forming ground cover. The grass is short indicating overgrazing. The site slopes towards the road and to reach the tower position the road bank needs to be slanted to allow construction vehicles to get to the tower base. The road bank adjacent to the slanted entrance needs to be stabilised to prevent collapse.

Span between tower 51(122) and tower 52(123)

Figure 33 shows powerline span above a drainage line below tower 52. The soils in the area are sandy and highly erodible. Strictly no disturbance to trees along the buffer zone of the drainage line. The powerline also runs over sugarcane fields

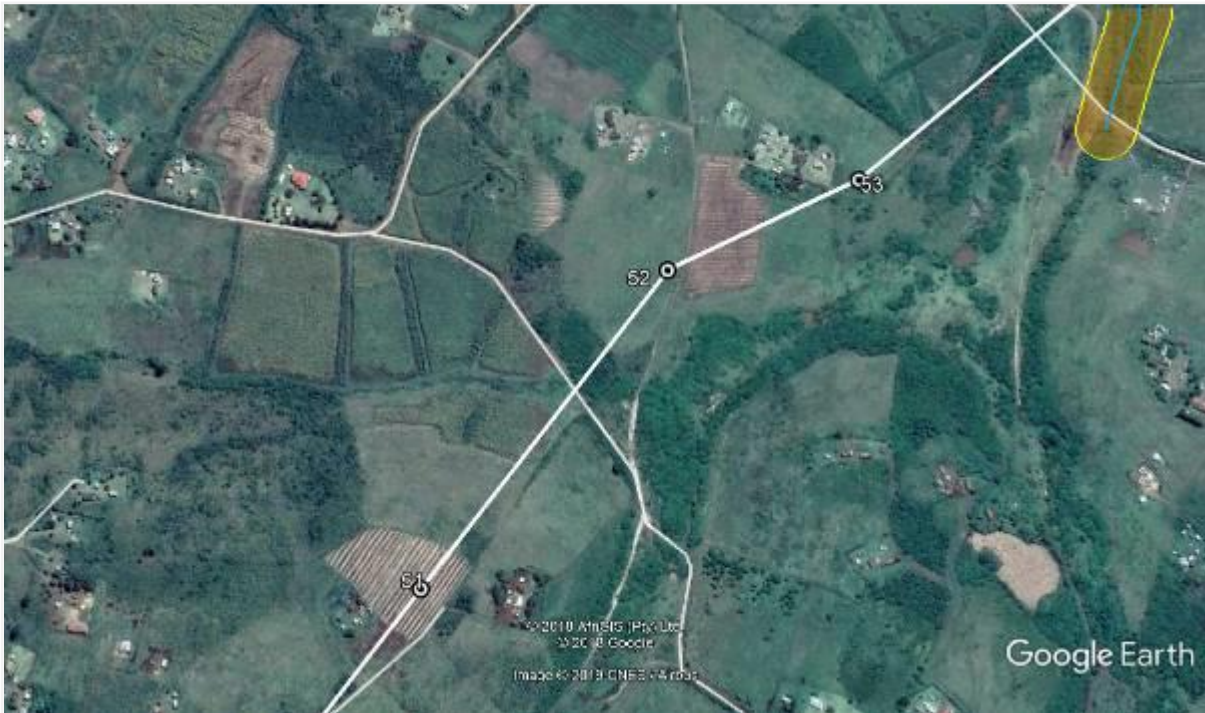


Fig 33 Showing fallow land at tower 51(122); bush along drainage line

Tower 53 (124)

Tower 53 (124) is located along a flatter terrain, however the terrain further away has a gradual drop towards a stream flowing between tower 53 and tower 54. The site is on an open grass patch with scattered flowering and non-flowering shrubs. A cluster of trees grows along the road edge. The site is situated along houses. Access into the site should be through accessible areas, which exist. The site is situated above cane fields. Protected species exist at the tower base and they require to be relocated. A permit to relocate the protected plant species needs to be sought with relevant authority.

<p>53(124)-54(125)</p>	<ul style="list-style-type: none"> • The powerline route spans over the drainage line • Towers are located away from the drainage line buffer • The drainage line is part of the drainage network that has been broken up by houses, roads and cultivated fields • Trees cover the buffer area of the drainage line • Location of towers and stringing of the powerline conductors will not impact on the drainage line 	
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Tower 54 (125)

The tower position for tower 54 (125) is within an open grass. The terrain at the tower base is flat. However further the terrain descends into a gradual slope towards a stream that flows between tower 53(124) and tower 54(125). Access to the tower base area is available. The size of grass shows that grazing is not heavy. Small shrubs and flowers cover the area. Clearing of the indigenous shrubs is needed.

Tree cutting between towers 51(122) and tower 54(125)

Tree canopy exists along the edges of drainage lines between tower 51(122) and tower 52(123) and between tower 53(124) and tower 54(125). Strictly no clearing of trees within buffer area of the drainage line.

Bird flight diverters towers 53(124)-55(126)

Fit bird flight diverters between tower 53(124) and tower 55(126), figure 34. The conductors span across a seasonal watercourse, drainage line and the main road respectively.



Fig 34 Showing spans requiring bird flight diverters

Tower 55 (126)

Tower base for tower 55 (126) is located within open grass patch. It is recommended that only grass can be cleared to reach tower base. Shrubs can be avoided. The grass is tall indicating less grazing. An old homestead is situated a distance from the tower base. The site is moderately weed infested. The site has a gradual slope. Access to tower 55(126) can be created from tower 56(127) and access runs along a water pipeline.

Tower 56 (127)

The site where tower 56 (127) is situated has a flat terrain. The tower is located within a site with poor species diversity. Grass cover is patchy indicating heavy grazing and rampant fires. Trees appear burnt and are sparse. Access to tower 56(127) runs along a water pipeline. A permit is needed to relocate protected plant species growing at the tower base. Powerline span crosses over Umsunduzi River. Location of towers and stringing will not impact on the river and its associated banks.

56-57 & 58-59

- The drainage lines crossed by spans from tower 56 to tower 59 form part of drainage system that fed water into Umsunduzi River
- The section of the drainage lines spanned by the powerline has trees growing along the buffer of the drainage line
- Tower 57 is located within a eucalyptus stand
- The extent of the drainage line has been disconnected from drainage network as a result of cultivated lands



Tower 57 (128)

Tower 57(128) is located within a cane fallow field. Eskom Holdings to discuss with owner of cane field for the location of the tower within the cane field.

NEFPA 9

The wetland is located at some distance from the powerline servitude. Houses cut through the wetland disrupt its continuity with the drainage networks. No surface water is visible within the wetland channel.



Fig 35 NEFPA 9

Tower 58 (129)

The site for tower 58 (129) is flat and is accessible. The site is covered by grass and there is bush growing at the edge of the site. Protected plant species are growing on the site. The plants need to be relocated and a permit for relocation is needed. The vegetation around the site forms some sort of a circle indicating that a homestead could have existed within the site. Indigenous trees at the edge of the site can be trimmed. No permit is needed to trim the trees.

Tower 59 (130)

The site for tower 59 (130) is dominated by plenty shrubs and access is from a nearby track. Grass is scanty, indicating sign of over grazing. There are protected plant species growing along the site. The protected plant species need to be relocated and a permit should be sought from relevant authorities.

Tower 60 (131)

Tower 60 (131) is situated within wooded old fields. The site can be accessed from existing track. The site has bush scattered around it. No cutting of trees is needed. Protected plant species exist and require to be located. A permit to relocate should be sought from relevant authorities. Protected aloe plant species were found along access to tower 60. To relocate the Aloe plant a permit is needed.

NFEPA 10

The wetland is part of the drainage system. The larger drainage network has been disturbed by roads, houses and cultivation. The disturbance indicates that the flow of water is hindered. The extended wetland network has been destroyed and is irreparable. The wetland remains as an isolated pocket that is fed by rain or other drainage lines. No disturbance of trees growing along the buffer area of the drainage line.



Fig. 36 NFEPA 10

Designation	Type	Specific type	Origin	Status	Area
NFEPA 10 Between tower 59(130) and 60(131) 28°32'47.92"S 32° 2'27.13"E	Lowveld Group 11	Channeled Valley Bottom Wetland	Natural	<ul style="list-style-type: none">TransformedThe extent of the drainage line intercepted by houses, cultivated fields and local road network	<ul style="list-style-type: none">Tower 59(130) and 60(131) are both located away from edge of wetlandA local road cuts through the wetland

					<ul style="list-style-type: none"> • Towers are located away from the wetland • Powerline spans across wetland drainage line • Access to tower positions available along tracks and open fallow lands
Aspects	Aspect present	Impacts			
Hydrology <ul style="list-style-type: none"> • Intercepting of water flow • Draining of wetland • Destruction of drainage into wetland 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 			
Typical wetland vegetation	<ul style="list-style-type: none"> • Bush moderately growing around the drainage line • Fallow lands with some weed infestation 	<ul style="list-style-type: none"> • None • Powerline will be strung over the bush 			
Direct Human Benefits	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 			
Rare & Endangered Species	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 			
Populations of Unique Species <ul style="list-style-type: none"> • Destruction of uniqueness 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 			
Species/taxon Richness <ul style="list-style-type: none"> • Change to biodiversity (plant, fauna, and aquatic) and species richness 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 			
Ecological Integrity <ul style="list-style-type: none"> • Altering of physical structure • Disturbance of wetland intact 	<ul style="list-style-type: none"> • Low 	<ul style="list-style-type: none"> • None 			
Wetland ecological system <ul style="list-style-type: none"> • Disruption of the capability of wetland to perform its functions 	<ul style="list-style-type: none"> • Modified 	<ul style="list-style-type: none"> • None 			
Issues	<ul style="list-style-type: none"> • None 				
Impact level	<ul style="list-style-type: none"> • Negligible 				

Tower 61 (132)

The site for tower 61 (132) has a gradual slope and the dominant vegetation is grass. The grassland is secondary grass. Shrubs grow scattered around the site. A 11kV woodpole is located some distance from the site.

Tower 62 (133)

The site for tower 63 (133) is characterised by thicket. Grass covers the ground. It is suggested that the tower peg be moved about 12m to a more open location. Access is from existing track.

Tower 63 (134)

Tower is characterised by scanty and short bush and grass, a sign of heavy grazing. The site was cultivated in the past. The site has a gradual slope.

Tower 64 (135)

Tower 64 (1350 is situated within open grasslands with short shrubs. Grass on the site is scanty, a sign of heavy grazing. A house exists near the site; however, the powerline will not impact on the house as a safe distance.

Tower 65 (136)

The site for tower 65 (136) is situated along open field. It is characterised by short shrubs and grass with good cover, a sign of moderate grazing. Short shrubs indicate that goats graze the site.

Tower 66 (137)

The site for tower 66 (137) is an open veld covered predominantly with grass. The site has a gradual slope and it is over grazed. A track leading to the site can be used to access the site. Scanty shrubs growing on the site will not be affected by the location of the tower. Protected species are found on the site. They need to be relocated and a permit for relocation need to be sought from relevant authority.

Tower 67 (138)

Figure 36 shows tower 67 (138) is located near a playfield. Location of the tower will not impact on the playfield. A gully exists parallel to a playfield This indicate that the soils are susceptible to erosion. It is therefore important to stabilise disturbed grounds after construction to prevent erosion.

NEFPA 11

The wetland stretches along a drainage line bordered by scattered bush. No surface water was observed along the channel of the wetland

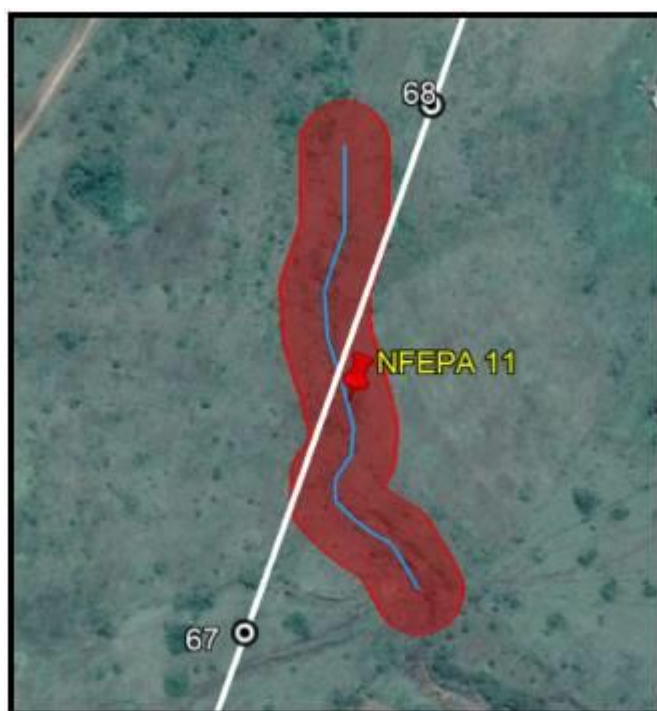


Fig. 37 NFEPA 11

Designation	Type	Specific type	Origin	Status	Area
NFEPA 11 Between tower 67(138) and 68(139) 28°31'39.23"S 32°2'55.87"E	Lowveld Group 11	Channeled Valley Bottom Wetland	Natural	<ul style="list-style-type: none"> Highly modified and transformed The extent of the drainage line has been disconnected from the drainage network by houses, fallow lands and local road network 	<ul style="list-style-type: none"> Tower 67(138) and 68(139) are both located away from edge of wetland Tower 68 is located close wetland buffer edge A local road cuts through the wetland Towers are located away from edge of wetland
Aspects	Aspect present	Impacts			
Hydrology <ul style="list-style-type: none"> Intercepting of water flow Draining of wetland Destruction of drainage into wetland 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Typical wetland vegetation	<ul style="list-style-type: none"> Low Riparian growing scanty along the drainage line 	<ul style="list-style-type: none"> Powerline will be strung over the trees and drainage line 			
Direct Human Benefits	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Rare & Endangered	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			

Species		
Populations of Unique Species • Destruction of uniqueness	• None	• None
Species/taxon Richness • Change to biodiversity (plant, fauna, and aquatic) and species richness	• None	• None
Ecological Integrity • Altering of physical structure • Disturbance of wetland intact	• Low	• None
Wetland ecological system • Disruption of the capability of wetland to perform its functions	• Modified	• None
Issues	• None	
Impact level	• Negligible	

Tower 68 (139)

Tower 68 (139) is located in grasslands with shrubs. Some weeds grow along the site. The grass shows signs of overgrazing. The site has a gradual slope and can be accessed from nearby track.

Span between tower 67(138) and tower 68(139) – Bird flight diverters

The span runs over a valley/channelling landform and therefore it is to be fitted with bird flight diverters.

Tower 69 (140)

The site for tower 69 (140) has a few shrubs with a few trees scattered along the site. The grass is tall indicating low grazing. Access is available from local tracks.

Tower 70 (141)

To gain access into the tower 70 (141) area the existing fence needs to be cut and a makeshift gate can be installed temporarily. After construction, the fence must be fixed to its original state. The contractor must get consent from the owner of the fence to cut it and install a makeshift gate to be used during construction. The site is higher than the adjacent road. The road bank into the site is steep and needs to be angled to allow cranes to enter the site. Slanting of the bank should be followed by compacting the bank to prevent erosion and to stabilise the adjacent sides of the banks so that they do not collapse. After construction the slanted bank should be restored to its original state and stabilised to ensure that it does not collapse. The grass along the site is tall indicating low grazing. Permit is required to disturb protected plant species.

Tower 71 (142)

The site is located within open veld. A cluster of trees grows on the site. The site slopes gradually towards a drainage line and access is available from the nearby road. Protected species exist along the site and they need to be relocated and a permit from relevant authority should be sought.

Tower 72 (143)

Tower 72 (143) is located within open veld with a flat terrain. Short shrubs grow along the site, an indication of goats browsing on shrubs. The grass is dense and tall showing low intensity grazing. Access is available from local road.

Tower 73 (144)

Tower 73 (144) is located in an open grassland area. The grass is short indicating heavy grazing. Sparse bush grows along the site

Tower 74 (145)

Tower 74 (145) is located in an old field with some shrubs. The area has a flatter terrain. The grass is taller indicating less grazing. Some branches may need to be trimmed and/or trees removed. The indigenous trees existing within the site do not form a canopy and therefore no permit is required.

Tower 75 (146)

Tower 75 (146) is placed on open old fields. Over grazing is evident by the short grass. Short shrubs indicate intense browsing.

Span between tower 74(145) and tower 75(146) – Bird flight diverters

The span runs over a valley/channelling landform and therefore it is to be fitted with bird flight diverters. The diverters are to be fitted in the middle 50% of the earth conductor.

NFEPA 12

The wetland stretches along a drainage line bordered by scattered bush. No surface water was observed along the channel of the wetland



Fig. 38 NFEPA 12

Designation	Type	Specific type	Origin	Status	Area
NFEPA 12 Between tower 74(145) and 75(146) 28°30'49.52"S 32°3'39.05"E	Lowveld Group 11	Flat	Natural	<ul style="list-style-type: none"> Modified and transformed The extent of the drainage line has been disconnected from the drainage network by houses, fallow lands and local road network 	<ul style="list-style-type: none"> Tower 75(146) is located outside the wetland buffer Tower 74(145) is located away from edge of wetland Access to tower positions available from local road
Aspects	Aspect present		Impacts		
Hydrology <ul style="list-style-type: none"> Intercepting of water flow Draining of wetland Destruction of drainage into wetland 	<ul style="list-style-type: none"> None 		<ul style="list-style-type: none"> None 		
Typical wetland vegetation	<ul style="list-style-type: none"> Riparian vegetation growing sporadically 		<ul style="list-style-type: none"> None The powerline runs over the drainage line 		

	along the drainage line buffer	
Direct Human Benefits	• None	• None
Rare & Endangered Species	• None	• None
Populations of Unique Species • Destruction of uniqueness	• None	• None
Species/taxon Richness • Change to biodiversity (plant, fauna, and aquatic) and species richness	• None	• None
Ecological Integrity • Altering of physical structure • Disturbance of wetland intact	• Negligible	• None
Wetland ecological system • Disruption of the capability of wetland to perform its functions	• Modified	• None
Issues	• None	
Impact level	• Negligible	

Tower 76 (147)

Tower 76 (147) is located in an open veld. Old contours show that it is an old field. The site is covered with grass and sparsely scattered shrubs. A pump house is located about half a kilometre from the site.

Tower 77 (148)

Tower 77 (148) is located on a site covered with short sparsely growing shrubs. Grass covers the ground. A few indigenous trees grow sporadically within the site. Palm trees grow some distance from the site. The site has gentle slope, sloping towards a seasonal stream.

Tower 78 (149)

Tower 78 (149) will be positioned on a flat terrain upslope. A gully, covered with grass, exists south of the site and stretches a few metres from the site. No signs of erosion occur within the gully. Shrubs and grass cover the grounds of the site. The site has a gentle slope towards to a seasonal stream downslope. A seasonal stream separates tower 77 (148) and tower 78 (149). A number of protected plant species exists within the footprint of the tower site and the site shows signs of over grazing indicated by short shrubs and lawn grass. These protected plants may need to be relocated to a safer location. It is highly recommended that the project ecologist be present when the relocation is undertaken.

78(149)-79(150)	<ul style="list-style-type: none"> • The powerline is suspended over the drainage line • Towers are located away from the drainage buffer area • Scanty trees grow along the buffer area of the drainage line • Location of towers and stringing of the powerline conductors will not impact on the drainage line 	
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Bird flight diverters 77(148)-78(149)

The conductors between tower 77 and tower 78 (148-149) will span over a drainage line and the conductors are to be fitted with bird flight diverters.

NEFPA 13

The wetland is part of the network of drainage lines that join local rivers. Some extent of this network has been destroyed by housing, landuse that intercept drainage lines and destroy channels that carry water flow. This section of the larger wetland has been cut off by various landuse. No wetland species were observed along the channel of the wetland.

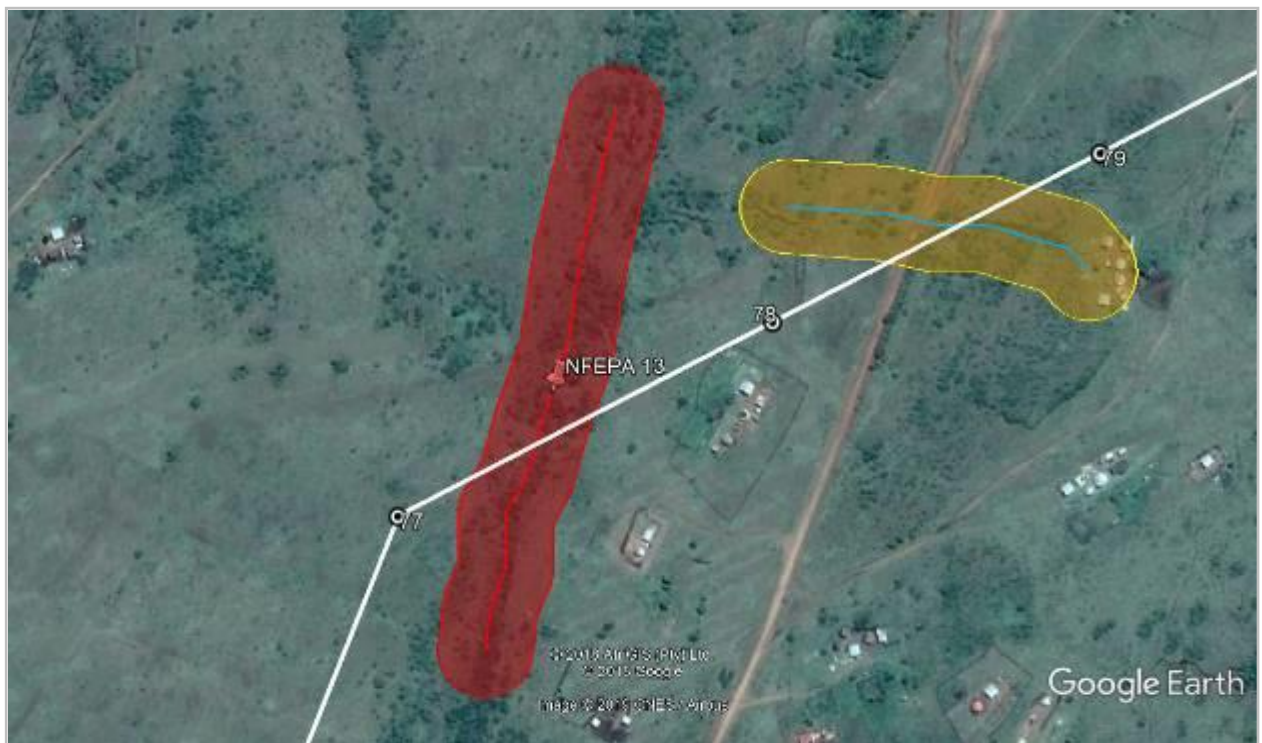


Fig. 39 NEFPA 13

Designation	Type	Specific type	Origin	Status	Area
NFEPA 13 28°30'28.59"S 32° 3'49.65"E Between tower 77(130) and 78(131)	Lowveld Group 11	Channeled Valley Bottom Wetland	Natural	<ul style="list-style-type: none"> Modified and transformed The drainage has been cut off from its connections to the drainage network 	<ul style="list-style-type: none"> Tower 59(130) and 60(131) are both located away from edge of wetland Access to towers is located away from wetland
Aspects	Aspect present	Impacts			
Hydrology <ul style="list-style-type: none"> Intercepting of water flow Draining of wetland Destruction of drainage into wetland 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Typical wetland vegetation	<ul style="list-style-type: none"> Scanty bush Riparian vegetation growing sporadically along the drainage line buffer 	<ul style="list-style-type: none"> None Powerline runs over the drainage line 			
Direct Human Benefits	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Rare & Endangered Species	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Populations of Unique Species <ul style="list-style-type: none"> Destruction of uniqueness 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Species/taxon Richness <ul style="list-style-type: none"> Change to biodiversity (plant, fauna, and aquatic) and species richness 	<ul style="list-style-type: none"> Low 	<ul style="list-style-type: none"> None 			
Ecological Integrity <ul style="list-style-type: none"> Altering of physical structure Disturbance of wetland intact 	<ul style="list-style-type: none"> Negligible 	<ul style="list-style-type: none"> None 			
Wetland ecological system <ul style="list-style-type: none"> Disruption of the capability of wetland to perform its functions 	<ul style="list-style-type: none"> Modified 	<ul style="list-style-type: none"> None 			
Issues	<ul style="list-style-type: none"> None 				
Impact level	<ul style="list-style-type: none"> Negligible 				

Tower 79 (150)

Tower 79 (150) is located within a site with gentle slope. Thorn trees growing on the site need to be cleared in order to accommodate a base of a tower. Access to tower 79 (150) is available from the bottom of the slope. A number of protected species occur within tower footprint. Project ecologist to be consulted about disturbance or relocation of protected species. It is suggested that protected plants be dug out and relocated. Project ecologist to be consulted about the disturbance of the protected plant species. A permit to disturb from relevant authority should be sought.

Tower 80 (151)

Access to the tower 80 (151) footprint is located on a site with a steep slope and construction vehicles will access the tower base by driving on contour lines. There is an existing footpath which can be used for access. A permit to disturb should be sought from relevant authorities.

Tower 81 (152)

Acacia thorn trees are growing on the access track to tower 81 (152) and will need clearing. However, no permit is to be sought as the trees do not form a canopy. The tower is located on a site with a gentle slope, sloping towards a drainage line.

Tower 82 (153)

Tower 82 (153) is located on old fields. The site has a gentle slope. Construction vehicles will reach the tower by driving along a contour line. The site is characterised by sparsely growing thorn bush trees. Grass mainly covers ground. The site slopes towards a drainage line. Marula tree on site will need to be cut to provide adequate space for working and constructing tower foundations and erecting the tower. The contractor to liaise with owners for locating a tower on their fields. Permit to be sought form relevant authority for permit to cut a protected tree species.

Tower 83 (154)

Tower 83 (154) is located at the top of the hill within a site covered with grass with young thorn shrubs. The site has a gentle slope which joins a seasonal stream downslope. Some thorn trees that have formed a bush canopy and may need to be removed. All trees that need to be removed are to be marked by project ecologist. Removal of indigenous trees within a canopy require a permit from relevant authority.

Tower 84 (155)

Tower 84 (155) is located at the top of a hill adjacent to the tower 83 (154) hill. The site has a gentle slope. Bush exists on site and may require clearing to accommodate the tower. Permit to clear trees within a bush canopy require a permit from relevant authority.

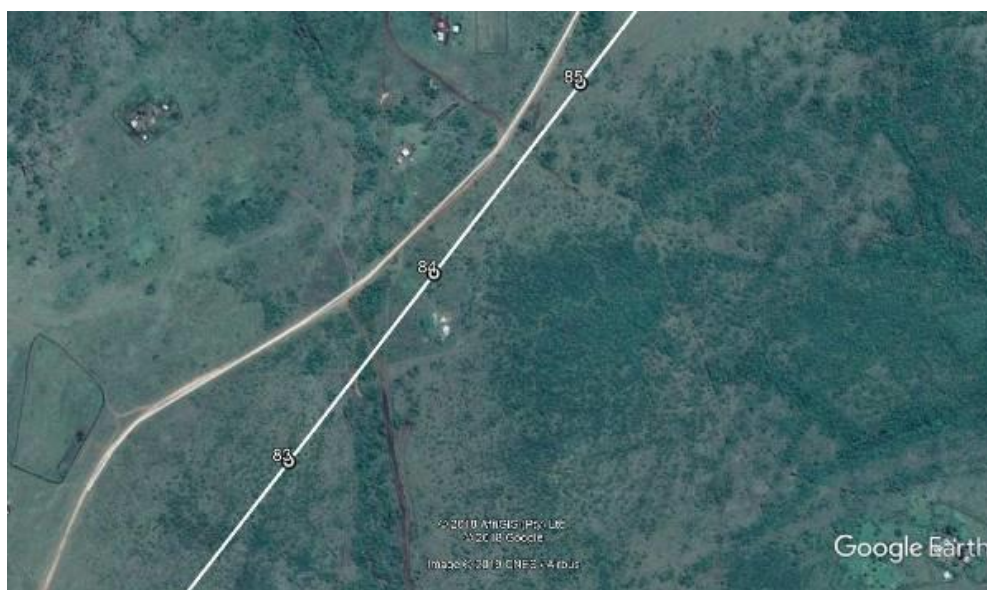


Fig. 40 Shows bush between towers 83(154 and 85(156)

Bird flight diverters between tower 83(154) and tower 84(155)

The conductors between towers 83 and 84 (153-154) span across two slopes and over a stream flowing between the two slopes. Span between tower 84 and tower 84 is to be fitted with bird flight diverters.

Tower 85 (156)

Tower 85 (156) is located within a site is covered by grass and shrubs and basal cover is scanty indicating over grazing. Access is available along footpath. Need to level entrance to reach the tower position. The site has a steep slope. The contractor to discuss with the project civil engineer access to the tower base site so as to ensure that the angle of the access track facilitate movement of run-off away from the track to prevent potential erosion. Protected species were observed on site and a permit for their disturbance be sought from relevant authority.

Tower 86 (157)

Tower 86 (157) is located within open grasslands. Sparsely populated thorn trees grow on the site. Protected plant species were observed within the site. Disturbance to the protected plants from the site requires a permit to from relevant authority, which is to be sought.

Tower 87 (158)

Tower 87 (158) is located along an open grassland with sparsely growing thorn trees. The grass shows sign of overgrazing. Access is available from a nearby local road. A structure with grave features was spotted near the site, however the grave-like structure exists a distance from the tower site and therefore construction work will not affect it. However, it was suggested that the grave should be fenced in order to protect it from potential accident. It is suggested that the contractor should enquire from local induna about the grave-like structure and therefore ensure the structure is a grave and also find out about the ownership of the grave. The contractor should discuss fencing of the grave with the owners and recommended that the family do the fencing in order for the family to undertake relevant ritual processes, unless the family allows the contractor to fence the grave. Such permission should be recorded as proof. It is important that reasons behind fencing of the grave be explained. Contractor must explain to the owners the reasons for fencing of the grave, as a temporary act to protect the grave site.

Tower 88 (159)

Tower 88 (159) is located within an open veld, old fields. The site a steep slope. Grass and shrubs cover the site and the shrubs are sparsely spread. The site has little biodiversity. A drainage line exists with seasonal water flows at the bottom of the slope. A Marula tree grows within the site. The Marula trees may need to be removed to create access to the tower base area. A permit from relevant authority to remove Marula tree should be sought. The site has steep side of the slope and an accessible side of the slope. The contractor is advised to use accessible entrance into the site.

Tower 89 (160)

Tower 89 (160) is located along fallow land and the site is characterised by the presence of a few protected plant species. The ground is covered by grass. There are few plant species on the ground. The site has a steep slope towards a stream which flows between tower 88 (159) and tower 89 (160). As a result of the slope access is not easy and needs to be investigated. It is advised that no entrance to be established along steep edges of the site. Driving into the site along access road, should be kept along contour lines to minimise potential erosion. In some areas within the site the trees become a thicket. It was observed that plant species density is low. Entrance into the site should avoid using the area with thicket to prevent cutting of the trees. The project ecologist needs to assist in locating suitable entrance into the site, to assist in showing access that will cause less disturbance to the trees. Disturbance to the indigenous trees in canopy requires a permit from a relevant authority.

Tower 90 (161)

Tower 90 (161) is located within a bushy area. Access into the site may go through a ploughed area. Driving through a ploughed field should be negotiated with the affected owner. Marula trees grow along access towards tower 90 and at tower 90 site. Permit to disturb the Marula trees is to be sought.

Tower 91 (162)

Tower 91 (162) is located within a wooded area. The site has high plant density. A number of Marula trees grow within the site. Cutting of the bush is required. Grass cover is also high indicating little grazing. Access to the site is available from local roads and tracks. To remove a Marula trees will require a permit from relevant authority.

Tower 92 (163)

Tower 92 (163) contains high plant density with protected species occurring on site. According to the project ecologist disturbance to the plants on the site can be irreversible, i.e., growth will not re-occur. The site has a steep slope. Due to dense vegetation and plenty bush the site is not easily accessible especially to locals. Opening access for locating the tower may render the area more accessible and disturbance may extend beyond the tower base area, causing irreversible damage to the growth of sensitive protected plants. It should be noted that this area occupies a relatively small area and the existing sensitive and protected plant species do not extended to a wider area. A smaller area will be disturbed when locating a tower base within the site. Presently homesteads exist on the opposite side of the site. Cattle footpaths exists within the site. The site lacks dry biomass to increase fire intensity which will control the increase of bush. Weed species grow intermittently on the site. Marula trees were observed on the site. A grave was identified near the site however it is situated outside the site footprint. Cutting of indigenous trees in a canopy and Marula trees requires a permit from relevant authority which must be sought.

Span between tower 89(160) and tower 92(163)

The areas below the span consists of high density protected Marula trees. Effort to be applied to avoid damaging, disturbing or cutting any of the protected trees. If unavoidable care to be applied to minimise disturbing, damaging or cutting of the protected tree. Contractor to liaise with ECO and project ecologist before disturbing.

NFEPA 14

The wetland is part of the flowing Umsunduzi River which feeds into Umfolozi river. This section of river crossing is still intact. No disturbance has been observed. The powerline spans across the river. Access to tower sites is available along tracks.

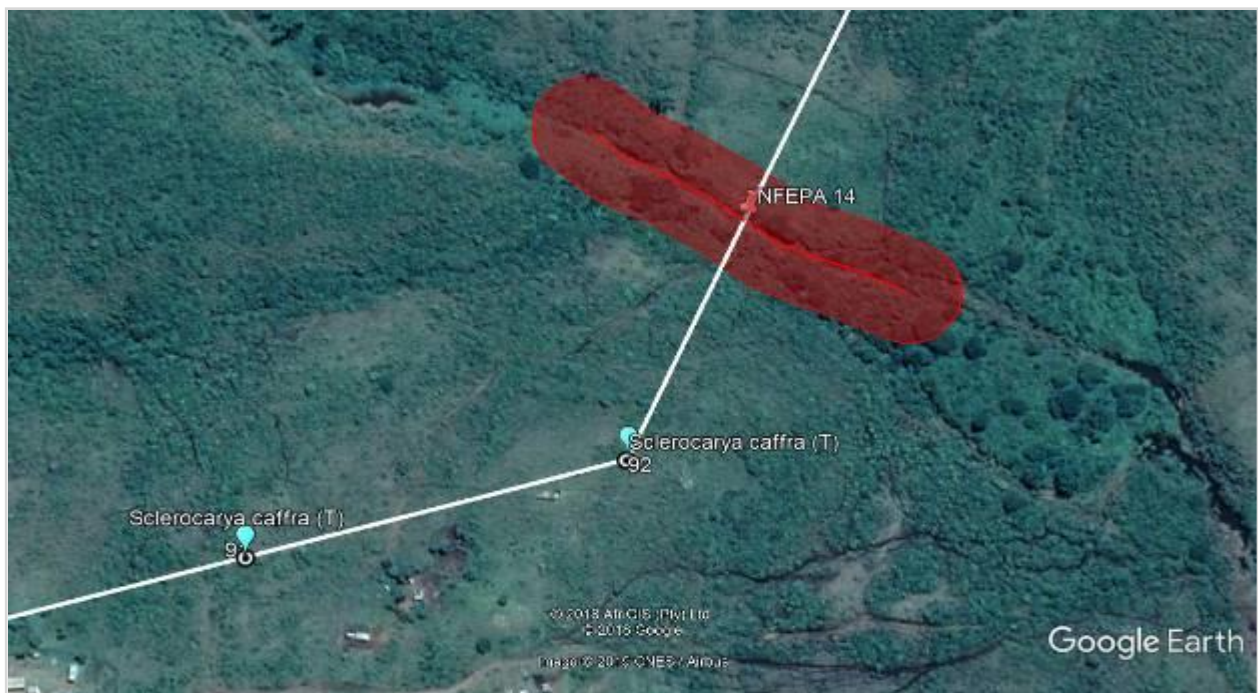


Fig 41 NFEPA Msunduzi River crossing. Protected Marula tree at tower 91 & 92

Designation	Type	Specific type	Origin	Status	Area
NFEPA 14 Between tower 92(163) and 93(164) 28°29'18.43"S 32° 5'36.10"E	Lowveld Group 11	Channeled Valley Bottom Wetland	Natural	<ul style="list-style-type: none"> Intact Little signs of disturbance along the buffer area and the river channel Msunduzi River is connected to drainage network and feeds into Umfolozi River 	<ul style="list-style-type: none"> Tower 92(163) and 93(164) are both located away from edge of Msunduzi River buffer area The riparian vegetation is still intact No signs of disturbance have been observed
Aspects	Aspect present	Impacts			
Hydrology <ul style="list-style-type: none"> Intercepting of water flow Draining of wetland Destruction of drainage into wetland 	<ul style="list-style-type: none"> Water present The river has a strong flow of water 	<ul style="list-style-type: none"> None Powerline will be strung over the river 			
Typical wetland vegetation	<ul style="list-style-type: none"> Moderate to dense Riverine vegetation and riparian area appear intact Old fallow lands exist along the riparian area of this river section Bush is growing along old fallow lands 	<ul style="list-style-type: none"> None Powerline will be strung over the trees 			
Direct Human Benefits	<ul style="list-style-type: none"> Irrigation Possible home use 	<ul style="list-style-type: none"> None 			
Rare & Endangered Species	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Populations of Unique Species <ul style="list-style-type: none"> Destruction of uniqueness 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Species/taxon Richness <ul style="list-style-type: none"> Change to biodiversity (plant, fauna, and aquatic) and species richness 	<ul style="list-style-type: none"> Low 	<ul style="list-style-type: none"> None 			
Ecological Integrity <ul style="list-style-type: none"> Altering of physical structure Disturbance of wetland intact 	<ul style="list-style-type: none"> Moderate 	<ul style="list-style-type: none"> None 			
Wetland ecological system <ul style="list-style-type: none"> Disruption of the capability of wetland to perform its 	<ul style="list-style-type: none"> Modified 	<ul style="list-style-type: none"> None 			

functions	
Issues	<ul style="list-style-type: none"> • None
Impact level	<ul style="list-style-type: none"> • Negligible

Tower 93 (164)

Tower 93 (164) was observed to have low plant density. Weed infestation is moderate and shows sign of increasing. Bush trees grow sparsely on site. Grass covers the ground and shows signs of heavy grazing. An existing footpath requires to be widened to accommodate heavy construction vehicles. Protected plant species grow on site and may need to be relocated, therefore a permit to disturb them should be sought from relevant authority.

93(164)-94(165)	<ul style="list-style-type: none"> • The drainage line runs through a wooded area • Towers are located away from the buffer area of the drainage line • The drainage line is part of the drainage network draining into Umsunduzi River • The drainage lines appear to be disrupted and some are therefore disconnected from the larger drainage network 	
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Tower 94 (165)

Tower 94 (165) is located within an open area. Plant density was found to be low. Grass cover is moderate. The site has a gentle slope. The site is located near homesteads. Access into the site is available from local roads and tracks. Protected plants were found to be growing within the site and it is suggested that a permit be sought to disturb the protected plants from relevant authority.

Tower 95 (166)

Tower 95 (166) is located within grassland covered site situated on a higher slope. Grasses are short indicating being overgrazed. Few woody species grow on the site. Lack of rain on higher altitude contribute to the slow growth of trees. Rock outcrops occur on site. Presence of rocks above ground indicate shallow soils which do not provide adequate medium for growth of trees. Access into the site is available from exiting track. Protected species grow within the tower footprint and within access into the site and may need to be relocated. A permit to disturb the plants should be sought with relevant authority.

Tower 96 (167)


Protected species grow within the tower footprint and within access into the site and may need to be relocated. A permit to disturb the plants should be sought with relevant authority. Grass covers the ground and shows sign of overgrazing. A mixture of bush trees occurs on site. Plant density is low. The site has a gradual slope. Protected plant species are found along the site and may need to be relocated. A permit to disturb the protected plants should be sought with relevant authorities. Graves were observed to be situated at a safe distance from the tower base. It is suggested that the gravesite should be fenced. Fencing of graves to be discussed with local induna and affected family.

Tower 97 (168)

Tower 97 (168) is situated within a site with moderately high number of acacia shrubs becoming a dominant species on the site. Grass is short and does not form a consistent ground cover indicate heavy grazing. Species diversity is low. An eroding cattle path runs below the site. The site is located near homesteads. Protected species grow on the site and along access track into the site. These protected plants will need permit to disturb them from relevant authority.

Tower 98 (169)

Tower 98 (169) is located along open grasslands. Bush on site is scanty and most of the bush is young indicating new onset of bush occupancy on the site. Grass cover is also sporadic with bare ground in between grass clumps. The site has a flat terrain. A low voltage line runs parallel to the site. Bare areas show cracked soils indicating soils with a high clay content. Protected species grow on the site and along access track into the site. These protected plants will permit to disturb them from relevant authority.

98(169)-99(170)	<ul style="list-style-type: none">• Towers are situated away from the buffer area of the drainage line• The powerline crosses over the drainage line• Moderately dense bush covers a quarter of the west part of drainage line, while the rest of the drainage section crossed by the powerline is scanty covered by trees• The extent of the drainage line has been intercepted	
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Tower 99 (170)

Tower 99 (170) is located within a short bushy area. Bush population is growing sparsely. Grass cover is scanty and tall showing signs of low grazing. Weeds grow along the site. The average of bush is less than a meter indicating secondary growth. Protected species grow on the site. These protected plants will need permit to disturb them from relevant authority.

NFEPA 15

The wetland is located away from the powerline route. Towers 99(170) and tower 100(171) are located away from the powerline route.



Fig. 42 NFEPA 15

Designation	Type	Specific type	Origin	Status	Area
NFEPA 15 Between towers 99(170) and 100(171) 28°28'17.05"S 32° 6'4.65"E	Lowveld Group 11	Channeled Valley Bottom Wetland	Natural	<ul style="list-style-type: none"> Highly transformed The wetland drainage line has been disconnected from the drainage network by houses, fallow lands and local road network 	<ul style="list-style-type: none"> Tower are situated away from edge of river buffer area
Aspects	Aspect present	Impacts			
Hydrology <ul style="list-style-type: none"> Intercepting of water flow Draining of wetland Destruction of drainage into wetland 	<ul style="list-style-type: none"> No water was evident in the wetland channel Road intercepted the extent of the wetland 	<ul style="list-style-type: none"> None Powerline and towers are located away from the wetland 			
Typical wetland vegetation	<ul style="list-style-type: none"> Low Shrubs grow along the wetland 	<ul style="list-style-type: none"> None 			
Direct Human Benefits	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Rare & Endangered Species	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			
Populations of Unique Species <ul style="list-style-type: none"> Destruction of 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 			

uniqueness		
Species/taxon Richness • Change to biodiversity (plant, fauna, and aquatic) and species richness	• None	• None
Ecological Integrity • Altering of physical structure • Disturbance of wetland intact	• Low	• None
Wetland ecological system • Disruption of the capability of wetland to perform its functions	• Modified	• None
Issues	• None	
Impact level	• Negligible	

Tower 100 (171)

Tower 100 (171) is located within open grasslands. Woody shrubs are scattered along the site. The site is heavily grazed. The site has a gradual slope. Protected plant species grow along the access track into the site. Permit to disturb it is required from relevant authority.

Tower 101 (172)

Tower 101 (172) is situated within open grasslands along fallow fields. The site has a gradual slope. Weeds and alien species grow prolifically within the site. Bush is growing scattered along the site. The site shows signs of being heavily grazed. Weeds cover a larger part of the site. Bush is scattered around the site. Access to the site is along a contour line. Protected species found along access track to the site. Application to disturb the protected species is to be done with the relevant authority.

NFEPA 16

The artificial dam contains water. The to be man-made dam receiving water from a natural drainage line. Further up from the wetland the drainage line is intercepted by a track and a road. Cluster of trees grow north of the wetland. The south side has no trees. The ground around the wetland including its buffer area is covered by grass. The powerline runs over the wetland and spans over the wetland buffer area. Tower 101(172) and 102(173) are located away from the wetland. Both the powerline conductors and towers will not impact on the wetland channel and buffer areas. Construction and stringing of the conductors will not impact on the wetland, on its structure and functionality.



Fig. 43 NFEPA 16

Designation	Type	Specific type	Origin	Status	Area
NFEPA 16 Between towers 101(172) and 102(173) 28°28'8.90"S 32° 6'19.07"E	Lowveld Group 11	Channeled Valley Bottom Wetland	Artificial	Moderate	<ul style="list-style-type: none"> Towers 101(172) and 102(173) are both located away from edge of buffer area of the wetland Towers and powerline are located away from wetland

Aspects	Aspect present	Impacts
Hydrology <ul style="list-style-type: none"> Intercepting of water flow Draining of wetland Destruction of drainage into wetland 	<ul style="list-style-type: none"> Present No sign of inlet and outland drainage lines 	<ul style="list-style-type: none"> None The powerline spans across the buffer area of the wetland Towers are located away from the wetland
Typical wetland vegetation	<ul style="list-style-type: none"> Shrubs grow along the north side of the wetland Fallow lands with bush growing and expanding 	<ul style="list-style-type: none"> None
Direct Human Benefits	<ul style="list-style-type: none"> Irrigation and water extraction 	<ul style="list-style-type: none"> None
Rare & Endangered Species	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None
Populations of Unique Species <ul style="list-style-type: none"> Destruction of uniqueness 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None
Species/taxon Richness <ul style="list-style-type: none"> Change to biodiversity (plant, fauna, and aquatic) and species richness 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Low
Ecological Integrity <ul style="list-style-type: none"> Altering of physical structure Disturbance of wetland intact 	<ul style="list-style-type: none"> Low 	<ul style="list-style-type: none"> None
Wetland ecological system <ul style="list-style-type: none"> Disruption of the capability of wetland to perform its functions 	<ul style="list-style-type: none"> Modified 	<ul style="list-style-type: none"> None
Issues	<ul style="list-style-type: none"> None 	
Impact level	<ul style="list-style-type: none"> Negligible 	

Tower 102 (173)

Tower 102 (173) is situated within fallow fields and with grass extending across the site. Shrubs grow sporadically along the site. Species diversity is low. Some herbaceous plants are found within the site grow in wetter areas. Slight digging of the soil showed that the soil is moist.

Span between tower 101(172) and tower 102(173) – Bird flight diverters

The span runs parallel to a water impound/wetland and therefore it is to be fitted with bird flight diverters. Stringing of the conductor will not impact on the water body.

Tower 103 (174)

The site where tower 103 (174) is located has good grass cover. The site has a gentle slope. Scrub woody plants grow along the edges of the site. Grass is taller indicating low intensity grazing. Weed growth is higher than indigenous species. Access is available from local tracks and roads.

Tower 104 (175)

Tower 104 (175) is located within open grasslands, old fallow lands. Herbaceous small shrubs and weeds grow within the site. Short grass shows signs of heavy grazing. Species diversity is low. Access is available from local tracks and roads. Protected species grow along the site. Application for their disturbance is to be sought from relevant authority.

Tower 105 (176)

The site where tower 105 (176) has flatter terrain along open grasslands. Site is accessible from a nearby road. Woody and weed species populations are low. Species diversity on site is low. The site is highly transformed, indicated by high weed infestation. The site is heavily grazed. Protected plant species exist along the site. Their disturbance requires permit from relevant authority.

Tower 106 (177)

Tower 106 (177) is situated on a slope. A few rural homesteads are located nearby. The site is heavily grazed. Weeds occupy much of the site. Woody species of equal height grow expansively on the site. Tall grass indicates low grazing. Without fire the woody species will grow into a thicket. A drainage line cascades down the slope some distance from the tower site. Woody species occupy the drainage line. Protected species grow on site and their disturbance requires a permit which is to be sought from relevant authority.

Tower 107 (178)

The site is located on open grasslands. The grass shows heavy grazing. Access into the site. Weeds grow on site. A 11kV powerline runs south of the site. Protected species were observed along the edge of the site. Construction must avoid disturbing them. A barricading tape must be placed along the edge of the protected plants to protect them from disturbance. The protected plant species should be relocated away from the work area. Permit to relocate aloe plants has been obtained.

Tower 108 (179)

The site has a gradual slope. Grass cover is low indicating signs of over grazing. The site has high density of weeds. Rock outcrops occur on the site. The site has low biodiversity. Low biodiversity and presence of rocks indicate presence of shallow soils. The site is near a low voltage powerline. Cranes should access the site away from the powerline side. The site is near homesteads.

Tower 109 (180)

The site is accessible and open grasslands. The site is overgrazed. Weeds grow abundantly on site. The site has low biodiversity. Rock outcrops found on site. The site is sparsely populated. The extent of the tower leg must avoid nearby fence. A low voltage powerline runs near the site. A protected species grows on site. The grass is short indicating overgrazing.

Tower 110 (181)

An abandoned house is near the servitude and tower and will be removed. Protected species occur on the site. Biodiversity is low. Mostly weeds invaded the site. There are signs of overgrazing. Woody species are scanty. Rocks appear on the surface. There is a ridge above the site. Protected species found on site. Permit to relocate them is required.

NFEPA 17

The wetland is situated along a drainage line. The drainage line supplies water into a wetland. The powerline runs parallel to the wetland. The wetland is situated away from the powerline. The extent of the drainage line is intercepted by houses and local tracks and roads. The longer drainage line now exists as disjointed drainage system. The powerline spans across the wetland from tower 110 (181) and tower 111(182). Scanty trees grow

along edges (buffer zone) of the wetland drainage line. The ground is covered by grass. A homestead exists at the end of the drainage line intercepting the continuity of the drainage line.



Fig. 44 NFEPA 17

Designation	Type	Specific type	Origin	Status	Area
NFEPA 17 Between towers 110(181) and 111(182) 28°27'3.18"S 32° 6'58.65"E	Lowveld Group 11	Channeled Valley Bottom Wetland	Natural	<ul style="list-style-type: none"> Modified and transformed The extent of the drainage line has been disconnected from the drainage network by houses, fallow lands and local road network 	<ul style="list-style-type: none"> Towers are located away from edge of river buffer area The riparian vegetation is still intact No signs of disturbance have been observed
Aspects	Aspect present		Impacts		
Hydrology <ul style="list-style-type: none"> Intercepting of water flow Draining of wetland Destruction of drainage into wetland 	<ul style="list-style-type: none"> None 		<ul style="list-style-type: none"> None 		
Typical wetland vegetation	<ul style="list-style-type: none"> A few shrubs grow along the wetland 		<ul style="list-style-type: none"> None 		
Direct Human Benefits	<ul style="list-style-type: none"> None 		<ul style="list-style-type: none"> None 		
Rare & Endangered Species	<ul style="list-style-type: none"> None 		<ul style="list-style-type: none"> None 		
Populations of Unique Species <ul style="list-style-type: none"> Destruction of uniqueness 	<ul style="list-style-type: none"> None 		<ul style="list-style-type: none"> None 		
Species/taxon Richness <ul style="list-style-type: none"> Change to biodiversity (plant, fauna, and aquatic) and species richness 	<ul style="list-style-type: none"> None 		<ul style="list-style-type: none"> None 		

Ecological Integrity <ul style="list-style-type: none"> Altering of physical structure Disturbance of wetland intact 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None
Wetland ecological system <ul style="list-style-type: none"> Disruption of the capability of wetland to perform its functions 	<ul style="list-style-type: none"> Modified 	<ul style="list-style-type: none"> None
Issues	<ul style="list-style-type: none"> None 	
Impact level	<ul style="list-style-type: none"> Negligible 	

Tower 111 (182)

Tower 111 (182) is located along open grasslands. The site has low species diversity and shows signs of overgrazing. Weeds infest the site. Rock outcrops appear on the site. Protected species are found on site. Permit to relocate them is required and has been obtained.

Span between tower 109(180) and tower 110 (181)

Figure 45 shows a house existing within the powerline servitude between tower 109(180) and tower 110(181) and requires to be relocated.



Fig. 45 Shows homestead within a powerline servitude near tower 110(181)

Fit Bird Flight Diverters Span from tower 107 (178) to tower 111(182)

This span runs parallel to a large natural waterbody and requires to be fitted with bird flight diverters.



Fig 46 Showing NFEPA wetland and a large waterbody and spans from towers 107(178) – tower 111(182) requiring bird flight diverters

Span between tower 110 (181) and tower 111(182)

The conductor span crosses a drainage line and runs near NFEPA wetland. No cutting of trees or vegetation within buffer zone of the drainage line below tower 111(182). Stringing of conductor will not impact on the wetland and the section of the drainage line it crosses.

Towers 112 (183)

The site is located along open grasslands. The site has a gentle slope. The site has low species diversity and grass is overgrazed. Woody species are few. Access is available from nearby footpath.

Tower 113 (184)

Tower 113 (184) is located within vast open grasslands. Woody species grow scanty within the site. The site is heavily grazed. Weed infestation is high indicating intense disturbance. Woody species grow sparingly across the site. Access into the site is available. Graves are situated a distance from the tower base and servitude area. It is recommended that the graves be fenced to protect them against potential disturbance even though they are located a distance from the tower base. Fencing of the graves should be done in consultation with the affected family and local induna. The family must provide guidance and approval for the fencing of the graves.

Tower 114 (185)

Tower 114 (185) is situated on a site that is heavily grazed and within an open grassland. The site is infested by weeds. Woody species are scanty. The site has low species diversity. The powerline will span over existing 11kV powerline. Access into the site is available.

Tower 115 (186)

The tower is located within open grasslands. Grass is short indicating overgrazing. Bush has formed a thicket along the edge of the ploughed field. The thicket is growing away from the tower base position. Weed infestation on the site is low. Access is available from nearby track. Protected plant species were found on the site. Permit to disturb or relocate the protected plant species is to be sought from relevant authority.

Tower 116 (187)

Tower 116 (187) is located above the riparian adjacent to Umfolozi River and above the floodplain. The tower overlooks Umfolozi river. The vegetation along the site is characterised by succulent thornveld. The site is located within scrub woody trees with pockets of bare space. The area has more indigenous trees within the site. Weed infestation is low. The site has a moderate slope. A number of protected plant species are found on site growing above and along the floodplain. The floodplain extends and includes the riparian area. Affected protected species, such as Aloes, should be relocated. Disturbance to protected plants and indigenous trees in a canopy and their relocation of protected species requires a licence and permit, respectively, which should be sought from relevant authority. Trees need to be cleared to accommodate the tower base. Removal of trees will include the area covering the length of the tower. Access is along a vehicle track and a footpath. It is recommended that clearance of trees should be minimal. Only trees that will affect location of the tower should be cleared, in other words only clear what is necessary. It is recommended that prior to construction sandbags be placed at the edge of the bottom of the site to contain silt that could occur. Disturbance along the site may loosen silt which will be washed downslope and collected along soil bags. After construction collected silt can be distributed evenly across the site. The sandbags are to be removed when construction is completed. The project ecologist must indicate protected and indigenous plants to be cleared. Figure 47 and 48 show that most of the tower base is located along open grass patch. Indigenous trees grow towards the edge of the tower base.



Fig 47 Tower base 116 (187) south of Umfolozi river outside the riparian area, amongst indigenous patch of trees



Fig. 48 Location of tower 116 (187) near Umfolozi

Tower 117(188)

The tower, 117 (188) is located on a koppie across Umfolozi River. The site is characterised with rock outcrops. The site has short grass indicating heavy grazing. The site has low species diversity but has a few protected plant and tree species. The tower is located away from the protected plant and tree species. Berms are to be fitted at the end of the edge of the site to contain run-off. Any collected silt after construction must be reapplied around the site. A number of protected species occur on site. Permit to disturb or relocate protected species is to be sought with relevant authority.

Span between tower 116(187) and tower 117(188)

Figure 50 shows the span between tower 116 (187) and tower 117 (188) is to be fitted with aviation spheres. The conductors span over Umfolozi River. No damage, disturbance or cutting of trees or vegetation within 32m from edge of a watercourse.

NFEPA 18

The wetland is located along a floodplain that stretches parallel to Umfolozi River. The floodplain is represented by a red area. A number of cultivated fields are located on the south of the river, predominantly east of the floodplain. North of the river is on a higher altitude. This area is characterised by rock outcrops and is higher than the river, hence no cultivation. Tower 116(187) is located outside the 1:100 floodline. Digging to accommodate pile foundation for tower 116(187) some indigenous trees within the tower site will need to be removed. Permit to remove the trees has been received from relevant authority. Since the area where tower 116(187) is situated on a slope it is therefore, recommended that the disturbed area be rehabilitated by grassing the disturbed area after construction to prevent potential erosion. Growth of trees along the riparian area shows that even if over grazing occurs however, growth of trees still takes place.



**Fig 50 NFEPA 18 and Umfolozi River crossing between towers 116(187) and 117(188)
Showing location of protected plant and tree species**

Designation	Type	Specific type	Origin	Status	Area
NFEPA 18 Between towers 116(187) and 117(188) 28°26'20.49"S 32° 6'47.23"E	Indian Ocean Coastal Belt Group 1	Floodplain Wetland	Natural	Umfolozi river is intact Floodplain is mostly cultivated Few trees grow along the floodplain	<ul style="list-style-type: none"> • Tower 116(187) is located outside the 1:00 floodline • Tower 117(188) is located at the top of a koppie above Umfolozi River • Powerline will be strung across the river • No signs of erosion were observed • Access to towers is available along existing tracks
Aspects	Aspect present	Impacts			
Hydrology <ul style="list-style-type: none"> • Intercepting of water flow • Draining of wetland • Destruction of drainage into wetland 	<ul style="list-style-type: none"> • Intact • Water is present in the river 	<ul style="list-style-type: none"> • None 			
Typical wetland vegetation	<ul style="list-style-type: none"> • Terrestrial trees found above floodplain and floodline • No disturbance to vegetation along the koppie at and around tower 117(188) 	<ul style="list-style-type: none"> • None • Powerline will be strung over tower 117(188) tower site 			
Direct Human Benefits	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • None 			
Rare & Endangered Species	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • None 			
Populations of Unique Species <ul style="list-style-type: none"> • Destruction of uniqueness 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • None 			
Species/taxon Richness <ul style="list-style-type: none"> • Change to biodiversity (plant, fauna, and aquatic) and species richness 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Low 			
Ecological Integrity <ul style="list-style-type: none"> • Altering of physical structure • Disturbance of wetland intact 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • None 			
Wetland ecological system <ul style="list-style-type: none"> • Disruption of the capability 	<ul style="list-style-type: none"> • Modified 	<ul style="list-style-type: none"> • None 			

of wetland to perform its functions		
Issues	<ul style="list-style-type: none"> • None 	
Impact level	<ul style="list-style-type: none"> • Negligible 	

Tower 118(189)

The tower 118 (189) is at the top of the ridge. Indigenous shrubs grow within the site. Grass cover is patchy. There are signs of overgrazing. Aloe species and succulents are found within the site. Species diversity is moderate. Protected species are found on site. The site on the ridge is flat and has a steep slope towards Umfolozi River. Access is available from existing tracks. Driving of construction should avoid damaging protected species. Project ecologist to mark protected species to be avoided. Permits to disturb protected species is to be sought with relevant authority.

Tower 119(190)

The tower, 119 (190), is located along the ridge. Grass cover is good. The contractor is to enquire about access from locals in order to avoid driving along private property. The tower was recommended to be moved to a nearby house for ease of access. Species diversity is low. The site has a steep slope. Shrubs are sparsely populated. A number of aloe species occur on site. Permit to disturb or relocate Aloes should be sought from relevant authority. Permits to disturb protected species is to be sought with relevant authority.

Tower 120(191)

The tower is located on a flat terrain. The site is accessible from existing track. A clump of bush exits at the edge of the tower area. The site has low species diversity. The site shows signs of heavy grazing. Bush on the site is sporadic. The site has rock outcrops. The line spans across 11kV powerline. The tower is closer to houses but does not impact on the homesteads. Permits to relocate or disturb protected species is to be sought with relevant authority.

120(191)-121(192)	<ul style="list-style-type: none"> • The drainage line is distinctly indicating disturbance which could have been caused by the road running through the drainage line. A few tracks and houses also intercept the drainage line • The powerline runs over the drainage line • No towers will impact on the drainage line and even on its buffer area • Siting and stringing of conductor will not impact on the drainage line 	
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Tower 121(192)



Tower 121(192) is situated along the ridge. Access is along steep slope and the slope is accessible. Driving to be strictly kept along contour lines and along a single track. The site shows signs of overgrazing. The site has low species diversity. Protected plant species found on site can be avoided by locating tower legs away from them. The project ecologist will mark the plants and will provide measures to prevent damages to protected plant species. The protected plants can be relocated away from the work area. Permit to disturb or relocated protected plants species need to be sought from relevant authorities. Graves exist away from designated work area. It is recommended that the graves should be fenced to protect them against potential damage. Owners of the graves must be contacted to discuss fencing of the graves to make them visible during construction.

Tower 122(193)

The tower is located on a site with rock outcrops. Access is available from an existing track. The site has a gentle slope. Grass cover is moderate and shows signs of low grazing. Species diversity is low. Short herbaceous shrubs as well as flowering shrubs grow sporadically within the site. The tower base should be located to minimise disturbance to protected plant species occurring on the site. Disturbance or relocation of protected plant species should be sought from a relevant authority.

Tower 123 (194)

Protected plant species occur along the site where tower 123 (194) is located. Access into the site runs along a steep slope. Driving should be kept along an existing track which runs along a contour line. Disturbance or relocation of protected plants species is to be sought with the relevant authority. Grass cover is less uniform. Scanty and short grass cover shows signs of overgrazing. Short herbaceous shrubs grow sporadically along the site. Disturbance or relocation of protected plant species should be sought from a relevant authority.

<p>120(191) and tower 121(192)</p>	<ul style="list-style-type: none"> • Vegetation covers the northside buffer area. Old fallow lands removed most of trees growing on the south side of the drainage line • The drainage lines appear to be disrupted and some are therefore disconnected from the larger drainage network • The drainage line is part of the drainage network that has been broken up by houses, roads and cultivated fields • The powerline runs across the drainage line • Towers are located away from the drainage line • Location of towers will not impact on the drainage line • Protected species along towers 120 (191) and tower 121(192) 	 <p>A satellite map from Google Earth showing a landscape with a drainage line highlighted in yellow. Two tower locations are marked with blue dots and labeled 'Huemia zebina (H)' and '120' and '121'. The drainage line is a winding path through the terrain, and a powerline is visible crossing it. The surrounding area includes some buildings and cultivated fields.</p>
<p>123(194)-124(195)</p>	<ul style="list-style-type: none"> • Vegetation covers the northside buffer area. Old fallow lands removed most of trees growing on the south side of the drainage line • The drainage lines appear to be disrupted and some are therefore disconnected from the larger drainage network • The drainage line is part of the drainage network that has been broken up by houses, roads and cultivated fields • The powerline runs across the drainage line • Towers are located away from the drainage line • Location of towers will not impact on the drainage line 	 <p>A satellite map from Google Earth showing a landscape with a drainage line highlighted in yellow. Two tower locations are marked with blue dots and labeled 'Huemia zebina (H)' and '123' and '124'. The drainage line is a winding path through the terrain, and a powerline is visible crossing it. The surrounding area includes some buildings and cultivated fields.</p>

Span between tower 124(195) and tower 128(199)

Fig. 52 shows the conductor servitude between tower 124(195) and tower 128(199) will span across a place of worship. Eskom has liaised with the church representative who agreed to move the worship site and Eskom to pay for the relocation. It is important that the contractor liaise with the worshippers about the servitude. Protected species grow within the site. Disturbance or relocation of protected plant species should be sought from a relevant authority.

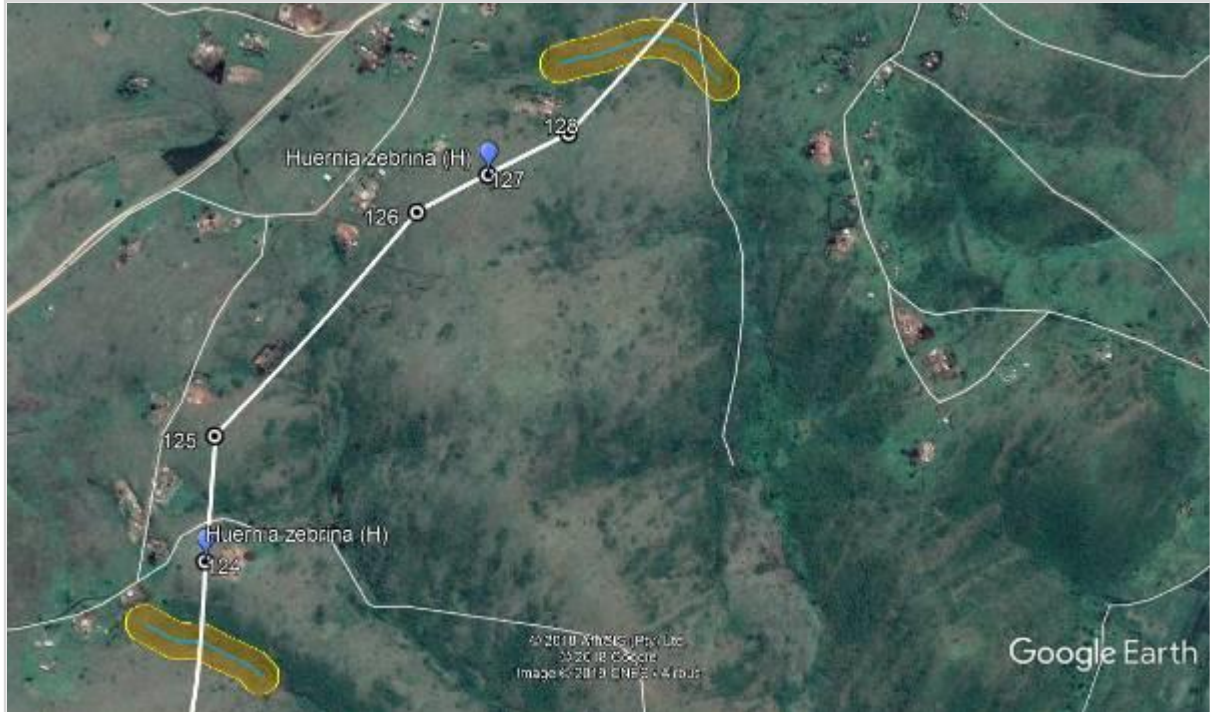


Fig. 52 Showing span between tower 123(194) and tower 126(197)

Tower 124(195) Bird flight diverters

Figure 51 shows tower 124(195) is located within the ridge and near a Shembe religion open circle of worship site. Shembe church leaders have to be approached to relocate their place of worship. Grass cover within the site is less dense showing signs of overgrazing. Shrubs are slowly expanding within the greater area. Access into the site needs to be constructed. Rock outcrops occur within the site. Protected plant species grow along the tower base. Their disturbance is inevitable. To disturb or relocate protected plant species requires a permit which should be sought with the relevant authority. The conductors between tower 124(195) and tower 125(196) cross over a seasonal stream. The span to be fitted with bird flight diverters.

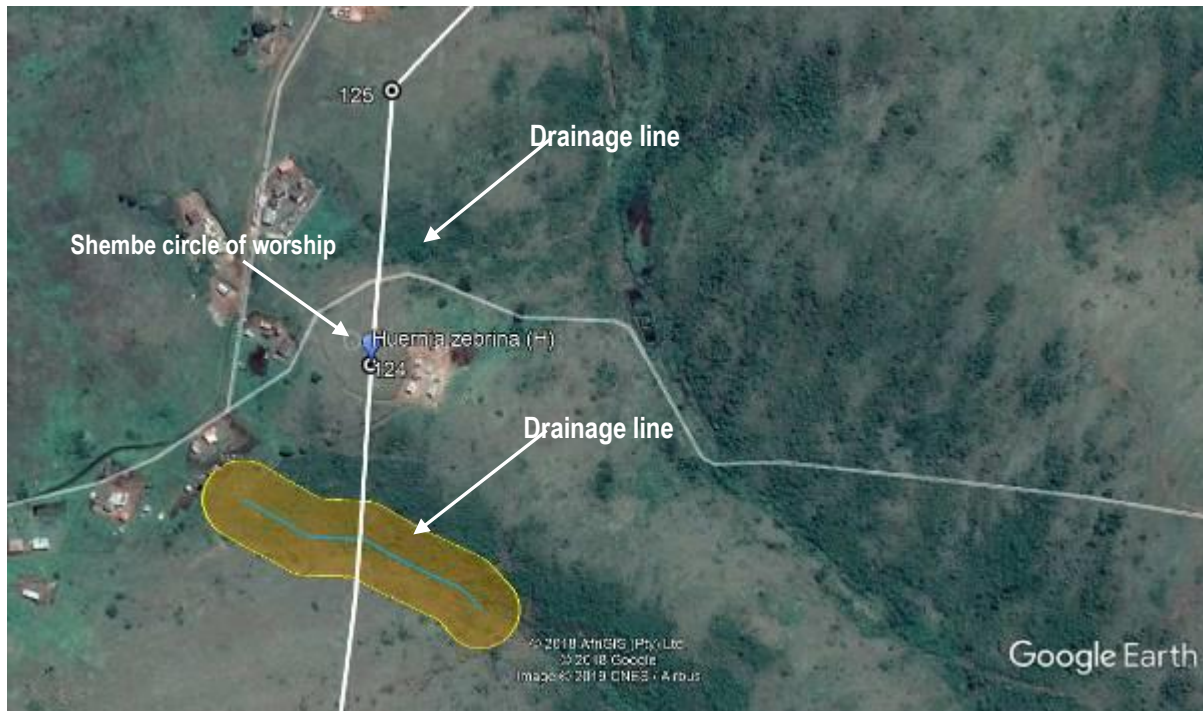


Fig. 51 Shows Shembe circle of worship near tower 124(195) drainage line and protected plants along the powerline route

Tower 125(196)

Tower 125 (196) is located within an open grassland area. Protected species were observed within the site. Permit to disturb the protected plant species is to be sought with the relevant authority.

Tower 126(197)

Tower 126 (197) is located on top of the ridge, along a steep slope. Access is to the tower site runs along the steep slope. Driving is to be kept within contour lines and along single tracks. No multiple tracks are to be created. The site is heavily grazed and has low species diversity. Short bush grows sparsely within the site. Fence exists near the tower base however the tower legs will not impact on the fence. Rock outcrops exist on the site. The conductors from tower 126(197) to tower 127(198) span over a fence around a private property. Protected plant species occur within the site. Permit to disturb or relocate them is to be sought from relevant authority.

Tower 127 (198)

Tower 127 (198) is situated within the site is along a small hill. Driving is to be done along contour lines to minimise potential erosion. The site has moderate grass cover. Plant diversity is low due to drought. Rock outcrops exist along the site. Protected plant species occur along the site. Permit to disturb or relocate them is to be sought from relevant authority.

Tower 128(199)


Tower 128(199) is at the top of the hill. Access is available along the hill. Driving is advised to be kept along contour lines to prevent driving along straight line along the slope. Grass cover shows signs of overgrazing. Shrubs are spreading thin along the site. Species diversity is low. Protected plant species grow on site. Their disturbance can be avoided. Project ecologist will mark plants to be avoided.

Tower 129(200)

The site on which tower 129 (200) is located is within grassland. The site has shrubs growing on it. Flowering plants and shrubs occupying the site. Despite the presence of herbaceous flowering plants and shrubs species diversity is low. The site is situated near a house.

Conductor span between tower 128(199) and tower 129(200)

Conductors between tower 128(199) and tower 129(200) cross over drainage lines. The span is to be fitted with bird flight diverters. No damage, disturbance, cutting of trees growing within buffer area of the drainage line. watercourse.

128(199)-129(200)	<ul style="list-style-type: none">• The section of the drainage line crossed by the powerline branches from a main drainage line• This drainage line has been disturbed and disconnected from the drainage network in the area• Vegetation grows scantily along the buffer area of the drainage line• Towers are located away from the buffer area• Siting and stringing of conductor will not impact on the drainage line	
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Tower 130 (201)

Tower 130 (201) is situated above a slope. The slope to the tower base is steep. Driving to the tower along the steep slope should be kept within contour lines and a single track. Access is challenging and it runs through private property. Graves occur away from the tower base and the work area. Graves should be fenced to prevent any potential damage during construction. Access to tower base runs past the grave area, however a distance from the grave site. Eskom and the contractor to liaise with affected family about fencing of the grave site. Grass cover is scanty and is taken over by weeds. Species diversity is low. The site has a high weed infestation. Work area is to be demarcated to limit damage within the work area. Drainage line runs at the bottom of the slope. The site shows signs of overgrazing. There are more flowers growing along the ridge. Succulents grow along the edge of the site. The tower needs to be moved out of the weed infested area by a few meters.

Tower 131 (202)

Tower 131 (202) is located along open fields. The tower is situated on a site that is characterised by rock outcrops. The site is heavily infested by weeds. There is very low species diversity. Access track to the site extends to people's houses. Use of the track by construction vehicle should not block use of the track by locals. Protected species occur on site. Disturbance or relocation of protected plant species requires a permit from relevant authorities.

Tower 132 (203)

The tower 132 (203) is located within old fields. Vegetation on site is scanty. Grass is dominant within the site. The site has a gentle slope. Species diversity is low. The site is situated near a house. The contractor should negotiate locating a powerline servitude over a private property with the landowner. Access into the site is

available from local roads. Protected plant species were found within the site. Disturbance or relocation of protected plant species requires a permit from relevant authorities.

Tower 133 (204)

The tower 132 (203) is located within old fields. The site has low species diversity. The site has a gentle slope. Rock outcrops occur on the surface. The site shows signs of overgrazing. It is located near houses. Protected species grow within the site. Access to the site has terrain challenges and the contractor should discuss access to the site with project civil engineer. Disturbance or relocation of affected plant species will require a licence from relevant authority.

Tower 134 (205)

Tower 143(205) is located within an open field. It has a gradual slope. The site has low biodiversity due to overgrazing. No woody species grow along the site. Access into the site needs to be assessed. Driving along the slope should be within contour lines and must follow the curve contour line. Access to the site passes a house. The contractor should inform the house owner about access to the tower base. Access needs to be properly constructed to accommodate a crane. Protected species were observed along the site and access track area. Possible disturbance or relocation of protected plant species is to be discussed with project ecologist.

Tower 135 (206)

The site where tower 135(206), figure 52, is located is within cultivated fields of sweet potato. The site has low species diversity. Protected species grow within the site. Disturbance or relocation of affected plant species will require a permit which is to be sought from relevant authority. Some of the protected species on site are possible harvested for medicinal use. The site is within old fields. The area is heavily transformed at a rapid pace and this is evident by over harvesting of medicinal plants. A drainage line exists a distance from the site. Protected species exist within the site. To disturb or relocate them requires a permit which should be sought from relevant authority.



Fig. 52 Showing tower 135(206) within a ploughed field

Tower 136 (207)

Tower 136 (207) is situated within a ploughed private garden. The contractor should request permission to enter the garden and to locate a tower within the garden. The contractor should explain that the garden can be ploughed around the tower.

Tower 137 (208)

The tower is located in-between houses. Access to the tower is from the main road. The site has low species density. Protected species occur within the site. The powerline conductors will span over a fence and private property. The fence will not be affected. Locating a servitude and a tower is to be negotiated with the landowner.

Tower 138 (209)

Tower 138 (209) is located within an open field which has low plant density. The site has a gentle slope towards a man-made dam. The site is located between houses. Vegetation on site shows signs of being overgrazed. Access is available from local roads.

Tower 139 (210)

Tower 139 (210) is situated upslope, within a ploughed field. It was recommended that the tower be positioned outside the ploughed field. A wetland exists south of the tower base. However, the wetland is situated away from the tower footprint. Access to the tower site is along the slope and driving up the slope should be kept along contour lines.

139(210)-140(211) &
140(211)-141(212)

- Vegetation along the buffer areas of both sections of the drainage lines crossed by the powerline is distinctly scanty
- The continuation of the drainage lines has been intercepted by houses. Both the sections of the drainage lines act as isolated pockets
- Tower 140(211) is located close to the edge of the drainage line buffer area while towers 139(210) and 141(212) are located away from the edge of the buffer area



Tower 140 (211)

Tower 140 (211) is positioned within an open field. The site is covered by grass. The site has low plant density.

Span between tower 137(208) and tower 140(211)

The powerline runs parallel to a drainage line that ends and feeds water into a small dam, figure 53. Scanty bush lines the buffer area of the drainage line. The powerline route is located away from the drainage line.



Fig 53 Shoes drainage line and powerline route

Tower 141 (212)

Tower 141 (212) is located within an open field. The site is covered with grass. The site has low plant density. A drainage line with riverine vegetation exists near the tower base. The tower is located a distance from the drainage line and will not impact on the drainage line. The site is located near a house and will not impact on the house. Access into the site is from local tracks.

Fitting bird flight diverters between tower 140 (211) and tower 141(212)

The conductors between tower 138(209) and tower 139(210) and between tower 140 (211) and towers 141 (212) spans over a drainage line. No damage, disturbance, cutting within 32m of riparian area from edge of the watercourse.

Tower 142 (213)

Tower 142 (213) is situated within a flat terrain. It has very low plant density. The vegetation on site shows signs of overgrazing. A fence runs adjacent to the site. Protected species were found on site. Disturbance or relocation of protected species require a permit which should be sought from relevant authorities.

Tower 143 (214)

Tower 143 (214) is placed within an open field with a flat terrain and it is fenced. The site is owned privately. Grass within the site shows signs of overgrazing. The site has low plant density. Protected species were found on site. Access to the site from existing tracks and roads. Access into the site is through a gate. The powerline will span over a private property. Contractor to liaise with the owner of property to enter the site. Disturbance or relocation of protected species require a permit which should be sought from relevant authorities.

Tower 144 (215)

Tower 144 (215) is located within a ploughed field with big soil mounds which are suspected to have come from the nearby soccer field and the soil mounds resulting from levelling on the soccer field.

Tower 145 (216)

Tower 145(216) is located on a site characterised by sparse vegetation. The site is located along an open veld. The site is predominantly covered by grass and scattered short shrubs. Short grass and short shrubs indicating overgrazing. Protected and Protected species were found growing along the site. Before construction takes place, the project ecologist must be involved in indicating protected plants not to be disturbed and ones that need to be relocated. Permit to disturb or relocate the protected species is to be sought with relevant authority. It is suggested that the tower be moved away from the area with moderate coverage of protected species.

Tower 146 (217)

The tower base is located with a privately ploughed garden surrounded by a fence. Access into the fenced garden is to be discussed with the owner. The site has overgrown grass and bushes. Bushes are clustered in one area and the tower base is outside the bush cluster. May need to reassess the position of the tower. The tower has gradual slope towards a drainage line. The tower is located away from the drainage line. Access is from existing road.

Span between tower 141(212) and tower 148(219)

The powerline is located between houses but away from the homesteads. Access is mostly available from existing local tracks.



Fig 54 Showing powerline route between tower141(212) and tower 148(219)

Span between tower 145 (216) and tower 146(217)


The span crosses over two drainage lines, figure 48. The span to be fitted with bird flight diverters. No damage, disturbance, cutting within 32m of riparian area from edge of the watercourse.

Tower 147 (218)

The location of the tower will require relocation of houses. The area around the house is weed infested. Access into the tower base is through the house property. Entrance into the site is to be discussed with the owner. The site has a gradual slope towards a drainage line. The tower is located away from the drainage line.

Fitting bird flight diverters between tower 145(216) and 146(217) and between tower 146(217) and tower 148(219)

The conductor between tower 145(216) and tower 146(217) span across a stream. Tower 146(217) and tower 147(218) runs parallel to a stream. Figure 51 shows crossing of drainage lines by the proposed powerline. Tower 148 (219) is within an existing path and the path runs within an open veld. The site is covered by tall grass indicating minimal low grazing and less burning. Bush is scattered across the site. However, species diversity is relatively low.

<p>145(216)-146(217) & 146(217)-149(220)</p>	<ul style="list-style-type: none">• Sections of the drainage lines crossed by the powerline are part of labyrinth of drainage network• Housing congestion has resulted in disconnection of drainage lines from the drainage network• Tower 146(217) is located near edge of the buffer area• Location of towers will not impact on the drainage line	
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Tower 149 (220)

Tower 149 (220) is positioned in a cultivated garden. Vegetation along the site is scanty. Contractor should negotiate with the owner to use his property to position the tower within private property. Contractor may need to cut the fence to gain access into the tower site. Contractor to rebuild cut fence into the property after construction.

Tower 150 (221)

Tower 150 (221) will be constructed as a new tower and is located within old sugarcane fields. The tower is located underneath existing powerline servitude. The existing tower will be replaced by new a new tower which will be constructed along the existing servitude. The new tower is located near a house. Protected species grow within the servitude. To disturb or relocate the plants requires a permit from relevant authority.

Tower 151 (222)

Tower 151 (222) is located under existing powerline within the existing servitude. The site is moderately covered by vegetation. According to the project engineer the foundation of the tower needs to be raised. A fence near the servitude needs to be moved in order to be able to locate the tower. The existing tower will be replaced by new a new tower which will be constructed along the existing servitude. Some of the protected plant species growing within the servitude between the towers may require to be relocated. Location of the towers will not be able to avoid disturbing some of the protected species. To disturb or relocate the plants requires a permit from relevant authority.

Tower 152 (223)

Tower 152 (223) is located under existing powerline adjacent to national road, N2 towards Pongola. Vegetation within the site is scanty. Plant density is low. A high number of protected plant species were found within the site. The project ecologist is to be consulted regarding relocation of protected species of which a permit is required.

Tower 153 (224)

Tower 153 (224) is located within substation perimeter fence on Eskom land at Mtubatuba substation.

12. KWAMBONAMBI SUBSTATION LOOP-IN-LOOP-OUT AND EXISTING IMPALA-MTUBATUBA 132 kV POWERLINE

KwaMbonambi Substation Loop-in-Loop-out is part of Impala-Mtubatuba powerline Environmental Authorisation. The Loop-in-Loop-out is about 100m from KwaMbonambi substation to the existing Impala-Mtubatuba 1 132kV powerline. Area adjacent to the substation is used for commercial timber. Figure 52 shows the Loop-in-Loop-out connections at existing Kwambonambi substation. The area covered by the Loop-in-Loop-out comprises of Eskom property and timber plantation. Ground cover comprises of grass. Due to transformation of the natural habitat no sensitivity exists along 100m Loop-in-Loop-out line. The vegetation of the area is highly degraded and invaded by alien species. The relatively little foot print of the Loop-in-Loop-out line no avi-fauna impacts are anticipated. No collisions along the substation and nearby existing powerline no collisions between avifauna and the structures have been reported in Eskom.



Fig. 52 Shows Impala-Mtubatuba 1 132kV powerline and KwaMbonambi Loop-In-Loop-Out Lines

13. CONCLUSION

13.1 Natural habitats and protected plant species

The walkthrough of the powerline route showed that sensitive areas such as rivers, wetlands, drainage lines, slopes and sites with protected species exist the powerline route. Natural phenomenon such as drought and floods are capable of transforming landscapes and groundcover. Over grazing and rampant fires have also contributed to the stresses on the vegetation, habitats and natural features along the landscape supporting the powerline. Natural state of the sensitive habitats has been transformed by houses, cultivated fields and road networks. Their integrity and ability to perform their functions and provide services has been altered. Location of the powerline in most cases has avoided locating towers along sensitive habitats. Buffer zones adjacent to watercourses will not be impacted by stringing and establishment of the powerline. Some sites towers are located within protected plant species. Disturbances or relocation of these protected species is subject to obtaining permits to from relevant authorities. Such permits had been awarded with conditions. Protected plant species such as Aloe plants and Zebra Huernia as well existence of protected Marula trees occur as isolated pockets along the powerline route. Protected plants to be affected by construction of the powerline should be relocated away from the work area. The drainage network spreading along the larger landscape has been intercepted by houses, cultivation and road networks. This has resulted in disconnected water systems. Some drainage lines are seasonal while other flow permanently. Three rivers are crossed by the powerline. Towers are mostly located outside the buffer area adjacent to these rivers. Location of towers and stringing of conductors will not impact on these buffer areas and the river channel. Disturbance may occur to some trees mainly during stringing. Permit to disturb, cut or trim indigenous trees has been obtained from relevant authority. The permit for disturbing protected trees only provides permit such disturbance to identified 12 Marula trees. Additional disturbance beyond 12 Marula trees need to be applied for to the relevant authority.

13.2 Public involvement

All individuals affected by the location of the powerline have been liaised with about the nature of disturbance and the process of construction a powerline. The public participation process regarding the walkthrough exercise is attached in Appendix B. The process involved explaining findings through the walkthrough, potential impacts and associated mitigation measures aimed at minimising the effect and extend of potential impacts. The main concern from stakeholders is when the project will start. Eskom has been progressively engaging with the affected stakeholders about the project schedule. Stakeholders have been assured that the project will be implemented.

13.3 Relocation of houses

A few houses will be affected by the powerline and will need to be relocated. Owners of affected homesteads have been met in some instances with the involvement of the local tribal council to ensure transparency and coordinated consultation. The relocation process has been explained and all concerns had been addressed by Eskom Lands & Rights at public meetings and during individual meetings. All affected landowners have agreed on the relocation process. Contractor has been urged to consult landowners prior to entering private properties.

13.4 Access to tower sites

No new access is to be created. Access to all tower sites is available along existing tracks, roads and open fields.

13.6 General recommendations

Project highlights are as follows:

Table 17 Summary of issues and recommendations

Issues	Recommendations
Disturbance to protected Marula trees	Contractor is urged to avoid where possible disturbing the protected Marula tree. Where disturbance is unavoidable, disturbance should be minimised
Disturbance to protected plant species	Protected plant species along the powerline should be relocated away from designated work areas. Procedure to relocate the plants is attached
Condition for compensation for	One of the conditions in the tree disturbance permit is the compensation

disturbed protected trees	for each damaged protected tree to be compensated by planting of three indigenous trees within secured public properties such as tribal courts, schools, churches.
Access into private properties	Contractor to liaise with affected landowner prior to entering private property
Location of towers along fallow lands	Even though fallow lands may not be cultivated, it is imperative to consult the owner of the field prior to accessing fallow fields. all liaisons are to be recorded for record keeping.
Compensation and repair of disturbed assets such as timber, crops, and fences	Compensation process has been explained from during the basic assessment process through the site-specific EMP process All affected asset owners have accepted the compensation process Contractor is urged to take pictures of the assets to be affected prior to damage or disturbance and after construction has been completed Owner of the assets must be happy with the repair work of the damaged assets
Provision of manual labour	Contractor to discuss use of manual labour with local tribal council structures to avoid potential conflicts
Removal of waste	General waste is to be disposed designated bins and transferred to registered landfill sites Hazardous waste such as concrete, oil, chemicals etc is to be disposed at designated bins and transferred to registered landfill sites Waste disposal slips are to be retained safely for record keeping
Work area	All work areas are to be demarcated in order to limit disturbance Danger tapes are to be placed around work areas
Use of cement	Only pre-mixed cement is to be poured into pile foundations holes Mixing of cement is strictly prohibited to be done on site
Compensation of relocated houses	Location and building of relocated houses have been discussed and no objections have been received
Safety during construction	All safety measures are to be implemented during construction
Working during rainy days	Construction should not take place during heavy rains in order to prevent damage to local roads and fields

13.6 Overall impact level

Construction of the powerline will have minimal impact on the following aspects:

Table 18 Powerline overall impacts

Impact	Recommendations
Ground cover and topsoil	Digging for pile foundations will be limited to specified hole dimension Topsoil will be stored safely and later used for grassing of disturbed areas around the tower sites
Weed invasion	Invasion of weed will be minimised by rehabilitating disturbed areas after construction
Potential erosion	Will be minimised by applying topsoil along disturbed area and grass will grow back naturally
Buffer zones along drainage lines	All towers are located away from buffer areas
Damage to indigenous tree	Effort will be applied to avoid damaging indigenous trees. However, where damage is not avoidable minimum damage should be done
Prevention of fire	Contractor urged not undertake activities that require use of fire Smoking is to be done within designated areas and fire prevention procedure be in place

APPENDIX A ACTIVITY TABLES FOR FLAGGED TOWERS

Table A1 Action table - Tower to be fitted with bird flight diverters & permit to disturb protected species

Installation of diverters		Permit for protected plants		Permit for protected trees	
Tower No.		Tower No.		Tower No.	
From Impala substation to Nseleni river Span between towers 9-10	The span requires to be fitted with bird flappers The conductor span across drainage line No clearing or disturbance to the trees growing within 32m of riparian area	From Impala substation to Nseleni river Tower 33	Presence of protected species Permit to disturb or relocate protected species needed	Towers 9-10	Trees along drainage line and its associated riparian area Trim tree that pose safety threat Strictly no cutting, clearance to be done Eskom to check through LADA for individual trees that may not have required safety clearance
Span between towers 24-25	Flight diverters are required as the powerline conductors span across a wetland No disturbance within 500m of the riparian area from the edge of the wetland	Tower 54	Presence of protected species Permit to disturb or relocate protected species needed	Span between towers 44-45	The span runs over a drainage line with trees growing along the edge of the drainage line No cutting of trees should be done
Span between towers 28 and 29	Flight diverters are required as the powerline conductors span across a drainage line No clearing or disturbance to the trees growing within 32m of riparian area	Tower 55	Presence of protected species Disturbance to the species can be avoided by creating new access	Towers 53-54	The conductor spans over Nseleni river. No cutting is to be done to avoid cutting trees along edge of river course or along riparian area to prevent impacting on the watercourse system Conductor to be strung across without cutting
Span between towers 44 and 45	Span to be fitted with flight diverters. The conductors cross over a drainage line No clearing or disturbance to the trees occurring growing within 32m of riparian area	Tower 60	Protected plant species found on site Permit to disturb or relocate protected species	Tower 56	No cutting to be done
Span between towers 53 - 54	Conductors between towers 53-54 span over a valley and will need to be fitted with aviation spheres No clearing or disturbance to the riverine vegetation growing within 32m of riparian area from edge of the river	Starting north of Nseleni substation Tower 12 (83)	Protected species found along the site. Necessary permit to disturb or relocate to be requested from relevant authority	Tower 58	Permit to cut or trim a protected tree is required prior to trimming or cutting
Span between towers 61-63	Span crosses over and parallel to a drainage line. The spans to be fitted with bird flight diverters No clearing or disturbance to the trees growing within 32m of riparian area	Tower 14 (85)	Access to tower 14 has protected species Permit required to disturb or relocate the protected species	Tower 12 (83)-13(84)	2m servitude of indigenous trees can be cleared Permit received
Starting near and north of Nseleni substation form Nseleni substation	The span crosses parallel to a man-made dam. Span to be fitted with flight diverters	Tower 24 (95)	Protected herb species Permit required to disturb or relocate the protected species	Starting north of Nseleni substation Tower 24 (95)	Protected indigenous tree found on site. Cutting or trimming of the trees requires permit from relevant authority

Installation of diverters		Permit for protected plants		Permit for protected trees	
Tower No.		Tower No.		Tower No.	
Towers 2(73) – 4(75)					
Conductor between towers 5(76)-6(77)	The span runs parallel to a local stream. Fit bird flight diverters 5(76)-6(77), spanning across a stream No clearing or disturbance to the trees growing within 32m of riparian area	Tower 30 and 31 (101-102)	Both sites have protected species that need to be relocated and thus require a permit from relevant authority	Tower 61 to tower 63	Strictly no cutting of trees within 32m of the riparian boundary
Towers 8(79)– 9(80) & 10(81)	The span between 8(79)-9(80) crosses a drainage line. Span between 9(80)-10(81) runs parallel to a drainage line. Flight diverters to be fitted along these spans	Tower 30 and 31 (101-102)	Both sites have protected species that need to be relocated and thus require a permit from relevant authority	Tower 82 (153)	A protected tree was found on site will need to be cut to provide adequate space for working and constructing tower foundations and erecting the tower. Permit to be sought from relevant authority for permit to cut a protected tree species.
Tower 12(83)-13(84)	The span to be fitted with bird flight diverters as it crosses a drainage line. No clearing or disturbance to the trees growing within 32m of riparian area	Tower 33 (104)	Protected herb species Permit required to disturb or relocate the protected species	Tower 82 (153)	A protected tree was found on site will need to be cut to provide adequate space for working and constructing tower foundations and erecting the tower. Permit to be sought from relevant authority for permit to cut a protected tree species.
Span 32(103)-33(104)	The span traverses over a stream and is to be fitted with bird flight diverters No clearing or disturbance to the trees existing within 32m of riparian area	Tower 35 (106)	Protected herb species Permit required to disturb or relocate the protected species	Access to tower 88 (159)	A protected tree exists on the site. The tree may need to be removed to make way for the tower. Permit from relevant authority to remove the protected tree should be sought. A protected plant grows along the edge of the site. It should not be disturbed, therefore entrance into the site should avoid where the protected plant is situated.
Span between tower 38(109)-41(112)	The spans cross over three drainage lines. Fit bird flight diverters, spanning across stream No clearing or disturbance to the trees growing within 32m of riparian area	Tower 38 and 39 (109 & 110)	Protected herb species on both tower basis Permit required to disturb or relocate the protected species	Access to tower 89(160)	Protected tree Open field In some area the trees become a thicket however, biodiversity is low. Such areas must not be used as entrance to avoid having to cut the trees. Such areas must not be used as entrance to avoid having to cut the trees. The project ecologist needs to assist in locating suitable entrance into the site, to confirm less damaging access into the site with regards to protected plant and tree species.
Bird flight diverters span between tower 53(124) -tower 55(126)	The span to be fitted with bird flight diverters. Towers 53(124) – 54(125) span crosses a watercourse and the span between towers 54(125) and 55(126) crosses over a main road No clearing or disturbance to the trees occurring within	Tower 48 (119)	Protected herb species Permit required to disturb or relocate the protected species	Tower 90 (161)	Protected tree Permit from relevant authority to trim or cut is needed

Installation of diverters		Permit for protected plants		Permit for protected trees	
Tower No.		Tower No.		Tower No.	
	32m of riparian area				
Bird flight diverters span between towers 67(138) – 68(139)	Span to be fitted diverters. The span crosses over a b valley No clearing or disturbance to the trees existing within 32m of riparian area	Tower 50 (121)	Protected plant Permit to disturb or relocate need to be sought from relevant authority	Tower 91 (162)	Protected tree Permit to relocate or disturb protected plant species must be sought from relevant authority
Bird flight diverters span between towers 74(145) -75(146)	The conductors span over a valley to be fitted with bird flight diverters	Tower 53 (124)	Protected plants Permit to disturb or relocate need to be sought from relevant authority	Tower 92 (163)	Protected tree Permit to disturb or relocate protected species is required from relevant authorities
Bird flight diverters 77-78 (148-149)	Conductor between towers 77 and tower 78 conductors cross over a local stream to be fitted with bird flight diverters No clearing or disturbance to the trees growing within 32m of riparian area	Access to tower 55 (126)	Protected species Permit to disturb or relocate need to be sought from relevant authority	Tower 92(163) – 93(164)	Span crosses river and riparian area. No clearing during stringing
Bird flight diverters between tower 83 and tower 84 (154-155)	The conductors between tower 83 and tower 84 span across two slopes and a stream flows beneath the conductors. Span between tower 84 and tower 84 to be fitted with bird flight diverters.	Tower 58 (129)	Protected plant species Permit to disturb or relocate need to be sought from relevant authority	Tower 110(181) – 111(182)	The span crosses a wetland. No clearing across the wetland
Conductor span between tower 92(163) and tower 93(164)	Fit bird flight diverters on the span, the conductors cross over a stream No clearing or disturbance to the trees occurring within 32m of riparian area	Tower 59 (130)	Protected herb species Permit to disturb or relocate need to be sought from relevant authority	Tower 116(187) – 117(188)	Can clear to access and construct tower 116(187). But no clearing between 116(187) and 117(188)
Span between tower 101 - 102 (172-173)	Flight diverter to be fitted along the span. Conductors run parallel to the water impound/wetland	Access to towers 60 (131)	Protected plant species Permit to disturb or relocate need to be sought from relevant authority	Span between tower 123(194) and tower 124(195)	The span crosses a drainage line. No clearing is to be done
Conductors between tower 107(178) and to tower 111(182)	The spans run parallel to a large waterbody. The spans are to be fitted with bird flight diverters	Tower 67 (138)	Protected plant species Permit to disturb or relocate need to be sought from relevant authority	Span between tower 125(196) and tower 126(197)	The span crosses a drainage line. No clearing is to be done
Span between tower 112(183) and tower 113(184)	Fit bird flight diverters No clearing or disturbance to the trees existing within 32m of riparian area	Tower 70 (141)	Protected herb plant Permit to relocate must be sought from relevant authority		
Conductors between towers 116(187) and 117(188)	The conductor span over Umfolozi River Tower 116(187) is located along scrub and patchy bush. Clearing of indigenous trees should be selective Cate to be taken to minimise or avoid clearing	Tower 78 (149)	Protected plant species found on site are to be dug out and relocated to a suitable place Permit to relocate must be sought from relevant authority	Span between tower 128(199) and tower 129(200)	The span crosses a drainage line. No clearing is to be done
Conductors span between tower 123(194) and	Conductors cross a drainage line	Tower 80 (151)	Protected plants exist along the site and they are to be relocated and permit	Span between tower 129(200) and tower	The span crosses a drainage line. No clearing is to be done

Installation of diverters		Permit for protected plants		Permit for protected trees	
Tower No.		Tower No.		Tower No.	
tower 124(195)	No clearing or disturbance to the bush existing within 32m of riparian area		to relocate sought from relevant authority Lots of protected	130(201)	
Conductors between towers 128(199) and 129(200) cross drainage line	The conductor spans over drainage lines No clearing or disturbance to the trees existing within 32m of riparian area	Tower 82 (153)	A protected tree was found on site will need to be cut to provide adequate space for working and constructing tower foundations and erecting the tower. Permit to be sought form relevant authority for permit to cut a protected tree species.	Span between tower 140(211) and tower 141(212)	The span crosses a drainage line. No clearing is to be done
Conductors between tower 145(216) and tower 146 (217) and 147(218) span over drainage lines	The span crosses over a seasonal drainage line No clearing or disturbance to the trees existing within 32m of riparian area	Tower 83 (154)	The tower is based upslope along site covered with grass and growing thorn shrubs. The site has a gradual slope which joins a seasonal stream downslope. Some thorn trees may need to be removed.	Span between tower 145(216) and tower 146(217)	The span crosses a drainage line. No clearing is to be done
		Tower 84 (155)	There are a number of protected species. The protected plants require to be relocated. Permit for their relocation is to be sought from the relevant authority.	Span between tower 147(218) and tower 148(219)	The span crosses a drainage line. No clearing is to be done
		Tower 88 – 91 (159-162)	A protected tree was found on site will need to be cut to provide adequate space for working and constructing tower foundations and erecting the tower. Permit to be sought form relevant authority for permit to cut a protected tree species		
		Tower 94 (165)	Protected plant, permit to disturb or relocate is required		
		Tower 95 (166)	Protected herb plant Permit to relocate or disturb protected plant species must be sought from relevant authority		
		Tower 96 (167)	Protected plant, permit to disturb or relocate is required		
		Tower 104 (175)	Protected plant, permit to disturb or relocate is required		
		Tower 107 (178)	Protected species were observed along the edge of the site. Construction must avoid disturbing them. A barricading tape must be placed along the edge of the protected plants to protect them from disturbance		

Installation of diverters		Permit for protected plants		Permit for protected trees	
Tower No.		Tower No.		Tower No.	
		Tower 110 (181)	Protected species were observed along the edge of the site. May need to be disturbed or relocated		
		Tower 115 (186)	Protected herb plant species Permit to disturb or relocate protected species		
		Tower 116 (187)	Southern bank of Umfolozi A number of protected plant species are found on site growing above and along the floodplain. Affected protected species need to be relocated. A permit is required to relocate them from relevant authority. Bush need to be cleared to accommodate the tower. Only clear what is necessary. Clearance of bush to be discussed with project ecologist The project ecologist must indicate protected and indigenous plants to be cleared		
		Tower 117 (188)	A number of protected species occur on site. Permit to disturb or relocate protected species. This tower is located on a koppie across Umfolozi River. Disturbance along the site may loosen silt which will be washed downslope and collected along soil bags. Berms are to be fitted at the end of the edge of the site to contain run-off Any collected silt after construction must be reapplied around the site When driving avoid damaging protected species. Project ecologist to mark protected species to be avoided.		
		Tower 118 (189)	Protected plant species found on site can be avoided by locating tower legs away from them. Permit to disturb or relocated protected plants species need to be sought from relevant authorities		
		Tower 120 (191)	Protected plant species found on site can be avoided by locating tower legs away from them.		

Installation of diverters		Permit for protected plants		Permit for protected trees	
Tower No.		Tower No.		Tower No.	
			Permit to disturb or relocated protected plants species need to be sought from relevant authorities		
		Tower 121 (192)	Protected plant species found on site can be avoided by locating tower legs away from them. Permit to disturb or relocated protected plants species need to be sought from relevant authorities		
		Tower 122 (193)	Protected plant species found on site can be avoided by locating tower legs away from them. Permit to disturb or relocated protected plants species need to be sought from relevant authorities.		
		Tower 123 (194)	Protected plant species occur along the site. Disturbance or relocation of protected plant species should be sought from a relevant authority Contractor to liaise with the project ecologist to mark plants to be relocated		
		Tower 124 (195)	Protected plant species occur along the site. Disturbance or relocation of protected plant species should be sought from a relevant authority		
		Span between tower 123 and tower 124 (194-195)	Protected species grow along the site. Disturbance or relocation of protected plant species should be sought from a relevant authority		
		Tower 125 (196)	Protected plant species occur on site. Disturbance or relocation of protected plant species should be sought from a relevant authority.		
		Tower 126 -128 (197-199)	Protected plant species occur along the site. Permit to disturb or relocate them is to be sought from relevant authority		
		Tower 133 (204)	Protected plant species were found along the site. Disturbance or relocation of protected plant species requires a permit from relevant authorities.		
		Tower 135 (206)	Protected and listed species grow along the site. Disturbance or relocation of affected plant		

Installation of diverters		Permit for protected plants		Permit for protected trees	
Tower No.		Tower No.		Tower No.	
			species will require a licence from relevant authority.		
		Tower 142-146 (213-217)	<p>Protected and Red Listed species were found growing along the site. Permit to disturb or relocate the protected species is to be sought with relevant authority. It is suggested that the tower be moved about 10m away from the area with moderate coverage of Red Listed species.</p> <p>Before construction takes place, the project ecologist must be involved in indicating protected plants not to be disturbed and ones that need to be relocated</p>		
		Tower 151 (222)	<p>Some of the protected plant species growing along this stretch may need to be relocated. Location of the tower will not be able to avoid disturbing some of the protected species. Some of the protected plant species need not be disturbed. Permit to disturb or relocate the protected species is to be sought with relevant authority</p> <p>Contractor to liaise with the project plant ecologist. The project ecologist needs to be consulted to provide guidance with regards to protection of plant species growing tower 150 and tower 153.</p>		

APPENDIX A ACTIVITY TABLES

Table A2 Towers to be fitted with Aviation Spheres & Spikes

Tower No.	Fitting aviation spheres
Span between towers 53 & 54	Powerline conductors span across Nseleni river Fit aviation spheres to mark the conductor. The conductor span crosses Nseleni river
From Nseleni substation	The span between tower 116 and 117 (186-187) is to be fitted with aviation spheres. The conductors are crossing Umfolozi river
Span between towers 116-117 (187-188)	
Fitting Spikes at tower 116(187) and tower 117(188)	Spikes to be fitted at the top of the towers to prevent landing and nesting of raptors
Fitting aviation spheres between tower 151(222) and tower 152(223)	The span to be fitted with aviation spheres as per Eskom specification included in the project design document

Table A3 Towers with access for construction, Relocation of houses and protection of graves

Tower No.	Access	Tower No.	Relocation of houses	Tower No.	Graves and others
Span between towers 28 and 29	At tower 28 and 29 access is steep from the road. The road has some erosion. Berms are recommended to be constructed to minimise damage to the road. Driving during rainy days is strictly prohibited	Tower 54	An old house along the powerline route needs to be demolished	Towers and span between towers 33-36	Alien windbreaker trees cutting to be discussed with the owner No permit needed as the trees are aliens
Access to tower 35	Potential erosion, a donga exists It is recommended that on rainy day no driving is to take place	Span between towers 57 and 58	A dwelling need to be relocated	Tower 55	Owner to be contacted to locate tower on private property During induction the avoided plant will be shown A photographic field guide will be provided
		Span between towers 62 and 63	A homestead exists within servitude between tower 62 and tower 63 and is to be relocated	Tower 5 (76)	Grave sited near the tower base site. The grave is however at a safe distance from the working area. The grave is to be fenced to prevent any potential damage
		Span between towers 68 and 69		From Nseleni substation	Tower is located on active sugarcane field, owner consent
		From Nseleni substation		Tower 6 (77)	Tower along open field infested with weeds. Open field belongs to a private owner. Consent from owner to be sought
		Span between towers 1(72) and 2(73)			
		Span between towers 2(73) and 3(74)		Tower 9 (79)	Located within actively growing sugarcane fields. Consent form crop owner
Tower 55	Construction of new access required Scouring of the track to be prevented by good compaction of the new access Closing of the new track not necessary	Span between towers 5(76) and 6(77)	Demolition of disused site Rubble to be disposed at registered landfill site	Tower 12 (83)	Tower along active sugarcane, owner consent to be sought
		Span between towers 52(123) and 53(124)		Tower 67 (138)	Football playground An alternative playground to be provided by the contractor A gully exists parallel to the football

Tower No.	Access	Tower No.	Relocation of houses	Tower No.	Graves and others
					playground No driving through the gully Need to stabilise the tower base as the soil might be susceptible to erosion
		Span between towers 64(135) and 65(136)		Tower 82 (153)	The site sits on old fields. The contractor to liaise with owners for locating a tower on their fields
Access tower 63	Access is to be along accessible lower slope contour line, along single tracks No multiple tracks to be created	Span between towers 106 (177) and 107 (178)	House to be demolished	Tower 87 (158)	A grave was spotted a distance from the tower. Construction will not affect it. It must be fenced to provide extra safety. Contractor to enquire from local induna the owners of the grave. The owners do the fencing, not the contractor in order not to unknowingly violate cultural rituals. Contractor in the presence of induna meet with the grave owners and enquire if they owners will prefer to do the fencing themselves or allow the contractor to do it. Contractor must explain to the owners the reasons for fencing of the grave, as a temporary act to protect the grave site. Contractor needs to explain that this is done as a precaution as construction of the tower will not impact on the gravesite due to the distance from the work area
Tower 69	Available from existing tracks and roads Tower base is located along a wet area. Presence of hygrophilous vegetation indicated wetness The vegetation along access to tower 70 indicate a wet area which might be difficult to access during rainy day Need to plan for access during rainy day	Span between towers 109(180) and 110(181)	A house exists along the powerline route. It needs to be relocated	Tower 92 (163)	A grave occurs nearby but away from tower position Graves are to be fenced to prevent potential damage during construction
North of Nseleni substation Tower 43 (114)	Access road steep, berms along road required to prevent scouring during rainy days and outlet drain to drain run-off	Span between towers 141(212) and 142(213)	Relocation of dwellings		
Tower 44 (115)	A makeshift gate across a fence is needed in order to be able to string conductor	Span between towers 146(217) and 147(218)	Relocation of dwellings	Tower 113 (183)	A grave occurs nearby but away from tower position Grave exists nearer the tower base. Graves need to be fenced to prevent any potential damage
Tower 52 (123)	Tower is located upslope. Access is from downslope It is recommended that access to tower base not driven vertical to the slope Driving should not be done during rainy days to prevent erosion and slippery	Span between towers 149(220) and 150(221)	Relocation of a hut	Tower 121 (192)	Graves exist away from designated work area. They need to be fenced in order to protect them, even though they are located some distance from the tower base and designated work area for erecting the above-ground structure. Owners of the graves must be liaised with to discuss fencing of the graves to make them visible during construction

Tower No.	Access	Tower No.	Relocation of houses	Tower No.	Graves and others
	Construction of the tower should most of it be carried out manually Driving up the slope should be kept to a minimal				
Tower 80 (151)	Access to the tower site is along the contour line. Driving to be limited along the contour line. No multiple tracks along the slope are to be done	Span between towers 150(221) and 151(222)	Relocation of dwellings	Tower 122 (193)	Location of the tower base needs to be discussed with the project ecologist to minimise disturbance to protected plant species occurring on the site.
Tower 84 (155)	Access to the tower site is along a contour line. Driving to be limited along contour line	Span between towers 151(222) and 152(223)	Relocation of dwellings	Tower 113 (184)	Grave site was noted near tower base located. The grave to be fenced to protect it. However, fencing must be done with the consent from the family and after liaising with local induna
Tower 85 (156)	Access to the tower site is along the contour line. Driving to be limited along the contour line. No multiple tracks along the slope are to be done. Contractor to discuss with the project civil engineer about ensuring that the angle of the access track facilitate movement of run-off out of the track to prevent scouring			Span between tower 123 and tower 124 (194-195)	The conductors will span across a place of worship. It is important that the contractor liaise with the worshippers about the servitude
Access to tower 88 (159)	The site has steep and easy entrance. Contractor to use accessible entrance into the site			Tower 124 (195)	The tower is located approximately 9 meters from the worship site. The worshippers are prepared to move the site 12 meters northwest of the servitude which will provide contractor adequate space for construction. The terrain within the site is flat.
Tower 90 (161)	Tower will be located along active field Driving through an active field should be negotiated with the affected owner.			Tower 120 (191)	Grave site was spotted near tower base located. The grave to be fenced to protect it. However, fencing must be done with the consent from the family and after liaising with local induna
Tower 92 (163)	New access required. Contractor to liaise with project civil engineer			Tower 129 (200)	A grave exists near a tower base, but at a distance. It must be fenced to protect it during construction of the tower
Tower 108 (179)	The site is near a low voltage powerline. Cranes should access the site away from the powerline side				
Tower south of Umfolozi river Tower 116 (187)	The access road needs to follow a contour line. Driving to be kept to single tracks Strictly no multiple tracks to be created				
Tower north of Umfolozi river Tower 117 (188)	This tower is located on a koppie across Umfolozi River. Disturbance along the site may loosen silt which will be washed downslope and collected along soil bags. Berms are to be fitted at				

Tower No.	Access	Tower No.	Relocation of houses	Tower No.	Graves and others
	the end of the edge of the site to contain run-off Any collected silt after construction must be reapplied around the site				
Tower 117 (188)	When driving avoid damaging protected species. Project ecologist to mark protected species to be avoided.				
Tower 121 (192)	The tower is located along the ridge. Driving to be strictly kept along contour lines and along a single track				
Tower 123 (194)	Access into the site runs along a steep slope. Driving should be kept along contour lines and along a single track				
Tower 126 (197)	A fence exists near the tower. No disturbance is to happen on the fence during construction Access is along the steep slope. Driving is to be kept along contour lines and along single tracks. No multiple tracks are to be created				
Tower 133 (204)	Access is along contour line and contractor to discuss access with project civil engineer about creation of access				
Tower 146 (217)	The tower base is located with a privately ploughed garden surrounded by a fence. Bushes are clustered in one area and the tower base is outside the bush cluster. May need to reassess the position of the tower.				

APPENDIX B PERMITS

APPENDIX C PUBLIC PARTICIPATION PROCESS

**APPENDIX D ENVIRONMENTAL AUTHORISATION
REFERENCE 14/12/16/3/3/1/1505
DATED – 29 September 2016**

**APPENDIX E SENSITIVITY (ECOLOGICAL) REPORT
&
SPECIALIST SIGNED DECLARATION OF INDEPENDENCE**

APPENDIX F GENERAL READINGS AND CONDITIONS

1. Eskom Holding Vegetation Management and Maintenance within Eskom Land, servitudes and rights of way Procedure
 - a. Eskom approved bush-clearing contractors are familiar with the procedure
 - b. Cutting of indigenous trees in a canopy or protected trees is to be done by approved bush-clearing contractors
 - c. Cutting and application procedures explained
2. Eskom Waste Management Standard
 - a. Contractor and sub-contractors to read the standard and enquire where clarity is needed
 - b. Contractors and sub-contractors to indicate that the standard had been read and clarification sought where needed
 - c. During induction highlights within the standard will be explained
3. Eskom Holding Environmental management of trees in KZN – a technical instruction
4. Specification for aircraft warning devices used on overhead sub-transmission and distribution lines
5. Impala-Mtubatuba Environmental management Plan Report (EMPr)
6. Impala-Mtubatuba Site Specific EMPr and attached Ecological Sensitivity Report
7. Impala-Mtubatuba Environmental Authorisation

General conditions

- a. It is important that the contractor comply with the special conditions stipulated by the landowners in the negotiated options
- b. The contractor shall comply with the conditions specified in the Environmental Management Plan (EMP) during construction
- c. Disturbance to the soil should be kept to a minimum
- d. No disturbance should be done on contour banks/lines uphill or other erosion control structures should not be disturbed
- e. Disturbance to the crops should be limited to agreed upon work area with the landowner
- f. Pictures of crops prior disturbance should be taken for auditing purposes
- g. Pictures of graves are to be taken prior to fencing and construction for auditing purposes
- h. All construction debris and litter should be removed from site daily during construction and after construction
- i. No fires should be started even for cooking or warming. Designated cooking areas should be assigned
- j. Any additional agreements between the landowner and the contractor should be brought to Eskom Holding SOC Ltd attention
- k. Environmental incidents should be recorded and attended to with immediate effect
- l. Contractor shall provide a project emergency preparedness procedure to address emergencies including environmental emergencies

Sanitation

Portable toilet facilities are to be provided to staff at all sites.

Wildlife

Hunting of game and wild animals is strictly prohibited

APPENDIX G CONTRACTOR INDUCTION

Need for contractor induction

Induction is one of the conditions stipulated in the Environmental Authorisation (EA) for the project. Induction is therefore provided in order to comply with the EA condition.

Aim of contractor induction

Contractor induction is aimed at explaining the following conditions stipulated in the:

1. Environmental management plan,
2. Updated specific environmental management plan,
3. Environmental Authorisation
4. Sensitivity ecological report
5. Eskom applicable procedures
6. Other procedures outlined in this report

Induction provides an opportunity for the contractor and contractor staff to become aware and engage on the applicable documents and enquire about procedures. The contractor is to reiterate the conditions during toolbox talks. Induction is an on-going activity to remind contractor staff to adhere to stipulated recommendations and procedures. An induction attendance register is to be completed, signed and copy filed in the site office environmental file. Toolbox talks records are to be filed in the site office environmental file for auditing purpose.

APPENDIX H SITE OFFICE ENVIRONMENTAL FILE

The need for the site environmental file

The need for the file is stipulated in the environmental authorisation of the project. Its existence is to comply with the condition in the environmental authorisation.

What is contained in the site office environmental file

This content of the site environmental file are as follows:

1. Project environmental authorisation
2. Basic Assessment Environmental Management Plan Report
3. Environmental Authorisation (EA)
4. Site Specific Environmental Management Plan Report with attached procedures
5. Awarded necessary permits
6. Environmental monitoring and auditing reports

Purpose of the site office environmental file

The file keeps relevant documents and records for referral and for audit purposes.

APPENDIX I REHABILITATION OF DISTURBED AREA

Rehabilitation of disturbed soil of disturbed area involves the following steps:

Demarcation of work area

The work area must be demarcated and all work be limited within the demarcated area to minimise disturbance to areas outside the work area. Safety tape to indicate a work area should be strapped around the demarcated work area.

Clearing of above-ground vegetation

This step involves removal of vegetation within the demarcated work area. Vegetation is cleared to prepare for digging of foundations for the tower legs. It is recommended that the cleared vegetation be stripped in 30mm x 15mm with 30mm root material. The stripping should be at least one-third of the total stripped area, to ensure effective spread of grass from the replanted grass strips. The stripped grass patches should be folded with roots folded inside. The folded grass strips should be watered to prevent drying of the roots and covered with thick layer of hay in order to prevent further drying of the roots. The grass strips should be watered at least twice a week before replanting. The most preferred method is to dig out the strips along adjacent area to the demarcated work area immediately after construction of the tower. The digging should be sporadic not concentrating on a single area which will cause a sizeable bare area. The strips should be at least one-third of the disturbed area. After construction has been completed the dug strip should be immediately re-planted along the disturbed area which must be cleared of debris. Topsoil must be dug out separate to sub-soil as topsoil contains nutrients that sustain growth of grass. Topsoil must be stored safely away from foot traffic and vehicle movement.



Fig 10. Shows the site area for the tower foundation

Preparation of disturbed area

The disturbed area must be cleared of construction debris prior to planting of grass strips. The area must be raked to loosen the soil. A thin layer of stored topsoil can be applied along the cleared disturbed area. This thin layer of topsoil must be raked and spread thinly along the disturbed area.

Sourcing of locally growing grass sods

Grass sods can be sourced along areas adjacent to the disturbed areas prior to clearing of vegetation. Digging of the sods should be sporadic and not located in a single area to prevent creating a large bare area. 30mm x 15mm sods can be dug. The dug sods must have about 30mm of root base. Only sods that are free of weeds should be dug out. The viability of the sods can be discussed with the project ECO. The sods are to be dug on the day of planting to prevent drying of roots. An experienced horticulture is to do the replanting of relocated species

Planting of grass

The grass sods should be planted sporadically along the disturbed area. They do not need to be planted tightly against each other. They must be slightly compacted to bond the roots with the topsoil.

Planting during wet season

It is recommended that the stripping of grass strips and replanting be done during wet season to encourage growth and spread of grass.

No-grass rehabilitation method

Another method involves clearing of the disturbed area of debris. Applying stored topsoil thinly along the disturbed area. The topsoil layer is to be raked to spread evenly and cover the disturbed area. The raked topsoil should be slightly compacted to bind the soil and prevent blowing away. Grass will regrow on the topsoil. However, weeds may come out as well. After some time, grass takes over and squeezes out weeds. Weeds are seasonal and grow by seeds. Since grass is a perennial plant it grows perpetually and eventually covers an area so no further disturbance occurs. This method is preferred as it excludes stripping of grass sods which can be susceptible to drying out and the roots may not adapt after replanting even though sourced from local material. The picture below shows that grass and herbaceous plants do regrow around tower bases if the disturbed area is raked properly and compacted slightly to support regrowth. Seeds of grass and herbaceous plants exist in the soil and are able to regrow during the rainy season. The plants are able to eventually outcompete weeds that might have invaded the disturbed area as weeds are the primary invaders of open areas.



Fig 10 showing growing of grass during operation of the powerline

Monitoring planted area

Planted areas should be inspected for good cover of planted grass or areas where planting was not done to check if grass is emerging along the areas. In some unplanted areas it might take some time for grass to emerge however, it does emerge eventually.

Lack of growth around tower bases

During the early weeks after construction, growth of grass may not take place. The bare area must be raked again to loosen the soil to encourage growth of grass. Grass does eventually grow. Only where a tree was cut and herbicides applied that growth may not take place.

APPENDIX J RELOCATION AND REPLANTING OF PROTECTED SPECIES

Licence KZN0033/08/18-19

Application for permit to disturb

The project ecologist has applied for a general permit to disturb areas with protected species. The motivation for a general permit is based on the fact that plants are able to grow back if the conditions for growth are suitable.

Conditions specified in the permit

The conditions specified in the permit are to be adhered to. Compliance to the conditions in the permit is to be monitored and non-compliance reported.

The attached permit has licenced the following activities
In respect of protected trees

Damage/disturb

1. Cutting of live trees/collection of produce from live trees
2. Numbers and sizes of trees per species: 12 *Sclerocarya birrea subsp. Caffra*
3. Canopy trees, mature tree

Licence conditions are stipulated in the attached

Suitable conditions for regrowth

During construction the disturbed area should not be polluted by concrete or cement or oil or herbicides spillages when applied to cut tree stumps or any other type of pollution. Top soil dug at tower foundation areas is to be set aside neatly and not mixed with subsoil. Topsoil contains nutrients necessary for growth. When construction has been completed the following activities must be implemented:

1. The disturbed area must be cleared of construction debris
2. The cleared area must be raked to loosen soil.
3. A thin layer of topsoil must be applied
4. This thin topsoil later must be slightly compacted to encourage soil cohesion
5. The compacted applied topsoil can be either planted with freshly sourced grass sods as per Appendix A or left as it is where growth and succession of plant growth will occur naturally

APPENDIX K ESKOM HOLDINGS WASTE MANAGEMENT STANDARD

All waste generated during construction must be picked on a daily basis to prevent complaints from neighbours and also to adhere to NEMBA Waste Management Act and to Eskom Holdings Waste management procedure.

Separation of waste

Collected waste must be separated accordingly. Hazardous waste must be taken to registered landfill sites that accommodate hazardous waste.

Use of registered landfill sites

The contractor must undertake the following activities

1. Enquire in writing with the local municipality waste section about the use of registered landfill site and enquire about disposal of waste
2. Liaise with the local municipality about the written enquiry and guidance
3. Record all liaisons with the municipality, municipality staff the contractor liaised with

The recording of the liaisons is to ensure that proper enquiring channels were followed. Eskom Holding waste management procedure to be adhered to.

APPENDIX L ESKOM HOLDINGS VEGETATION MANAGEMENT STANDARD

**APPENDIX M ESKOM HOLDINGS ENVIRONMENTAL MANAGEMENT OF
TREES IN KZN OPERATING UNIT**

APPENDIX N – GRIEVANCE REGISTER

Nature of complaint/grievance	Complainant	Date of complaint/grievance	Contractor person who received the grievance	Investigation	Mitigation measures applied	Closure of the problem

Task	Date Started	Date Complete	Completed By	Signature
Send letter of receipt when written grievance received				
Discuss grievance with grievant (within 24 hours of verbal or written complaint)				
Investigate grievance				
Communicate the result of the investigation to the grievant (within 7 working days of receiving verbal or written complaint)				
Document the investigation and outcome (Do not include details in the file of any staff member involved unless a disciplinary action has been undertaken.)				
Offer external review to the grievant				
Send questionnaire to grievant				
Track complaints to rectify recurring issues within our Service				

APPENDIX O IMPALA – MTUBATUBA LINE COORDINATES

Impala to Nseleni: Decimal Degrees (DD) and Degrees, Minutes and Seconds (DMS)

TOWER	DD LAT	DD LONG	DMS LAT	DMS LONG
1	-28.765500860	31.946590170	28°45'55.8031"	31°56'47.7246"
2	-28.764674720	31.945635810	28°45'52.8290"	31°56'44.2889"
3	-28.765308560	31.942839500	28°45'55.1108"	31°56'34.2222"
4	-28.765996610	31.939803640	28°45'57.5878"	31°56'23.2931"
5	-28.765784330	31.938049830	28°45'56.8236"	31°56'16.9794"
6	-28.764566580	31.935898170	28°45'52.4397"	31°56'09.2334"
7	-28.763211170	31.933503420	28°45'47.5602"	31°56'00.6123"
8	-28.762151920	31.931631970	28°45'43.7469"	31°55'53.8751"
9	-28.761259750	31.930055970	28°45'40.5351"	31°55'48.2015"
10	-28.758513440	31.929938580	28°45'30.6484"	31°55'47.7789"
11	-28.756738140	31.928343390	28°45'24.2573"	31°55'42.0362"
12	-28.754966470	31.926751560	28°45'17.8793"	31°55'36.3056"
13	-28.753171830	31.926380780	28°45'11.4186"	31°55'34.9708"
14	-28.750017390	31.926219440	28°45'00.0626"	31°55'34.3900"
15	-28.746998140	31.926065030	28°44'49.1933"	31°55'33.8341"
16	-28.744384440	31.925931420	28°44'39.7840"	31°55'33.3531"
17	-28.741725780	31.925795470	28°44'30.2128"	31°55'32.8637"
18	-28.738166000	31.925613420	28°44'17.3976"	31°55'32.2083"
19	-28.734829560	31.925442860	28°44'05.3864"	31°55'31.5943"
20	-28.733801560	31.923280750	28°44'01.6856"	31°55'23.8107"
21	-28.732623670	31.920803440	28°43'57.4452"	31°55'14.8924"
22	-28.731252940	31.917920810	28°43'52.5106"	31°55'04.5149"
23	-28.729819640	31.914906890	28°43'47.3507"	31°54'53.6648"
24	-28.728399360	31.913694830	28°43'42.2377"	31°54'49.3014"
25	-28.726561250	31.912126360	28°43'35.6205"	31°54'43.6549"
26	-28.725046690	31.912634690	28°43'30.1681"	31°54'45.4849"
27	-28.724008810	31.914371250	28°43'26.4317"	31°54'51.7365"
28	-28.723072170	31.915938360	28°43'23.0598"	31°54'57.3781"
29	-28.720591140	31.920089030	28°43'14.1281"	31°55'12.3205"
30	-28.719532140	31.921746280	28°43'10.3157"	31°55'18.2866"
31	-28.717731750	31.924563470	28°43'03.8343"	31°55'28.4285"
32	-28.716671580	31.926222250	28°43'00.0177"	31°55'34.4001"
33	-28.715817830	31.927789250	28°42'56.9442"	31°55'40.0413"
34	-28.714157670	31.930836030	28°42'50.9676"	31°55'51.0097"
35	-28.712402580	31.934056860	28°42'44.6493"	31°56'02.6047"
36	-28.711548750	31.935623750	28°42'41.5755"	31°56'08.2455"
37	-28.709826440	31.938784140	28°42'35.3752"	31°56'19.6229"
38	-28.707748890	31.939856250	28°42'27.8960"	31°56'23.4825"
39	-28.704943330	31.941304140	28°42'17.7960"	31°56'28.6949"
40	-28.703436720	31.942847110	28°42'12.3722"	31°56'34.2496"

TOWER	DD LAT	DD LONG	DMS LAT	DMS LONG
41	-28.702311470	31.943999470	28°42'08.3213"	31°56'38.3981"
42	-28.700239000	31.944116250	28°42'00.8604"	31°56'38.8185"
43	-28.698921280	31.944190470	28°41'56.1166"	31°56'39.0857"
44	-28.697979690	31.944310750	28°41'52.7269"	31°56'39.5187"
45	-28.697061530	31.946787750	28°41'49.4215"	31°56'48.4359"
46	-28.695399830	31.947922580	28°41'43.4394"	31°56'52.5213"
47	-28.693313060	31.949347640	28°41'35.9270"	31°56'57.6515"
48	-28.690839780	31.951036470	28°41'27.0232"	31°57'03.7313"
49	-28.689371330	31.952039220	28°41'21.7368"	31°57'07.3412"
50	-28.686727940	31.953844060	28°41'12.2206"	31°57'13.8386"
51	-28.685343890	31.954789060	28°41'07.2380"	31°57'17.2406"
52	-28.681803470	31.958356970	28°40'54.4925"	31°57'30.0851"
53	-28.678362030	31.961824920	28°40'42.1033"	31°57'42.5697"
54	-28.673704690	31.965520750	28°40'25.3369"	31°57'55.8747"
55	-28.673074360	31.966221670	28°40'23.0677"	31°57'58.3980"
56	-28.672363190	31.967012360	28°40'20.5075"	31°58'01.2445"
57	-28.671231780	31.967068970	28°40'16.4344"	31°58'01.4483"
58	-28.670280720	31.968298750	28°40'13.0106"	31°58'05.8755"
59	-28.668248360	31.970385420	28°40'05.6941"	31°58'13.3875"
60	-28.667618560	31.971187530	28°40'03.4268"	31°58'16.2751"
61	-28.666058690	31.973173920	28°39'57.8113"	31°58'23.4261"
62	-28.663891670	31.975933330	28°39'50.0100"	31°58'33.3600"
63	-28.663935030	31.979925360	28°39'50.1661"	31°58'47.7313"
64	-28.663476030	31.982533390	28°39'48.5137"	31°58'57.1202"
65	-28.663214330	31.984020500	28°39'47.5716"	31°59'02.4738"
66	-28.661251190	31.985697890	28°39'40.5043"	31°59'08.5124"
67	-28.660862030	31.989353610	28°39'39.1033"	31°59'21.6730"
68	-28.660628560	31.991545780	28°39'38.2628"	31°59'29.5648"
69	-28.660932530	31.992933830	28°39'39.3571"	31°59'34.5618"
70	-28.660886250	31.994595470	28°39'39.1905"	31°59'40.5437"
71	-28.660441440	31.994744810	28°39'37.5892"	31°59'41.0813"

Nseleni to Mtubatuba: Decimal Degrees (DD) and Degrees, Minutes and Seconds (DMS)

TOWERS		DD LAT	DD LONG	DMS LAT	DMS LONG
Section 2	Incremental				
1	72	-28.65941508	31.9949046	28°39'33.894"S	31°59'41.657"E
2	73	-28.65749026	31.99516357	28°39'26.965"S	31°59'42.589"E
3	74	-28.65395311	31.99563943	28°39'14.231"S	31°59'44.302"E
4	75	-28.65214966	31.9955733	28°39'7.739"S	31°59'44.064"E
5	76	-28.64967554	31.99548258	28°38'58.832"S	31°59'43.737"E
6	77	-28.64770392	31.99358341	28°38'51.734"S	31°59'36.9"E

TOWERS		DD LAT	DD LONG	DMS LAT	DMS LONG
7	78	-28.64722606	31.99040771	28°38'50.014"S	31°59'25.468"E
8	79	-28.64697619	31.98874737	28°38'49.114"S	31°59'19.491"E
9	80	-28.64432049	31.98657494	28°38'39.554"S	31°59'11.67"E
10	81	-28.64228606	31.98491082	28°38'32.23"S	31°59'5.679"E
11	82	-28.64104025	31.98286592	28°38'27.745"S	31°58'58.317"E
12	83	-28.63961957	31.9805341	28°38'22.63"S	31°58'49.923"E
13	84	-28.63589891	31.97896944	28°38'9.236"S	31°58'44.29"E
14	85	-28.63343087	31.97958074	28°38'0.351"S	31°58'46.491"E
15	86	-28.63072493	31.98025092	28°37'50.61"S	31°58'48.903"E
16	87	-28.6284016	31.97942112	28°37'42.246"S	31°58'45.916"E
17	88	-28.62636375	31.97869331	28°37'34.909"S	31°58'43.296"E
18	89	-28.62475629	31.9793379	28°37'29.123"S	31°58'45.616"E
19	90	-28.62246833	31.98025534	28°37'20.886"S	31°58'48.919"E
20	91	-28.62063262	31.9809914	28°37'14.277"S	31°58'51.569"E
21	92	-28.61961372	31.98235591	28°37'10.609"S	31°58'56.481"E
22	93	-28.61736491	31.98213231	28°37'2.514"S	31°58'55.676"E
23	94	-28.61639167	31.98449461	28°36'59.01"S	31°59'4.181"E
24	95	-28.61554433	31.98655122	28°36'55.96"S	31°59'11.584"E
25	96	-28.61472751	31.98853362	28°36'53.019"S	31°59'18.721"E
26	97	-28.61358231	31.99131285	28°36'48.896"S	31°59'28.726"E
27	98	-28.61257074	31.99376759	28°36'45.255"S	31°59'37.563"E
28	99	-28.61134607	31.99673924	28°36'40.846"S	31°59'48.261"E
29	100	-28.61099463	31.99838878	28°36'39.581"S	31°59'54.2"E
30	101	-28.61039533	32.00120146	28°36'37.423"S	32°0'4.325"E
31	102	-28.60983353	32.00383781	28°36'35.401"S	32°0'13.816"E
32	103	-28.60890136	32.00521792	28°36'32.045"S	32°0'18.785"E
33	104	-28.60689987	32.00818105	28°36'24.84"S	32°0'29.452"E
34	105	-28.60563858	32.01004823	28°36'20.299"S	32°0'36.174"E
35	106	-28.60472461	32.01140119	28°36'17.009"S	32°0'41.044"E
36	107	-28.60268416	32.01182902	28°36'9.663"S	32°0'42.584"E
37	108	-28.59961481	32.01247255	28°35'58.613"S	32°0'44.901"E
38	109	-28.59678289	32.01306626	28°35'48.418"S	32°0'47.039"E
39	110	-28.59406066	32.01261207	28°35'38.618"S	32°0'45.403"E
40	111	-28.59136915	32.01216301	28°35'28.929"S	32°0'43.787"E
41	112	-28.58865237	32.01063951	28°35'19.149"S	32°0'38.302"E
42	113	-28.58686534	32.00963743	28°35'12.715"S	32°0'34.695"E
43	114	-28.58530463	32.00876229	28°35'7.097"S	32°0'31.544"E
44	115	-28.58173242	32.0100996	28°34'54.237"S	32°0'36.359"E
45	116	-28.57774041	32.01159394	28°34'39.865"S	32°0'41.738"E
46	117	-28.57517744	32.01255328	28°34'30.639"S	32°0'45.192"E
47	118	-28.57307553	32.01371012	28°34'23.072"S	32°0'49.356"E
48	119	-28.57085234	32.01493364	28°34'15.068"S	32°0'53.761"E
49	120	-28.56878964	32.01606879	28°34'7.643"S	32°0'57.848"E
50	121	-28.56652706	32.01806709	28°33'59.497"S	32°1'5.042"E
51	122	-28.56473411	32.01965054	28°33'53.043"S	32°1'10.742"E

TOWERS		DD LAT	DD LONG	DMS LAT	DMS LONG
52	123	-28.56167573	32.0223514	28°33'42.033"S	32°1'20.465"E
53	124	-28.56080412	32.02446153	28°33'38.895"S	32°1'28.062"E
54	125	-28.55764266	32.02887404	28°33'27.514"S	32°1'43.947"E
55	126	-28.55727112	32.03253893	28°33'26.176"S	32°1'57.14"E
56	127	-28.55699827	32.0352297	28°33'25.194"S	32°2'6.827"E
57	128	-28.55494841	32.03702114	28°33'17.814"S	32°2'13.276"E
58	129	-28.55211161	32.03950014	28°33'7.602"S	32°2'22.2"E
59	130	-28.54876002	32.04021296	28°32'55.536"S	32°2'24.767"E
60	131	-28.54431768	32.04115769	28°32'39.544"S	32°2'28.168"E
61	132	-28.54094769	32.04187431	28°32'27.412"S	32°2'30.748"E
62	133	-28.53877556	32.04233618	28°32'19.592"S	32°2'32.41"E
63	134	-28.53737488	32.04354207	28°32'14.55"S	32°2'36.751"E
64	135	-28.53478393	32.04577261	28°32'5.222"S	32°2'44.781"E
65	136	-28.53313611	32.04644073	28°31'59.29"S	32°2'47.187"E
66	137	-28.53092786	32.04733604	28°31'51.34"S	32°2'50.41"E
67	138	-28.52906749	32.04809028	28°31'44.643"S	32°2'53.125"E
68	139	-28.5256359	32.04948144	28°31'32.289"S	32°2'58.133"E
69	140	-28.52268835	32.0506763	28°31'21.678"S	32°3'2.435"E
70	141	-28.5205636	32.05153757	28°31'14.029"S	32°3'5.535"E
71	142	-28.51931136	32.05353772	28°31'9.521"S	32°3'12.736"E
72	143	-28.51807493	32.05551251	28°31'5.07"S	32°3'19.845"E
73	144	-28.51671294	32.05768774	28°31'0.167"S	32°3'27.676"E
74	145	-28.51549474	32.05963322	28°30'55.781"S	32°3'34.68"E
75	146	-28.51293691	32.06078243	28°30'46.573"S	32°3'38.817"E
76	147	-28.51068965	32.06179205	28°30'38.483"S	32°3'42.451"E
77	148	-28.50850625	32.06277293	28°30'30.623"S	32°3'45.983"E
78	149	-28.5073206	32.06536738	28°30'26.354"S	32°3'55.323"E
79	150	-28.50631314	32.06757177	28°30'22.727"S	32°4'3.258"E
80	151	-28.5055345	32.0692754	28°30'19.924"S	32°4'9.391"E
81	152	-28.50368309	32.07090606	28°30'13.259"S	32°4'15.262"E
82	153	-28.5019027	32.0724741	28°30'6.85"S	32°4'20.907"E
83	154	-28.49969539	32.07441804	28°29'58.903"S	32°4'27.905"E
84	155	-28.49763042	32.07623653	28°29'51.47"S	32°4'34.452"E
85	156	-28.49557236	32.07804884	28°29'44.06"S	32°4'40.976"E
86	157	-28.49417635	32.07927809	28°29'39.035"S	32°4'45.401"E
87	158	-28.49268201	32.08059389	28°29'33.655"S	32°4'50.138"E
88	159	-28.49208942	32.08309945	28°29'31.522"S	32°4'59.158"E
89	160	-28.49155275	32.08536839	28°29'29.59"S	32°5'7.326"E
90	161	-28.49085037	32.08833762	28°29'27.061"S	32°5'18.015"E
91	162	-28.49036962	32.09036976	28°29'25.331"S	32°5'25.331"E
92	163	-28.4898494	32.09256856	28°29'23.458"S	32°5'33.247"E
93	164	-28.48659063	32.09427572	28°29'11.726"S	32°5'39.393"E
94	165	-28.48382305	32.09572547	28°29'1.763"S	32°5'44.612"E
95	166	-28.4823995	32.09647113	28°28'56.638"S	32°5'47.296"E
96	167	-28.47889887	32.09651478	28°28'44.036"S	32°5'47.453"E

TOWERS		DD LAT	DD LONG	DMS LAT	DMS LONG
97	168	-28.47590391	32.09655211	28°28'33.254"S	32°5'47.588"E
98	169	-28.4735457	32.09658151	28°28'24.765"S	32°5'47.693"E
99	170	-28.4712469	32.09961111	28°28'16.489"S	32°5'58.6"E
100	171	-28.47048761	32.10190588	28°28'13.755"S	32°6'6.861"E
101	172	-28.46960165	32.10458332	28°28'10.566"S	32°6'16.5"E
102	173	-28.46873638	32.10719802	28°28'7.451"S	32°6'25.913"E
103	174	-28.46754768	32.10894594	28°28'3.172"S	32°6'32.205"E
104	175	-28.46570994	32.11164811	28°27'56.556"S	32°6'41.933"E
105	176	-28.46467306	32.11317264	28°27'52.823"S	32°6'47.422"E
106	177	-28.46350876	32.1140494	28°27'48.632"S	32°6'50.578"E
107	178	-28.46169703	32.11541365	28°27'42.109"S	32°6'55.489"E
108	179	-28.45768755	32.1168755	28°27'27.675"S	32°7'0.752"E
109	180	-28.45625958	32.11663659	28°27'22.535"S	32°6'59.892"E
110	181	-28.45409973	32.11627524	28°27'14.759"S	32°6'58.591"E
111	182	-28.45023671	32.11562898	28°27'0.852"S	32°6'56.264"E
112	183	-28.44924611	32.11423737	28°26'57.286"S	32°6'51.255"E
113	184	-28.44791546	32.11236813	28°26'52.496"S	32°6'44.525"E
114	185	-28.44603907	32.11262001	28°26'45.741"S	32°6'45.432"E
115	186	-28.44426335	32.11235089	28°26'39.348"S	32°6'44.463"E
116	187	-28.44238564	32.11263758	28°26'32.588"S	32°6'45.495"E
117	188	-28.43523262	32.11372961	28°26'6.837"S	32°6'49.427"E
118	189	-28.43279288	32.11410203	28°25'58.054"S	32°6'50.767"E
119	190	-28.43020611	32.11727238	28°25'48.742"S	32°7'2.181"E
120	191	-28.42812561	32.11982207	28°25'41.252"S	32°7'11.359"E
121	192	-28.42491141	32.12213126	28°25'29.681"S	32°7'19.673"E
122	193	-28.42363821	32.12304593	28°25'25.098"S	32°7'22.965"E
123	194	-28.42248873	32.12317288	28°25'20.959"S	32°7'23.422"E
124	195	-28.41916612	32.12353979	28°25'8.998"S	32°7'24.743"E
125	196	-28.41721863	32.12375484	28°25'1.987"S	32°7'25.517"E
126	197	-28.41377851	32.12722892	28°24'49.603"S	32°7'38.024"E
127	198	-28.41319535	32.12843743	28°24'47.503"S	32°7'42.375"E
128	199	-28.41253048	32.12981521	28°24'45.11"S	32°7'47.335"E
129	200	-28.40982365	32.13240187	28°24'35.365"S	32°7'56.647"E
130	201	-28.40853753	32.13458282	28°24'30.735"S	32°8'4.498"E
131	202	-28.40742134	32.13506832	28°24'26.717"S	32°8'6.246"E
132	203	-28.40620572	32.13649248	28°24'22.341"S	32°8'11.373"E
133	204	-28.40462028	32.13834984	28°24'16.633"S	32°8'18.059"E
134	205	-28.40284035	32.14043493	28°24'10.225"S	32°8'25.566"E
135	206	-28.40177602	32.14226351	28°24'6.394"S	32°8'32.149"E
136	207	-28.40023724	32.14389814	28°24'0.854"S	32°8'38.033"E
137	208	-28.3979885	32.14671076	28°23'52.759"S	32°8'48.159"E
138	209	-28.39662738	32.14946991	28°23'47.859"S	32°8'58.092"E
139	210	-28.39555255	32.15164861	28°23'43.989"S	32°9'5.935"E
140	211	-28.39477689	32.15479664	28°23'41.197"S	32°9'17.268"E
141	212	-28.39335383	32.15729331	28°23'36.074"S	32°9'26.256"E

TOWERS		DD LAT	DD LONG	DMS LAT	DMS LONG
142	213	-28.3919532	32.15831963	28°23'31.032"S	32°9'29.951"E
143	214	-28.39058855	32.15931956	28°23'26.119"S	32°9'33.55"E
144	215	-28.38944322	32.16089654	28°23'21.996"S	32°9'39.228"E
145	216	-28.38835953	32.1623886	28°23'18.094"S	32°9'44.599"E
146	217	-28.38682853	32.16449644	28°23'12.583"S	32°9'52.187"E
147	218	-28.38741896	32.16701452	28°23'14.708"S	32°10'1.252"E
148	219	-28.38945196	32.16809933	28°23'22.027"S	32°10'5.158"E
149	220	-28.38976	32.17096831	28°23'23.136"S	32°10'15.486"E
150	221	-28.39096091	32.17269104	28°23'27.459"S	32°10'21.688"E
151	222	-28.39260818	32.17505417	28°23'33.476"S	32°10'30.195"E
152	223	-28.39376391	32.17671225	28°23'37.55"S	32°10'36.164"E

APPENDIX P MAPS