

ENVIRONMENTAL IMPACT ASSESSMENT
DRAFT BASIC ASSESSMENT REPORT

ESKOM ERMELO-UITKOMS 88kV LINE
DEA Ref nr 14/12/16/3/3/1/784
NEAS Ref DEA/EIA/0001597/2012

Appendix F
Impact Assessment

TEXTURE
ENVIRONMENTAL CONSULTANTS

ENVIRONMENTAL IMPACT ASSESSMENT DRAFT BASIC ASSESSMENT REPORT

ESKOM ERMELO-UITKOMS 88kV LINE
DEA Ref nr 14/12/16/3/3/1/784
NEAS Ref DEA/EIA/0001597/2012

Appendix F Impact Assessment

1. ASSESSMENT METHODOLOGY FOR THE POTENTIAL ENVIRONMENTAL IMPACTS

This section provides the assessment methodology of the potential impacts of the project on the environment.

EIA Methodology and Impact Evaluation

Activities that will be undertaken to give effect to the proposed development give rise to certain impacts. For the purpose of assessing these impacts, the project has been divided into the following phases:

1. *Planning/Pre-construction phase*
All activities on site up to the start of construction, not including the transport of materials, but including the initial site preparations. This also includes the impacts that would be associated with planning.
2. *Construction phase*
All the construction and construction-related activities on site, until the contractor leaves the site.
3. *Operational phase*
All activities after construction, including the operation and maintenance of the proposed development.

The activities arising from each of the relevant phases have been included in the impacts assessment tables. The assessment endeavours to identify activities that would require environmental management actions to mitigate the impacts arising from them. The criteria against which the activities were assessed are given in the next section.

Assessment criteria

The assessment of the impacts has been conducted according to a synthesis of criteria required by the guideline documents to the EIA regulations (2010) and integrated environmental management series published by DEA.

1. *Nature of impact*
This is an appraisal of the type of effect the proposed activity would have on the affected environmental component. The description should include what is being affected, and how.

2. *Extent*

The physical and spatial size of the impact. This is classified as:

- i) Site: The impact could affect the whole, or a measurable portion of the site.
- ii) Local: The impacted area extends only as far as the activity, e.g. a footprint.
- iii) Regional: The impact could affect areas such as neighbouring farms, transport Corridors and the adjoining towns.

3. *Duration*

The lifetime of the impact; this is measured in the context of the lifetime of the proposed project.

- i) Short term : The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than any of the phases.
- ii) Medium term: The impact will last up to the end of the phases, where after it will be entirely negated.
- iii) Long term: The impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter.
- iv) Permanent: The only class of impact which will be non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient.

4. *Intensity*

Is the impact destructive or benign? Does it destroy the impacted environment, alter its functioning, or slightly alter it? These are rated as:

- i) Low: The impact alters the affected environment in such a way that the natural processes or functions are not affected.
- ii) Medium (Moderate): The affected environment is altered, but function and process continue, albeit in a modified way.
- iii) High: Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

This will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project.

5. *Probability*

This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:

- i) Improbable: The possibility of the impact occurring is very low, due either to the circumstances, design or experience.
- ii) Probable: There is a possibility that the impact will occur to the extent that provisions must be made.
- iii) Highly probable: It is most likely that the impacts will occur at some or other stage of the development. Plans must be drawn up before the undertaking of the activity.
- iv) Definite: The impact will take place regardless of any prevention plans, and mitigation actions or contingency plans are relied on to contain the effect.

6. *Determination of significance*

Significance is determined through a synthesis of impact characteristics.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.

The classes are rated as follows:

- i) No significance: The impact is not substantial and does not require any mitigation.
- ii) Low: The impact is of little importance, but may require limited mitigation.
- iii) Medium (Moderate): The impact is of importance and therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.
- iv) High: The impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

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

Introduction

This section of the report aims to evaluate and assess the potential impacts likely to occur from the undertaking of the proposed activities. This allows for the mitigation of the impacts and their associated costs and timeframes to be included in the project planning. The environmental issues in this section have been identified as being important and were identified and investigated in detail during the EIA.

Assessment of Potential Impacts

The assessment findings are described in the sections below. In this report, mitigation measures will refer to the precautionary measures which can be implemented in the planning stage in order to avoid, reduce or remedy the impacts of activities from the proposed project. Please note that key mitigation measures have been highlighted in this report and detailed in the Environmental Management Programme (EMPr) attached as Appendix G.

The assessment findings and proposed mitigation measures are described in the sections below.

2.1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN PHASE

The potential impacts that are likely to occur as a result of the planning and design phase are described below. In addition the mitigation measures that may eliminate or reduce the potential impacts are provided:

2.1.1 Biophysical Impacts

Impact on natural habitat

This impact is associated with the potential for disruption of sensitive floral habitats and fauna populations. The planning regarding the route of the power line should take into account the ecological sensitivity of the site.

Relevant to the project is the following:

- The ecological sensitivity of the study area is determined by combining the sensitivity analyses of both the floral and faunal components. The highest calculated sensitivity unit of the two categories is taken to represent the sensitivity of that ecological unit, whether it is floristic or faunal in nature.
- Only wetlands are seen as having a high ecological sensitivity and deemed as 'No-Go' zones. Even though no wetlands in pristine condition occur in the study area. The wetlands that occur are predominantly hillslope seepages and floodplains associated with the streams and small rivers in the study site. The transformed areas within the study site are not seen as sensitive. These include areas of regularly cultivated lands and rehabilitated opencast mines. Both these 'habitat types' are viewed as 'Go Zones' with Low sensitivity ratings.
- No proposed impacts on the ecology of the environment were identified as possibly being beneficial. However, the impact of the powerline is calculated as 'low', with the greatest impact (Moderate) being on the floodplains of the streams. The implementation of proposed mitigating measures will reduce potential impacts.
- From an ecological (or biodiversity) point of view no fatal flaw (or flaws) were found with regards to the go-ahead (go, no-go option) of the project. In other words, if all recommendations and mitigating measures are put in place the project can go ahead in terms of the ecological component of the project.
- A comparison between the two alternative routes, as to the number of ecologically sensitive units each one potentially impacts on, shows a higher potential impact in relation to watercourses by Alternative Route 1. Although both alternative routes run within the floodplain of the Witpuntspruit, Alternative Route 1 does so over a much greater distance.
- Taking the number of ecologically sensitive units each route alternative potentially impacts on, the Ecological recommended line variant for the proposed project is: Alternative Route 2.

A comparison between the two alternative routes, as to the number of ecologically sensitive units each one potentially impacts on, is shown in the Table below.

Table: Comparison of Potential Impacts by Alternative Routes

Ecological Sensitive Units	Alternative Route 1	Alternative Route 2
Areas of High ecological sensitivity	0	0
No-Go areas in close proximity	4	4
No. of river & stream crossings	6	4
No. of major drainage line crossings	13	11
Rocky outcrops in corridor	0	0
Ridges in corridor	0	0
Major Wetlands encountered	2	4
Total impacts per route	25	23

Mitigation for impact on natural habitat

Proper planning will limit the impact of the power lines on the natural habitat and therefore a number of mitigating and management measures have been recommended. The implementation of these measures will significantly reduce the potential impacts the project may have on the natural environment. Measures recommended include some of the following:

- Site specific measures in terms of ecology as identified by the ecologist, Johannes Maree (Tel 082 5641211) must be included in the contract with the Contractor and implemented by the Contractor during the construction phase.
- No area for a campsite or temporary storage site should be selected where it would be necessary to cut down any trees or clear any shrub land whatsoever, not even alien species.
- No indigenous trees or shrubs outside of the powerline corridor of 8m to be removed.
- Disturbed surface areas in the construction phase to be rehabilitated. No open trenches to be left. No mounds of soils created during construction to be left.
- An on going programme to be implemented to mechanically control alien plant species that invade the disturbed soils around the newly erected pylons. This should be done in such a way as to allow the natural grasses and pioneer plants to colonise the disturbed areas. Typically there should not be any, or very little, infestation of weeds under the powerlines where the veld / grass has only been cut. The weeds found in the area typically invade disturbed soils, with the exception of tree species, but these typically invade kloofs, ravines and drainage lines.
- No chemical control (herbicides) to be used in the control of alien plants or indigenous plants, except on tree and bush stumps in 8m corridors directly under powerlines. All control of weeds to be mechanical in nature. That is, physically cut down, pulled out or mowed over.
- All construction material, equipment and any foreign objects brought into the area by contractors and staff to be removed immediately (within two weeks) after construction.
- Removal of all waste construction material to an approved waste disposal site. And only by an official registered waste removal company.
- No temporary or other construction facilities to be erected or stored within 100m of the banks of the rivers, streams or main drainage lines.
- Positioning of any pylons need to be a minimum of 32m (preferably 50m) from the edge of the river banks or outside of the 1 in 100 year floodline, whichever is furthest.
- No campsite, temporary storage facility, or any other facility to be erected within 500m of a wetland.

Impact on natural habitat

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Long term	Medium	Probable	Medium	Low
Alternative 2	Local	Long term	Medium	Probable	Low	Low

2.1.2 Human environment

Social Impact

- The construction of new power lines could potentially impact on landowners if not planned and designed to accommodate the needs of the landowners.
- In addition, the possibility exists that a project might impact also upon residents who are not landowners. Land users or lands rights holders could farm on the portion of land affected by the proposed line or rent a house and not own it. The compensation for the servitude is always paid to the landowner and not to the land user.
- Any possible impact on landowners as well as land users should be identified and accommodated before construction of the route.
- The development on State land allocated to a tribe requires the consent of the Minister of the Department of Rural Development and Land Reform as nominal landowner of the land. In terms of the Interim Protection of Informal Land Rights Holders, 1996 (Act 31 of 1996), the Land Rights Holders must be consulted, must participate in the decision making process, and consent to the development in the form of a tribal resolution.

Mitigation for Social Impact

The route of power lines should be designed to accommodate the needs of landowners and landusers.

- The design for the power line route and the placement of structures should be accommodating to existing structures in the alignment of the route.
- Routes with evident visual disturbance caused by existing power lines or roads are in general more acceptable than traversing through pristine area.
- For the above reasons the Route alternatives had been proposed adjacent to existing disturbance as far as is achievable. (e.g. from the Ermelo substation the Route Alternatives 1 and 2 follow an existing power line to the Uitkoms substation; Route Alternative 2 deviates just for a small section away from existing powerlines).
- During the course of the EIA, all affected landowners were identified and consulted with regarding the proposed project. Meetings were conducted with the relevant affected landowners to address their specific requirements. All landowners indicated their agreement to the route or their willingness to enter into further negotiations.
- The properties in question (servitudes) will not be purchased and the registered owner will receive compensation for the use of the servitude.
- A negotiator has been appointed by the applicant to consult with land owners/land rights holders. Further negotiations are taking place to confirm the details for the acquisition of the servitudes as well as compensation. The negotiator will confirm the specific requests/requirements with each landowner. These will be stipulated in the final document, an option document. The option document is a binding document that reflects all the requirements of the landowner, for example: the exact positions of the pylons on the property; the negotiated compensation for the servitude; specific access arrangements to the property etc.

Social Impact

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Long term	Medium	Probable	Low	Low
Alternative 2	Local	Long term	Medium	Probable	Medium	Low

2.2 IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE

The potential impacts that are likely to occur as a result of the construction phase are described below. In addition the mitigation measures that may eliminate or reduce the potential impacts are provided:

2.2.1 Biophysical Impacts

Impact on natural habitat

The proposed activity is the erection and maintenance of small sized (88kV) powerlines. Due to the physical nature (and small footprint) of the powerlines, the overall impact to the natural environment is minimal over the medium- to

long-term. This relative to other impacts in the region such as open-cast coal mining, agriculture and urbanisation. The initial (short-term) construction phase will have a higher initial impact on the environment, but this is still seen as being relatively low. The nature of the impact is mainly a number of small (typically 3m by 3m) footprints across the terrain, spaced every 200m to 300m, sometimes further apart. Large construction sites or large earth-moving operations are not required. In other words, the actual, physical disturbances are small and therefore the environment is minimally disturbed and can recover quickly. The aerial-borne lines can have a negative impact on birds and relevant studies are undertaken to address these impacts. Trees and tall shrubs growing directly under powerlines need to be removed and kept permanently so. Due to the open, tree-less nature of the grassland vegetation of the study area, very few indigenous trees are encountered along the powerline corridors, so this has basically no impact on the vegetation of the study site.

As mentioned, the construction of the power line will have a higher initial impact on the environment, but this is still seen as being relatively low. This impact is associated with disturbance to and/or destruction of the flora and fauna component.

- Potential impacts during the construction phase include the loss of primary vegetation, the loss of potential Red Data flora and fauna, disturbances and the loss of areas with high ecological function. The impacts are discussed under specific headings in this report and are based on the findings of the ecological (flora, fauna and avifauna) specialist assessments.
- During construction the project could cause a significant impact where insensitive clearing for construction and access purposes, etc. is required. Insensitive clearing can cause the destruction of habitat. Not only does vegetation removal represent a loss of seed and organic matter, but it is also a loss of protection to plants and small animals. Insensitive vegetation clearance can also cause erosion.
- During the construction phase, it is possible that areas corresponding to the footprint of the proposed pylon structure could provide habitat for threatened or conservation important fauna and floral species.
- Pressure on the natural environment will occur as a result of an influx of labourers into the area that could involve the collection of firewood and medicinal plants, as well as uncontrolled veld fires.
- Various species of indigenous trees and bush on private land are protected by law in terms of the National Forests Act No. 84 of 1998, which stipulates that it is necessary to obtain a permit from the Forestry Branch of the Department of Agriculture, Forestry and Fisheries in order to cut, trim or remove them.
- It was found that Route Alternative 2, based on its low ecological sensitivity, was considered the most suitable alignment.

Mitigation of impact on natural habitat

- The proposed project requires the construction of a 132kV line. The total servitude width is 31 meters.
- Relatively small, localised areas of natural flora will be affected by the development, which will be restricted to the servitude for the power line and access to it.
- Construction activities in most areas along the Corridors of the power line will be of a short duration and should thus not result in long-term impact on vegetation.
- Of significance are the sites situated closer to ecological habitats such as water courses and wetland areas. Water bodies are potentially vulnerable or endangered by the power line pylons and access roads.
- Impact on these ecologically sensitive areas can be minimised through the correct location of pylons and access roads.
- Mammals, reptiles and small bird species may be impacted during construction, particularly those that are nesting/breeding at the time. Most species are however likely to move away from the area during construction and return when construction is over. Thus it is unlikely that these species suffer any long-term effect.
- Site-specific measures for the specific properties as identified by the ecologist, must be implemented by the Contractor during the construction phase and by Eskom and the maintenance teams during the operational phase. Refer to mitigation measures provided in the Planning phase.
- Work corridor to be limited to 20 metres along the route of the servitudes.
- Ensure that no trees or existing grass strata outside of the servitude corridor be removed to lower any kinetic energy of potential run-off, that disturbed surface areas in the construction phase be restored and lastly that no open trenches or mounds of soils created during construction be left.

- The procedures for vegetation clearance and maintenance within servitudes and on Eskom owned land as prescribed by Eskom must be implemented. Selective bush clearing must take place, i.e. indigenous vegetation, which does not interfere with the safe operation of the structure, should be left undisturbed.
- Where clearing of access for construction is essential, the maximum width to be cleared is 8m, 4m on either side of the alignment for the power line. Clearing for tower positions must be the minimum required for the specific tower.
- Removal of trees, shrubs and other vegetation should be kept strictly to within the 8m corridor under the power lines.
- Only a single, basic vehicle track to be constructed as an access road under pylons.
- Avoid and control unauthorised off-road driving.
- Access roads need to be kept to an absolute minimum.
- Damage can result in habitat modification or erosion as a result of the proposed power line construction activities. This can be avoided in general, by not allowing any construction of any sort to take place within aquatic and riparian habitats encountered, as these habitats are viewed as sensitive.
- A few streams / small rivers (Witpuntspruit, Humanspruit,) along with drainage lines cross the powerline corridors. These need to be avoided in the sense that no pylons may be placed directly within the main stream of any one of these watercourses.
- No typical wetlands such as pans or fresh water lakes, occur within the proposed powerline corridors, but some do occur in the area, or in fairly close proximity. Under no circumstances may any activities directly or indirectly related to the powerline project take place within any wetland area.
- Control the removal of medicinal or aesthetic plants.
- The harvesting of wood from drainage lines for warming and cooking must be avoided.
- Floral Species of Conservation Concern: *Gladiolus malvinus*, *Crinum bulbispermum*, *Ilex mitis*, *Gunnera perpensa*, *Asparagus fractiflexus*, *Nerine gracilis*, *Aspidoglossum xanthosphaerum*, *Khadia carolinensis*, *Merwillia plumbea*, *Habenaria barbetoni*, *Crinum bulbispermum*, *Aloe cooperi*, *Gunnera perpensa*, *Eucomis montana*, *Rapanea melanophloeos*.
- There are numerous other herbaceous, bulbous geophytes (eg. *Gladiolus*, *Iris*) that are likely to occur in the grasslands and wetlands of the study area. Many of these species are under threat, although not necessary currently registered as Red Data species. It is therefore recommended for sake of ease for contractors to consider all such species as sensitive and avoid disturbing them or erecting pylon supports directly on top of encountered populations.
- Red Data Species highly likely to occur in the area: *Alepidea longeciliata*, *Brachycorythis conica* subsp. *Transvaalensis*, *Disa chrysostachya*, *Disa cooperi*, *Disa nervosa*, *Disa versicolor*.
- During site visits no terrestrial Red Data faunal species were encountered in the study area, although previously evidence of Pangolin was seen east of the study site. However, due to the habitats in the study area there remains the high potential for certain Red Data species, to be present, especially along ridges and in the open grassy lowlands in the east of the study area. Red Data Faunal Species likely to occur in the area: *Pyxicephalus adspersus*, *Atelerix frontalis*, *Manis temmincki*, *Mellivora capensis*, *Pipistrellus rusticus*, *Python natalensis*.

These impacts on the general ecological systems during the construction phase are evaluated as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Long term	Medium	Probable	Medium	Low
Alternative 2	Local	Long term	Medium	Probable	Low	Low

Impact on Grassland Plains

The Eastern Highveld Grassland is a vegetation type that is endangered and serious efforts need to be made to protect it as best as possible. However, although the study site falls within this grassland type, the study area and the immediate surrounding areas have been largely transformed and disturbed. These disturbances are predominantly in the form of open-cast coal mining, cultivated lands (agriculture), cattle and sheep farming and urbanisation. Furthermore, the nature of the ecological impact of powerlines is relatively low. For these reasons the significance of the impacts are seen as low and can be viewed as neutral.

Mitigation of impact

- Due to the long distance covered by the powerline corridors between Ermelo Substation and Uitkoms Substation, it may well be necessary to set up temporary storage and accommodation facilities along the route. In such cases, areas of flat, open lands should be selected. Preferably old, previously cultivated lands should be selected that are open and not wooded. In other words, no areas of pristine grassland should be selected.
- No area for a campsite or temporary storage site should be selected where it would be necessary to cut down any trees or clear any shrub land whatsoever, not even alien species, as oftentimes contractors do not have the expertise to distinguish between alien and indigenous species.
- Any selected temporary site (Accommodation or storage) needs to be within the 100m powerline corridor.
- No indigenous trees or shrubs outside of the powerline corridor of 8m to be removed, although due to the grassland vegetation of the study area very few occur. Patches of exotic trees (especially blackwattle (*Acacia mearnsii*) within the large 100m corridor may be totally removed. This will also have a positive impact on the grassland environment. The stumps of these trees to be treated with the recommended poisons to prevent budding and regrowth, but no poisons to be applied directly to the surrounding soils.
- Disturbed surface areas in the construction phase to be rehabilitated. No open trenches to be left. No mounds of soils created during construction to be left.
- The sandy nature of the soils in most of the corridor route makes them susceptible to soil erosion by water once disturbed, especially in steeper areas. The ground surface around all foundation slabs for the pylons needs to be inspected before the start of the summer rain season and within three months after the end of summer for erosion. Any erosion found needs to be fixed immediately and preventative measures put in place to prevent a reoccurrence of the situation.
- All construction material, equipment and any foreign objects brought into the area by contractors and staff to be removed immediately (within two weeks) after construction.
- Removal of all waste construction material to an approved waste disposal site. And only by an official registered waste removal company.
- Care needs to be taken should contractors come across large holes dug in the ground in the grasslands. These potentially could be aardvark or pangolin lares, both are Red Data Species and protected by law. If unsure reposition the necessary pylon at least 20m away from the entrance.
- Only a single, basic vehicle track to be constructed as an access road under pylons. The track is not to pass directly through any wetlands or pan depression, even those directly under the powerline itself.

A rating matrix for Grassland Plains, along with the effective implementation of positive mitigating measures, is calculated below.

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Site	Long term	Low	Probable	Low	Low
Alternative 2	Site	Long term	Low	Probable	Low	Low

Impact on rivers, streams and drainage lines

Drainage lines are generally viewed as sensitive and need to be avoided where possible. There are a number of drainage lines within the study area, some of which are traversed by both route alternatives. Due to the high rainfall, soils, grassland vegetation and flat, low gradient of the terrain, many of the drainage areas remain damp for most of the year. This is more due to the continual seepage of groundwater in the depressions and the slow run-off of the water. Most of the drainage lines are flat, shallow and wide. Atypical of donga-like or deep-walled grassless lines that are found in steep terrain, which results in fast flowing water that erodes and dries quickly. All drainage lines encountered in the powerline corridors need to be traversed with no pylons been erected within them. All drainage lines are calculated as been of medium/high sensitivity.

Higher potential impact in relation to watercourses is expected by Alternative Route 1. Although both alternative routes run within the floodplain of the Witpuntspruit, Alternative Route 1 does so over a much greater distance. Therefore, taking all of the above issues into account, the Ecological recommended line variant for the proposed project is: Alternative Route 2.

A rating matrix for *Drainage Lines* along with the effective implementation of positive mitigating measures is calculated below.

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Site	Long term	Low	Probable	Low	Low

Alternative 2	Site	Long term	Low	Probable	Low	Low
---------------	------	-----------	-----	----------	-----	-----

Rivers are always seen as sensitive and should be avoided, along with their associated riparian vegetation and floodplains. No large, perennial rivers are found in the study area. However, the powerline corridors will need to cross a few small streams in order to link up between Ermelo and Uitkoms Substations. Of particular concern is the Witpuntspruit, which is a small to medium size perennial stream that runs inside of the proposed powerline servitudes. Mitigating measures are necessary, the implementation of which will ensure that almost no negative impact in terms of the ecological environment are felt. Typical of many of the small rivers and streams in the Highveld grasslands, the rivers do not have a very distinctive riparian vegetation zone, especially with regards to trees. Often the trees found along these watercourses are invasive aliens such as weeping willow (*Salix babylonica*) and grey poplar (*Populus x canescens*). As indicated, higher potential impact in relation to watercourses is expected by Alternative Route 1. Although both alternative routes run within the floodplain of the Witpuntspruit, Alternative Route 1 does so over a much greater distance. Therefore, taking all of the above issues into account, the Ecological recommended line variant for the proposed project is: Alternative Route 2.

A rating matrix for Rivers in the study area, along with the effective implementation of positive mitigating measures is shown below.

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Regional	Long term	High	Probable	High	Medium
Alternative 2	Regional	Long term	High	Probable	High	Low

Mitigation of impact

- A few streams / small rivers (Witpuntspruit, Humanspruit,) along with drainage lines cross the powerline corridors. These need to be avoided in the sense that no pylons may be placed directly within the main stream of any one of these watercourses.
- No temporary or other construction facilities to be erected or stored within 100m of the banks of the rivers, streams or main drainage lines.
- Positioning of any pylons need to be a minimum of 32m (preferably 50m) from the edge of the river banks or outside of the 1 in 100 year floodline, whichever is furthest.
- Positioning of the foundation slabs for the pylons must be a minimum of 32m away from the edge of all drainage lines.
- Under no circumstances may a pylon be placed directly in the bed (main flow) of a river or drainage line. Not even if in position of a valid Water Use Licence (WUL).
- No temporary ablation facilities to be placed within 200m of the banks of any of the rivers, streams or drainage lines (even those that are dry during the time of construction)
- Only proper portable, chemical ablation facilities to be used and these to be positioned only within the 31m powerline servitudes.
- Portable ablation facilities only to be serviced by registered companies and on a regular basis. Under no circumstances may any effluent or sewage to be dumped (or buried) in the open veld.
- Proper water facilities need to be installed and maintained for construction workers. No water from out of the rivers may be used for drinking, washing or cooking purposes.
- No fishing, capture of any water or land animals, or removal of water plants or other vegetation for food to be allowed.

Impact on wetlands

All wetlands are considered sensitive and those found in the study area are no exception. Due to the high rainfall and undulating grassland plains with pan depressions numerous wetlands can be found in the general area. A number of small water bodies (wetlands) are scattered across the study area, but most of these fall outside the powerline corridors and will also be avoided during the construction and maintenance phases. Corridor routes have been adjusted to avoid wetlands where possible, but in some instances come within close proximity to some small pans and seasonal waterlogged depressions. The main wetland types impacted upon are the floodplains of the small rivers and streams encountered in the study area. No large, or pristine wetland pans or other typical wetland types such as endorheic or palustrine wetlands are present. Mitigating measures have been put in place to avoid any construction or disturbance of these small water bodies as well. Wetlands are viewed as 'No-Go' zones.

Mitigation of impact

- No typical wetlands such as pans or fresh water lakes, occur within the proposed powerline corridors, but some do occur in the area, or in fairly close proximity. Under no circumstances may any activities directly or indirectly related to the powerline project take place within any wetland area.
- No campsite, temporary storage facility, or any other facility to be erected within 500m of a wetland.

A rating matrix for Wetlands along with the effective implementation of positive mitigating measures is calculated in below.

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Regional	Long term	Very High	Highly Probable	Medium	Low
Alternative 2	Regional	Long term	Very High	Highly Probable	High	Low

Impact on Birds

The possible impacts of the proposed construction of power lines and substations on birds are the following:

Habitat destruction

During the construction phase and maintenance of substations and power lines some habitat destruction and alteration inevitably takes place. This happens with the construction of access roads, and the clearing of servitudes, as well as clearing vegetation at the substation site. Servitudes have to be cleared of excess vegetation at regular intervals in order to allow access to the line for maintenance, to prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the conductors and to minimize the risk of fire under the line which can result in electrical flashovers. These activities have an impact on birds breeding, foraging and roosting in or in close proximity of the servitude through modification of habitat. *Habitat destruction along route Alternative 1 is anticipated to be of Moderate Significance, while habitat destruction along route Alternative 2 is anticipated to be of Low to Moderate significance in this study area.*

Disturbance

Similarly, the above-mentioned construction and maintenance activities impact on bird through disturbance, particularly during bird breeding activities. *Disturbance of birds is anticipated to be of Moderate Significance.*

Mitigation of Impact on Birds

Relevant to this study: (See full report in Appendix D3)

- The proposed construction of the Alternative 1 power line should therefore have a medium habitat transformation impact and the construction of Alternative 2 a low-medium habitat transformation impact from an avifaunal perspective, depending on how much excess vegetation are cleared during the construction of the line. The removal of large trees should be avoided as much as possible.
- Strict control should be maintained over all activities during construction, in particular heavy machinery and vehicle movements, and staff. It is difficult to mitigate properly for this as some habitat destruction is inevitable. It is important to ensure that the construction Environmental Management Plan incorporates guidelines as to how best to minimize this impact.
- During Construction, if any of the “Focal Species” identified in this report are observed to be roosting and/or breeding in the vicinity (within 500m of the power line), the EWT is to be contacted for further instruction.

These impacts during the construction phase are evaluated as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Medium term	Medium	Probable	Medium	Low
Alternative 2	Local	Medium term	Medium	Probable	Low-Medium	Low

Risk of Surface and Groundwater Pollution

- Hazardous materials and construction equipment will be stored at the campsite and used on site. The pollution of groundwater may result from spillages that may occur. In addition, the campsite may accommodate construction workers, in which case solid and liquid effluents will be produced, including sewage and domestic solid waste.

- Therefore diesel, oil and lubricant spills are the main concern in respect of water pollution during construction together with organic pollution caused by inadequately managed facilities at site camps and at the work sites. The above may result in a change in groundwater quality with the associated negative impact on humans and the natural habitat.
- A management plan must be in place to rehabilitate any such spills. Part of the management strategy must further include the proper storage and removal of any by-products and building rubble.
- Relevant to this project is the following:
- A few streams / small rivers (Witpuntspruit, Humanspruit,) along with drainage lines cross the powerline corridors. The proper implementation and management of mitigating measures are crucial.
- The drainage routes (or lines) are not seen as being of any threat to the power line, but they should be kept in mind during construction and care should be taken to avoid them. Concrete foot supports should not be placed directly in or on the banks of these drainage furrows. Neither drainage nor erosion are seen to be significant threats as long as the proper mitigating measures are implemented.

Mitigation of Surface and Groundwater Pollution

Construction camp

- Encourage the construction contractor to employ local people as far as is reasonably practical and encourage the contractor to transport them daily to and from site. This will reduce solid and liquid waste production and water demand at the site camps.
- Camp site, storage facilities and other necessary temporary structures to preferably be erected within the confines of the Ermelo and Uitkoms Substations. With the possibility of another one (maximum two) temporary sites within the powerline corridors due to the distance between the substations.
- All construction activities and movement of people and machinery to remain within the designated power line corridor.
- Proper water facilities need to be installed and maintained for construction workers. No water from out of the river may be used for drinking, washing or cooking purposes.
- In all cases, abstraction of water for construction purposes will require a permit from the Department of Water Affairs unless pre-existing rights are purchased from landowners. For this project, water tanks will be provided at the construction site.
- Mixing of cement, concrete, paints, solvents, sealants and adhesive must be done in specified areas on concrete aprons or on protected plastic linings to contain spillage or overflows onto soil to avoid contamination of underground water. The use of pre-mixed cement is recommended. No concrete to be allowed to be mixed in the veld.

Diesel, hydraulic fluid and lubricants

- Minimize on-site storage of petroleum products;
- Build adequate structures (berms and containment structures) to contain any oil spills which might emanate from transformers;
- Bund storage tanks to 120% of capacity;
- Ensure proper maintenance procedures in place for vehicles and equipment.
- Servicing of vehicles to be in designated areas with appropriate spill management procedures in place;
- Ensure measures to contain spills readily available on site (spill kits).

Site camp domestic waste (kitchens, showers)

- Deposit solid waste in containers and dispose regularly at the appropriate landfill site licensed in terms of section 20 (b) of the National Environment Management Waste Act, 2008 (Act No 59 of 2008). Proof thereof to be kept by contractor.
- A copy of the service agreement, to verify the disposal sites that will be accepting the waste, should be submitted to the Dept of Water Affairs.
- Dispose of liquid waste (grey water) with sewerage.

Site camp sewage

- Minimize on-site accommodation.
- Only proper, certified portable chemical toilets to be used in campsites.
- Only certified, portable chemical ablution facilities to be used and these to be positioned only within the 31m power line servitudes.

- Only certified waste disposal companies to be used to regularly clean and empty portable toilets.
- Under no circumstances may any human waste (sewage) be discarded (or buried) in the open veld.
- No ablution facilities allowed to be placed within 200m of the banks of any river or seasonal stream.
- No ablution facilities allowed to be within 200m of any drainage lines (even during times when they are dry)

Site camp inert waste (waste concrete, reinforcing rods, waste bags, wire, timber etc)

- Ensure compliance with stringent daily clean up requirements on site.
- Any waste that cannot be recycled will be transported to the appropriate landfill site licensed in terms of section 20 (b) of the National Environment Management Waste Act, 2008 (Act No 59 of 2008).

Rivers and drainage lines

- Rivers and drainage lines are always seen as sensitive and should be avoided at all cost. A few streams / small rivers (Witpuntspruit, Humanspruit,) along with drainage lines cross the powerline corridors. These need to be avoided in the sense that no pylons may be placed directly within the main stream of any one of these watercourses.
- No temporary or other construction facilities to be erected or stored within 100m of the banks of the rivers, streams or main drainage lines.
- Positioning of any pylons need to be a minimum of 32m (preferably 50m) from the edge of the river banks or outside of the 1 in 100 year floodline, whichever is furthest.
- Positioning of the foundation slabs for the pylons must be a minimum of 32m away from the edge of all drainage lines.
- Under no circumstances may a pylon be placed directly in the bed (main flow) of a river or drainage line. Not even if in position of a valid WUL.
- During and after construction, storm water control measures should be implemented especially around stockpiled soil, excavated areas, trenches etc. so that export of soil into the watercourse is avoided.

The risk of surface and ground water pollution during the construction phase are evaluated as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Regional	Long term	High	Probable	High	Medium
Alternative 2	Regional	Long term	High	Probable	High	Low

Impact of erosion

- During pylon foundation excavation, bush clearing and earth grading will be done in order to provide vehicle access to the pylons. Depending on location, this may encourage soil erosion. This will be localized rather than an extended linear disturbance. Creation of access tracks has the potential to cause soil erosion if not managed correctly. By compacting soil, vehicles kill the grass and prevent future growth. The bare soil therefore becomes eroded. If in close enough proximity to rivers, erosion or poor management of stockpiles or materials may impact directly on the river in the form of siltation and pollution. This would be significant should it occur in the vicinity of the local streams. These impacts are however expected during the construction phase only.
- The loss of vegetation, erosion is likely to occur as an indirect impact of the development. The footprint of the infrastructure (pylons) is however small and since grass coverage is likely to recur the overall impact of the erosion is manageable.
- Insufficient soil coverage after placing of topsoil, where large surface areas are applicable, could also cause erosion.
- To cause the loss of soil by erosion is an offence under the Soil Conservation Act (Act No 76 of 1969.)
- The management of surface water runoff during construction is important to prevent soil erosion on the site. If construction takes place during the rainy season, sufficient storm water management will be required to manage water runoff.
- In summary, excavation of foundations for pylons, movement of vehicles and people and the run-off from cleared areas can cause erosion.

Mitigation of Impact of erosion

- Rocky ridges are generally seen as sensitive and need to be avoided where possible. There are no typical koppies (rocky outcrops) found within the powerline corridors. There are a few areas where there are bolder-

strewn undulating slopes, but these are not the same as koppies or rocky ridges and are not seen as being ecologically sensitive, from either a floral or faunal point of view.

- The routes for both Alternative 1 and Alternative 2 were designed to follow existing power lines and these servitudes can be used as access roads during construction. This will lower the need for clearing of natural vegetation during construction.
- Care should still be taken to avoid any unnecessary disturbance of veld or soil. Removal of trees, shrubs and other vegetation should be kept strictly to within the 8m corridor under the power lines.
- Only a single, basic vehicle track to be constructed as an access road under pylons.
- Access roads need to be kept to an absolute minimum.
- No roads may be cut through riverbanks, stream banks or drainage line banks, as this may lead to erosion and siltation of watercourses and downstream dams. Only existing, proper watercourse crossings may be used during construction and maintenance phases.
- Pro-active measures must be implemented to curb erosion and to rehabilitate eroded areas. All areas susceptible to erosion must be installed with temporary and permanent diversion channels and berms to prevent concentration of surface water and scouring of slopes and banks, thereby countering soil erosion.
- Crossing of dongas and existing eroded areas shall be thoroughly planned prior to the start of construction and movement of construction and delivery vehicles.
- Water diversion berms shall be installed at donga crossings to ensure runoff water on the servitude does not run into dongas and cause an erosion hazard, nor resulting in increased or further erosion.
- Suitable erosion containment structures shall be constructed at donga crossings where required and viable. Specialists shall properly design all structures and drawings shall be available for reference purposes.
- No unplanned / improperly planned cutting of donga embankments is allowed as this leads to erosion and degradation of the natural environment.
- No unnecessary roads or vehicle tracks or driving of vehicles through the veld as this leads to increased denuding of the covered soils, which leads to increased erosion potential.
- Unnecessary clearing of flora resulting in exposed soil prone to erosive conditions should be avoided.
- No trees or existing grass strata outside of the power line corridor should be removed to lower any kinetic energy of potential run-off.
- Indigenous vegetation, which does not interfere with the safe operation of the substation/ power line, should be left undisturbed.
- The ground around all foundation slabs for the pylons need to be inspected before and after the summer rainy season for erosion. Any erosion found needs to be fixed and preventative measures put in place to prevent a reoccurrence of the situation.
- Specifications (as identified in the Environmental Management Programme) for topsoil storage and replacement, to ensure sufficient soil coverage as soon as possible after construction activities, must be implemented.
- All cleared areas must be ripped and rehabilitated after construction. The top 200mm layer of topsoil must be removed and stockpiled in heaps not higher than 2m and replaced on the construction areas once the activities have been completed. The affected areas should be replanted with a grass mixture indigenous to the area.
- Neither drainage nor erosion is seen to be significant threats as long as the proper mitigating measures are implemented.

The impact of the project activities on all proposed Corridors that may lead to erosion and sedimentation during both construction and operational phases is considered to be of moderate significance without mitigation. The impacts on geology and soils will be reduced to low significance with mitigation.

Project Phase	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Long term	Medium	Probable	Medium	Medium
Alternative 2	Local	Long term	Medium	Probable	Medium	Low

Solid Waste

- It is expected that a certain amount of construction waste will be generated during construction.
- Expected waste could be unused steel, conductor cables, cement or concrete and general waste around the construction site (plastic, tins and paper), which may degrade the environment if not disposed in the correct manner.

- Solid waste might remain on site after the completion of construction. This can cause pollution to the environment and be detrimental to animals.

Mitigation of Solid waste

- The construction teams should ensure that all waste is removed from the site and that they recycle the items that can be used again. Unusable waste steel and aluminium will be sold to scrap dealers for recycling at the Eskom stores.
- Any waste that cannot be recycled will be transported to the appropriate landfill site licensed in terms of section 20 (b) of the National Environment Management Waste Act, 2008 (Act No 59 of 2008). A copy of the service agreement, to verify the disposal sites that will be accepting the waste, should be submitted to the Dept of Water Affairs.
- Proper and adequate containers (rubbish bins) to be put in campsites for the temporary disposal of food waste and general litter generated by construction workers. These containers need to close securely to avoid items (eg. paper and plastic) been blown into the veld, or been pushed over and rummaged through by wild animals. Proper waster management is essential.
- Containers for food and general waste to be removed weekly to avoid bins overflowing their capacity.
- Under no circumstances may any sewage, waste food or general litter be dumped in the veld.
- Stockpiling of construction material should be such that pollution of water resources is prevented and that the materials will be retained in a storm event.
- Once construction is completed, the contractor has to obtain written consent from the relevant landowner that the construction site, construction areas, access routes, etc. are sufficiently and adequately rehabilitated to the landowner's satisfaction.

The impact of solid waste during the construction phase is evaluated as follows:

Project Phase	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Short term	Medium	Probable	Medium	Low
Alternative 2	Local	Short term	Medium	Probable	Medium	Low

2.2.2 Human environment

Impact of labourers

An uncontrolled influx of temporary labourers with associated squatter and increased crime problems create pressure on the natural environment (placement of snares, removal of trees for firewood, careless waste disposal, etc.). This could be severe resulting in permanent damage to the environment if not mitigated properly.

Mitigation of impact of labourers

- A small number of construction workers would be on site. A large workforce is thus not expected. Distribution line construction further requires highly skilled individuals but also provide work for semi to lesser skilled labourers. Even if all the required labourers (highly skilled to unskilled) would be sourced from outside the study area (worst case scenario) it is not anticipated that the relatively small construction workforce would have an impact on the population size and density of the local communities within the study area due to the fact that the areas in and around Ermelo is densely populated.
- As all the Route corridors traverse the above mentioned densely populated areas, all the Corridors are rated similar.
- Given the specialists nature of distribution line construction, specialist contractor teams would be appointed by Eskom for the construction phase of the project. These contractor teams would consist of highly skilled specialists, semi-skilled and unskilled workers. The nature, extent and intensity of this impact would thus depend on the number of locals that would form part of the contractor teams and whether construction camps would be set up to house the temporary "outside" workforce within the study area.
- Due to the anticipated size of the construction workforce, it is apparent that the impacts associated with the inflow of temporary workers to the study area is not expected to result in severe negative impacts on the local communities' social networks, even if the majority of the workforce would be from outside the community

(worst case scenario). It is furthermore not expected that the inflow of temporary workers would put additional pressure on the current infrastructure and service delivery in the area, as their immediate needs would be provided through the construction camp infrastructure and services provided on site, or by the existing infrastructure and services available in the study area.

- Care should, however, be taken to avoid conflict between the local communities and the “outside” workforce that would be working “inside” densely populated areas such as Ermelo and surrounds. Although the construction period would be of a short duration in any one area, it should be kept in mind that the construction teams could interfere with the social networks and daily living patterns of the residents due to the proximity of the construction area to the existing dwellings. With the construction of the power lines along the last section of all the route (closer proximity to the Uitkoms Substation), construction would be more removed from local towns due to the rural characteristics of the area. The influx of the construction workforce in the low density “rural” areas would thus result in a less intense impact compared to the impact in densely populated areas.
- Mitigation measures to counter impact on the natural environment and limit potential for crime include specifications in terms of control of construction workers (i.e. provision of toilet and cooking facilities, provision of either accommodation facilities or transport facilities, implementation of Environmental Educational Programmes, etc.). Accommodation for labourers must either be limited to guarding personnel on the construction site (with labourers transported to and from existing neighbouring towns) or a separate fenced and controlled area where proper accommodation and relevant facilities are provided.
- Eskom and the contractors should maximise the use of local labour where possible by developing a strategy to involve local labour in the contractor teams and construction process.
- Before construction commences, representatives from the local authority and community-based organisations, as well as neighbouring and/or affected residents should be informed of the details of the construction company (contractor), size of the workforce and construction schedules.
- Conditions stipulated by property owners in terms of the construction activities should be implemented and monitored.
- Contractors and temporary employees should behave fittingly at all times.
- Workers should receive fines if they do not adhere to the conditions, rules and regulations.
- Workers should be made aware of property owners’ concerns regarding construction work on their properties so that they are familiar with the sensitive issues.
- A specific contact person should be identified to allow community members and property owners to easily direct their queries and concerns and obtain general information regarding the construction process.
- Prepare a comprehensive Environmental Management Programme (EMPr) for the control of environmental impacts at the site camps.
- The EMPr is to include specific provision for the management of the following:
 - Site location
 - Solid waste
 - Liquid effluent (sewage)
 - Storm water
 - Litter
 - Nuisance (Noise)
 - Hazardous substances
 - Social pathologies (prostitution, drunkenness, theft)
 - HIV/Aids prevention.
- Develop an HIV/Aids workplace policy.
- Ensure that the contractors develop a comprehensive site camp management plan. This should apply even in the case of the limited accommodation camps recommended above.
- Plan campsites an appropriate distance from any facility where it can cause a nuisance.
- Camp site, storage facilities and other necessary temporary structures to preferably be erected within the confines of the Ermelo and Uitkoms Substations. With the possibility of another one (maximum two) temporary sites within the powerline corridors due to the distance between the substations.

This impact is evaluated as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Short term	Medium	Probable	Medium	Low

Alternative 2	Local	Short term	Medium	Probable	Medium	Low
---------------	-------	------------	--------	----------	--------	-----

Employment Opportunities

Power line construction does not create large scale job opportunities. For the construction of the proposed distribution lines an estimated average of 65 individuals peaking to 100 individuals would be required. These opportunities would require skilled workers (approximately 10 individuals), semi-skilled workers (approximately 30 individuals) and approximately 20 unskilled labourers. The type of jobs required could include project and construction managers, contract supervisors, construction foremen and general labourers (skilled and semi-skilled). Opportunities for local labour are thus definitely possible (a total of approximately 50 semi-skilled to unskilled jobs), although limited when the population size is taken into consideration. Due to the social character of the population within the study area and specifically Ermelo, any possible job opportunities for locals should still be viewed as a social benefit as the limited number of job opportunities (even temporary) could still have some positive economic impact on select families. The proposed project could further assist with capacity building through on-site training and skills development opportunities.

Mitigation

The following mitigation measures could be implemented to enhance the positive aspects associated with local job creation:

- It is recommended that the contractor employ local semi-skilled and unskilled labour from the study area to avoid conflict between locals and outsiders with regards to the securing of employment.
- Eskom should stipulate in their contracts with the contractors that local labour should be used for e.g. bush clearing, road construction and fencing.
- Ward councillors could assist in determining available local labourers that could be considered for possible employment.
- Eskom should ensure an equitable process whereby minorities and previously disadvantaged individuals (women) are also taken into account.
- It is recommended that Eskom implements a skills audit and develops a skills database.
- Capacity building and skills transfer should immediately commence to ensure that locals are employable.
- It should be ensured that contractors use local skills, or train semi-skilled people or re-skill appropriate candidates for employment purposes where possible.
- Onsite training should focus on the development of transferable skills (technical, marketing and entrepreneurial skills) to ensure long-term benefits to the individuals involved.

The impact is evaluated as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Short term	Medium	Probable	Medium	Medium
Alternative 2	Local	Short term	Medium	Probable	Medium	Medium

The impact is considered being of moderate positive significance without mitigation.

Local Procurement

At this stage, no information is available with regards to the material and quantity of material required, as well as for consumables (e.g. fuel for construction vehicles) for the construction of the distribution line. The impact of the project on the procurement of local businesses and previously Historically Disadvantaged South Africans (HDSA's) can therefore not be determined at this stage. It is, however recommended that Eskom commits itself to involving locals (HDSA's and SMME's) in the procurement of capital goods, consumables and services, if these are locally available. Due to the specialised material and equipment used, the intensity of this impact is considered to be of a low magnitude, although moderately probable.

Mitigation

The following mitigation measures are proposed:

- Local procurement should be aimed at as far as possible.

- Local sourcing of materials would assist in providing more economic and employment opportunities for the local people.
- Local procurement could result in indirect economic spin-offs and benefits such as increased income, and expansion of other local economic sectors.

The impact has been assessed as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Regional	Short term	Low	Probable	Low	Medium
Alternative 2	Regional	Short term	Low	Probable	Low	Medium

Local economic benefits

Local economic benefits during the construction phase would include the temporary employment of local labourers and short term socio-economic spin offs such as increased buying power around the construction sites, and small scale economic advancement of entrepreneurs (e.g. those selling food and goods to the construction workers). Although the benefits of temporary employment is short lived, it should still be seen as a positive impact due to the high unemployment rates and levels of poverty found in the study area.

Mitigation

The following is recommended to enhance the socio-economic benefits during the construction phase:

- Maximise the use of local labour even if the number of locals that would be employed would be limited.
- Accommodate, but regulate the activities of vendors in the vicinity of the construction areas and at the construction camps.

The impact has been assessed as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Regional	Short term	Low	Probable	Low	Medium
Alternative 2	Regional	Short term	Low	Probable	Low	Medium

Daily living and movement patterns

The construction timeframe for the distribution line is estimated to be a few months. This process will include site preparations, vegetation clearance (where required), excavations for pylon foundations, assembly and erection of the pylons, and stringing of the line. Heavy construction vehicles would be used to transport material to the construction sites, but due to the limited number of these, the negative impacts on the residents' daily living and movement patterns are expected to be of a low magnitude. Main Corridors that could be negatively affected, even by a limited number of construction vehicles, include the R65, N11 and N2.

The impact on the daily living and movement patterns of private property owners with regards to the possible construction of new access roads would especially be evident in the rural open areas where numerous gravel roads connect to tarred roads. Where construction work has to be undertaken adjacent to private properties it could also have a negative impact on those owners' daily living and movement patterns, especially in the populated areas of Ermelo and so forth.

Impacts on daily living and movement patterns also refer to the increased *noise pollution* during construction activities, especially where construction would take place in close proximity to dwellings and in low ambient noise areas (agricultural land). Right-of-way clearing and construction activities, however, will be short term. Noise will thus only be temporary generated and if construction activities adhere to all relevant legislation in this regard and limit construction activities to normal working hours, the impact is anticipated to be minimal.

The impact of the presence of construction camps on the daily living and movement patterns of residents is discussed in this report. As both of the Route alignments traverse open areas, as well as cut through densely populated urban areas, the anticipated impact on the residents' daily living and movement patterns are anticipated to be similar.

Mitigation

- Property owners that would be affected by the distribution line construction should be consulted prior to the construction phase with regards to the construction schedules, transportation corridors, construction of additional access roads and construction methods to be used.
- Eskom should keep the construction of access roads to a minimum and rather use the existing infrastructure, as the construction and maintenance of these roads are very costly, impact on the residents' daily living and movement patterns, and create a potential for erosion.
- Rehabilitation of new access roads for construction vehicles should be undertaken as soon as the construction process allows.
- There should be strict adherence to speed limits when using local roads and when travelling through residential areas.
- Access Corridors and access points for heavy construction vehicles should be indicated to warn motorists of the movement of these vehicles.
- Limit the movement of construction vehicles to off-peak periods (where possible).
- Limit the movement of construction vehicles in areas where sensitive receptors are situated e.g. schools and pedestrians.

Noise mitigation

- Machinery and vehicles should be in good working order to limit excessive noise pollution.
- Construction hours will be restricted to specific periods which exclude Sundays and public holidays.
- All construction workers will be allowed only for specified day light hours and will be transported from the site by the contractors.

The impact has been assessed as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Short term	Low	Probable	Low	Low
Alternative 2	Local	Short term	Low	Probable	Low	Low

Impact on Safety and Security

Safety and security impacts include construction related risks and accidents, vehicular accidents, the perceived increase in crime as a result of outsiders being in the area, a threat to the safety of children or individuals in the area, mortality to stock and other farm animals close to the site, including stock theft and poaching and the possible increased risks of veld fires. This impact would be more severe in the areas where the construction sites are in close proximity to residential neighbourhoods and in areas with high levels of pedestrian movement e.g. in the vicinity of schools.

In terms of safety, it should be noted that the project involves the excavation of land for the structures of the power lines. The excavated area for the pylons could be approximately 3 meters deep by 1,5 meters wide. Excavations and open trenches can act as a trap for children (and also snakes, small mammals and lizards). Blasting could also create a safety risk in terms of flying objects and damage to properties.

Mitigation of Impact on Safety and Security

Safety mitigation measures

- Personal protective equipment and clothing should be given to workers and enforced to avoid construction related accidents.
- Construction workers should wear clearly identifiable clothing that allows landowners to easily identify contract workers on site.
- It is recommended that Eskom embark on a traffic awareness campaign prior to the construction phase in the high density residential areas focused on schools and pedestrians.
- The movement of construction vehicles through the local communities should be limited to off-peak periods (if possible) to minimise adverse impacts on the movement of pedestrians (individuals walking to and from work and schoolchildren) and to a lesser extent on private vehicular traffic.
- Construction vehicles should keep to the speed limits.
- Signs must be erected at strategic locations throughout the area, warning residents and visitors about the hazards around the construction site and the presence of heavy vehicles.

- The contractor and Eskom should develop safety management plans which should be discussed with construction workers prior to construction.
- Construction workers should preferably not prepare food at the construction sites to limit the risks of veld fires.
- Construction sites should be fenced off to avoid unauthorised entry.
- Local labour should be used as far as possible to limit the influx of an outside work force and potential outside jobseekers.
- Safety and security measures should be discussed with the property owners and local safety and security structures e.g. the local Community Policing Forums.
- During construction, the Contractor should, put up a temporary fence around the campsite and work areas.
- All construction activities should take place within fenced or otherwise demarcated areas.
- All excavated areas for pylons must be fenced and barrier tape must be placed around them to prevent humans and animals from falling into them.
- The contractors must appoint their own guards to safeguard their materials.
- Once construction is completed, the contractor has to obtain written consent from the relevant landowner that the construction site, construction areas, access routes, etc. are sufficiently and adequately rehabilitated to the landowners' satisfaction.
- Should blasting be deemed necessary, it may only be undertaken by specialists in the field and should be limited to localised areas. All relevant legislation must be adhered to.
- All adjacent landowners have to be informed of the blasting programme prior to any blasting taking place. Contractors must liaise personally with adjacent landowners. All communication in this regard must be documented.
- A Fire Management Plan has to be identified during the pre-construction phase and must be implemented throughout the construction and operational phases of the project.
- No open fires to be allowed in the power line corridors or adjacent areas.
- No open fires to be allowed outside of the substations sites.
- Cooking or fires must be kept to within the demarcated area of the substation. Special care needs to be taken for the prevention of run away veld fires into the adjacent area.
- In the campsite a designated area for camp fires and cooking needs to be made. Should open fires be used then an area of at least 2m by 2m needs to be cleared of any flammable materials such as grass. This is also necessary with the use of portable gas or paraffin burners typically used for cooking.
- No fires to be left unattended or allowed to burn through the night.
- Fire fighting equipment must be readily available on site during welding and cutting operations.
- Branches and other debris resulting from pruning processes should not be left below conductors or in areas where it will pose a risk to infrastructure.
- No fires may be made for the burning of vegetation and waste.
- Fires shall not be made for the purpose of chasing or disturbing indigenous fauna.
- Construction workers should be barred from collecting firewood or any medicinal and protected plant species.
- No firearms should be allowed at the construction sites.

The impact has been assessed as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Short term	Low	Probable	Low	Low
Alternative 2	Local	Short term	Low	Probable	Low	Low

Impact of dust pollution

The negative impact of noise and dust, generally associated with construction activities, are temporary, occurring mostly during the construction phase.

Mitigation of dust

Dust mitigation measures:

- Sweeping of construction sites and clearing of building rubble and debris must take place regularly.
- According to the applicant and their contractors, dust suppression is not required due to the following reasons:

- The servitude areas receive minimal bush clearance. Indigenous vegetation which does not interfere with the safe operation of the power line is left undisturbed. Further to the above, vegetation is not ploughed, but mowed and therefore no areas are left without vegetation cover.
- In terms of access roads, existing roads are used and the impact to these roads is insignificant. The reason is that construction material is minimal (a pylon - planted approximately 330m apart, cement - to plant the pylon, and cable - for the overhead wires). Therefore a small number, of construction vehicles deliver the material to the site. Speed of above 30km/hour will not be exceeded. A limited/ insignificant amount of dust is therefore emitted in the atmosphere. In other words, there will be no significant construction, ground-clearing, leveling or grading of soils, moving or compacting of soils which are often associated with other forms of construction, but not with erecting of powerlines.
- Alternative 1 as well as Alternative 2 follows existing power lines and their servitudes can be used as access roads during construction. This will lower the need for clearing of natural vegetation during construction.
- Alternative 2 deviates for a small section south-west towards Uitkoms substation. This small section runs along the fences of properties and clearing of natural vegetation for an access road might be needed. This can increase the possibility of erosion, and possibly dust pollution.

The impact has been assessed as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Short term	Low	Probable	Low	Low
Alternative 2	Local	Short term	Medium	Probable	Medium	Low

Impact on cultural heritage resources

Construction can destroy heritage resources ('national estate') should it occur in or near the proposed project area.

- A **Phase I Heritage Impact Assessment (HIA) study** as required in terms of Section 38 of the National Heritage Resources Act (No 25 of 1999) was done and revealed no presence of the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999).

The impact has been assessed as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Permanent	Low	Impossible	Low	Low
Alternative 2	Local	Permanent	Low	Impossible	Low	Low

- In addition, a desktop **palaeontological impact assessment** scope and study was undertaken and the following is reported:
 - There is no objection to the development of the construction of the new 20.9km 88kV Chikadee powerline between substations Ermelo and Uitkoms. Preferred choice: Alternative 1 or 2 as both have equal impact and mostly follows the existing HV lines.
 - It may be necessary to perform a Phase 1 Palaeontological Impact Assessment to determine whether the planting of pylons will affect fossiliferous outcrops as the palaeontological sensitivity is MODERATE. A Phase 2 Palaeontological Mitigation may be required taken into account the overall palaeontological impact is LOW to VERY HIGH depending on the outcome of the Phase 1 Palaeontological Impact Assessment.

The impact has been assessed as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Site	Permanent	Very High	Highly probable	Medium	Low
Alternative 2	Site	Permanent	Very High	Highly probable	Medium	Low

Mitigation of impact on cultural heritage resources

- Both Alternative 1 and Alternative 2 are recommended for the proposed 88kV power line between Ermelo substation and Uitkoms substation from a heritage as well as a palaeontological impact assessment point of view.
- It may be necessary to perform a Phase 1 Palaeontological Impact Assessment to determine whether the planting of pylons will affect fossiliferous outcrops as the palaeontological sensitivity is MODERATE. A Phase

2 Palaeontological Mitigation may be required taken into account the overall palaeontological impact is LOW to VERY HIGH depending on the outcome of the Phase 1 Palaeontological Impact Assessment.

- If archaeological/palaeontological or other types of heritage resources are uncovered during construction/ground clearance activities SAHRA (Mrs Colette Scheermeyer/ Mr Phillip Hine, tel: 021 462 4502) and a professional archaeologists/palaeontologist dependent on the finds must be alerted immediately to inspect the finds. A rescue excavation may be required if the identified heritage resource/s is deemed to be significant.

Visual impact

Visual and aesthetic impacts will result from the construction activities of excavation, erection of pylons and transporting of materials. In most areas the construction activities will however be of short duration.

The visual impact resulting from the construction of power lines can be substantial in a more rural environment. Should sensitive vegetation clearing as proposed in the mitigation measures be exercised then the visual impact resulting from construction of the power line should be of low significance.

Mitigation of visual impact

The following is relevant to this project:

- Impact to the natural habitat as a result of the project is to be expected. Construction could cause a significant impact where clearing for construction and access purposes, etc. is required. Insensitive clearing can cause the destruction of habitat.
- It is suggested that any existing servitude roads as well as existing roads must be used during construction of the power line. Alternative 1 and Alternative 2 follow an existing powerline and the servitude thereof can be used for access.
- The procedures for vegetation clearance and maintenance within overhead power line servitudes and on Eskom owned land, updated September 2009 must be implemented. These procedures includes i.e. the following:
 - Where clearing for an access road is essential, the maximum width to be cleared is 8m.
 - Clearing for pylon positions must be the minimum required for the specific tower, not more than a 5m radius around the structure position.
 - Indigenous vegetation, which does not interfere with the safe operation of the power line, should be left undisturbed.

The impact has been assessed as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Short term	Medium	Highly Probable	Medium	Low
Alternative 2	Local	Short term	Medium	Highly Probable	Medium	Low

Loss of agricultural land

The construction of power lines with the resulting clearance of servitudes could lead to a loss in agricultural land. Route Corridors could traverse land that could be used for agricultural purposes or so-called "open" land. The intensity of the impact on agricultural activities would thus depend on the type of activities undertaken on the properties as well as the location of the distribution line on each of these properties (impact on resource use).

Tower/pylon positions could limit the resource use and productivity of agricultural land and clearing of areas for the pylons could have a short term impact on cultivated land.

In the long term, even if farming activities would be maintained, the negative impacts are not perceived to be severe as most farming activities could continue underneath distribution lines. However, the intensity of the impact on each of the properties should be determined once a preferred corridor has been approved. The size of the property and extent of the agricultural activities also influence the significance of this impact and should thus be considered.

Mitigation of impact on Agriculture

The proposed construction of the power line will not impact significantly on any agricultural activity. The following is relevant to this project:

- The main agricultural activities presently active in the study area are cultivation, cattle farming, sheep farming and goat farming. Cultivation is predominantly maize and beans in the summer season. Most of which is dry land production. Cattle farming is more prominent than sheep or goats. Most of the land actively used for farming in the study area is grazing for cattle. Goat farming is conducted more on a subsistence basis.
- Most of the land in the study area has low to moderate agricultural potential. Nearly all of the land in the study site has been calculated as being 'moderate potential arable land' Land just north and east of Camden is calculated as being 'very high potential arable land'. Unfortunately most of these lands are presently being open-cast mined, or earmarked for mining. Therefore, the present agricultural potential is non-existent in those areas.
- Should the construction of the power line impact on any agricultural activities, this impact will only be for a limited period during construction. An access road of 8m wide could be cleared to construct the power line. After construction, normal agricultural activities could continue under the power line as usual.
- A quantification of possible losses should be done based on a property specific basis once a final Corridor alignment has been determined.
- During the negotiation phase, possible impacts on the use of irrigation equipment should be established. The Corridor alignment in the preferred corridor might then have to be adapted to avoid such equipment.
- Eskom should select towers and construction approaches to have the minimum impact on agricultural practices.
- It is submitted that for this project, the servitude area will not interfere with any agricultural activities.
- In addition, Eskom will not own the servitude but will purchase the rights to construct and maintain the line. A change in land use from agriculture to other land uses is not applicable.
- In addition, in terms of the Subdivision of Agricultural Land Act, 1970 (Act 70 of 1970), Section 2(a) Eskom is a statutory body and therefore it is not subjected to the provisions of the Act.

The impact has been assessed as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Short term	Low	Probable	Low	Low
Alternative 2	Local	Short term	Low	Probable	Low	Low

2.3 IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE

The potential impacts that are likely to occur as a result of the operational phase are described below. In addition the mitigation measures that may eliminate or reduce the potential impacts are provided:

2.3.1 Biophysical Impacts

Impact on Birds

Two common problems in Southern Africa are the electrocution of birds (and other animals) and birds colliding with power lines.

Electrocutions: Electrocution of birds happens when they lose their balance and they bridge the clearances.

Collisions: Collisions are when birds collide with the conductors or earth wires of overhead power lines.

Mitigation of impact on birds

Electrocutions

Electrocution is possible on 88kV power lines, especially where large raptors and vultures feature prevalently. Fortunately, it is highly unlikely that vultures will occur in the study area and few large raptors were recorded in the SABAP data sets, so *the impact of electrocution is likely to be of Low Significance* for the proposed power line if the proposed mitigations are implemented.

Collisions

In general, large lines with earth wires that are not always visible to birds can have the largest impact in terms of collisions. Most heavily impacted upon are korhaans, bustards, storks, cranes and various species of water birds. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines. Unfortunately, many of the collision sensitive species are considered threatened in southern Africa. Collision of certain large flying bird species such as Southern Bald Ibis, White Stork, Blue Korhaan, Secretarybird, Greater Flamingo and Grey Crowned Crane with the proposed lines is a possibility, and *this impact is predicted to be of Moderate Significance*.

Recommendations

Collisions

- The area within 100m on either side of the Witpuntspruit, as well as all open water bodies and farm dams in the area are classified as *Medium-High Sensitivity*. Within these areas, it is recommended that construction of the power line be avoided, if possible, and any line that is built in these zones will require collision mitigation in the form of bird flight diverters (“flappers”). All remaining areas on the site are classed as *Low-Medium Sensitivity*.
- Mark the relevant sections of line with appropriate marking devices. These sections of line, and the exact spans, should be finalised by a “walk down” as part of the Environmental Management Programme (EMP) phase, once power-line routes are finalised and pylon positions are pegged.

Electrocution

- It is highly recommended that the steel monopole design be used and that this incorporates the standard bird perch. If this is the case then most raptors and birds of high electrocution risk will perch well above the conductors and out of harm’s way. In addition it is critical that all clearances between live and earth components are greater than 1.8 meters. If this is the case then the impact of bird electrocution will be very minimal.

Disturbance during routine maintenance

- No nests may be removed, without first consulting the EWT’s Wildlife and Energy Program (WEP). During maintenance, if any of the “Focal Species” identified in this report are observed to be roosting and/or breeding in the vicinity, the EWT is to be contacted for further instruction.

These impacts during the operational phase are assessed as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Long term	Medium	Probable	Medium	Low
Alternative 2	Local	Long term	Medium	Probable	Low - Medium	Low

Impact of alien vegetation

- One of the impacts of concern is the introduction of alien plants and the use of chemical herbicides (weed-killers). This impact needs to be monitored and managed on an ongoing basis.
- The clearing of vegetation during the construction phase will leave bare patches of soil, thereby enhancing the colonisation by ruderal weeds (mostly annual weeds) or declared alien species that will prohibit the natural succession during rehabilitation procedures. Such soil disturbances (as well as the inappropriate handling of topsoil) could enhance the spread of invader taxa to other systems or vegetation units of high sensitivities. Also, increased disturbances along the drainage lines will potentially facilitate the spread of alien invader species along drainage lines.

Mitigation of alien vegetation

- The manner in which the right of way was obtained/registered is an important factor in determining the legal requirements for erosion and weed control.
- The Conservation of Agricultural Resources Act (Act 43 of 1983) places a duty on the land user to control erosion and declared weeds and invader plants. Hence, the standard specifies weed control as a requirement for all power lines: The act defines land user as follows:
- 'land user' means the owner of land, and includes-
 - any person who has a personal or real right in respect of any land in his capacity as fiduciary, fideicommissary, servitude holder, possessor, lessee or occupier, irrespective of whether he resides thereon;
 - any person who has the right to cut trees or wood on land or to remove trees, wood or other organic material from land.
- A servitude is a real right which Eskom obtained in order to construct its infrastructure upon the affected property and it is registered in the Deeds Office against the title deed of the affected property. This places a duty on Eskom to control declared weeds and invader plants.
- Alien vegetation in servitudes shall be managed in terms of Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983. In Terms of these regulations, Eskom shall "control" i.e. combat category 1, 2 and 3 plants to the extent necessary to prevent or to contain the occurrence, establishment, growth, multiplication, propagation, regeneration and spreading such plants within servitude areas or land owned by Eskom. Due to the nature of alien vegetation, a programme for alien vegetation control must be implemented. The implementation thereof is recommended as follows:
- An on going programme to be implemented to mechanically control alien plant species that invade the disturbed soils around the newly erected pylons. This should be done in such a way as to allow the natural grasses and pioneer plants to colonise the disturbed areas. Typically there should not be any, or very little, infestation of weeds under the powerlines where the veld / grass has only been cut. The weeds found in the area typically invade disturbed soils, with the exception of tree species, but these typically invade kloofs, ravines and drainage lines.
- Mechanical control of alien species to be implemented within three (3) months of completion of construction of the powerline. Thereafter every six months.
- Surface area under powerlines (where necessary) to be mowed and not ploughed. Thereby avoiding creating a negative impact of allowing weeds to encroach.
- No chemical control (herbicides) to be used in the control of alien plants or indigenous plants, except on tree and bush stumps in 8m corridors directly under powerlines. All control of weeds to be mechanical in nature. That is, physically cut down, pulled out or mowed over.
- Disturbance of the soils must be kept to an absolute minimum to limit the potential introduction of alien plants.

These impacts on each of the Route Alternatives are assessed as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Long term	Medium	Highly Probable	Medium	Low
Alternative 2	Local	Long term	High	Highly Probable	High	Medium

2.3.2 Human environment

Visual impact

Impact on the aesthetics of an area is related primarily to the visual impact of the proposed power line and secondary to the impact of habitat destruction.

Factors to consider regarding the visual impact are the following:

- The ability of the surrounding environment to absorb the visual impact of the power line.
- The structures to be used for the power line.

Mitigation of Visual Impact

It is not expected that significant additional visual impact will occur as a result of the power line due to the following:

- The significance of the visual intrusion of this power line on the character and sense of place is considered low due to the existence of other lines in the vicinity, whilst the visual association with existing lines is of high significance since numerous lines therefore raise potential visual impact.
- People who live in the area are likely to gradually become accustomed to the powerline, thereby reducing the level of long term impact.
- In general the recommendations from landowners are that the power line should not traverse any property, but rather run along the public or existing roads. The chosen route should be mostly along primary roads with wide verges or wide gravel roads. Routes with evident visual disturbance caused by existing power lines or roads are more acceptable than traversing through pristine area.
- In line with the above, Route Alternative 1 and Route Alternative 2 were designed to run through more “disturbed” corridors, i.e. mostly along an existing powerlines.
- In addition, visual impact could generally be mitigated to some extent by constructing the line with monopole steel structures. Visuals of the structure are included in Appendices C2 and C3 of the BAR. From previous experience the steel poles are known to weather and with time blend into the environment.
- As a result of this; the visual impact is considered to be of a moderate to low long-term significance with application of effective mitigation measures.

The impact has been assessed as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Long term	Medium	Probable	Medium-Low	Low
Alternative 2	Local	Long term	High	Probable	Medium	Medium-Low

Access to property

Eskom Holdings has a right to enter property in order to maintain plant and obtain meter readings, therefore the manner of access to land, on which Eskom holds servitudes and electrical infrastructure, should be considered by Eskom as well as landowners.

Security is important to landowners who need to ensure that the safety of their family, staff and property is catered for.

Mitigation to establish a protocol for Access to property

Approaches to facilitate access for all Eskom staff and contractors (performing work on behalf of Eskom) is stipulated in the Access to Farms (Distribution, Transmission and Generation) Standard 32-1173.

Protocol measures are i.e. as follows:

- All Eskom staff will carry identity cards containing their photographs, indicating that they are Eskom employees. Landowners may verify presence of Eskom staff telephonically at the Contact Centre, at 08600 37566.
- Eskom contractors will carry identity cards displaying their photographs, indicating that they are contractors. Letters containing contract appointment as well as whom at Eskom to contact will be given to each Contractor. In the case of unplanned activities, the contractor must be in possession of a work order number.
- Eskom vehicles will be clearly marked on the door. Vehicles operating after dark will be fitted with amber rotating lights.
- Vehicles of Eskom contractors must have a magnetic strip on the side containing the words “Eskom contractor”, as well as an amber rotating light.
- No person may climb or crawl over or through fences without the owners’ permission. No person may damage or remove a fence without the owners’ permission.

- Gates should be left in the state the landowner intended. In order to assist with any possible claims, any visitor will keep a log of each gate that is used stating:
 - the position of the gate with reference to towers
 - the state in which it was found (open or closed)
 - the time
 - any other appropriate information (locks, etc.)
- Standard Eskom locks shall be used in all cases and in such a manner that it securely locks the gate. Where dual-use is made of the gate by Eskom Holdings and the land owner, the Eskom lock shall be locked into the chain-link, separate from the farmer's lock as to permit both parties to gain access without inconveniencing either party. No interference with land owners' locks will be tolerated. The cutting of land owners' locks except in extreme emergency will result in disciplinary action.
- Where helicopters are deployed, care should be taken in conjunction with the Line and Servitude Manager and the landowner not to cause any disturbance or harm to livestock such as ostriches or game. The use of helicopters on lines during line patrols does present it's challenges when all the property owners en route need to be informed before the inspection. Notice of such patrols should be communicated via District Agricultural offices a month before.
- Any damage caused to any gate, fence, crop or grazing shall be reported to the Line and Servitude Manager or ECO who will then refer it to the appropriate Eskom Holdings Official for processing. Extreme care must be taken with fires and the use of fires will only be permitted with express approval of the landowner.
- No fauna or flora will be collected or removed from any farm by any visitor without written permission of the Landowner, in which case cognizance will be taken of appropriate provincial legislation pertaining to fauna and flora. Under such cases Eskom Holdings ethical policies and guidelines will be strictly applied.
- Any visitor will at all times refrain from littering and must remove any refuse when leaving.
- Visitors shall as far as possible only use the servitude roads or the roads as determined by the environmental management plan and agreed to with the Land owner. Where this is not possible the landowner's permission shall be obtained for the use of any other roads. In all cases care shall be taken to not cause any damage in the process and driving through the veld must be avoided as far as possible.

Planned outages

- Eskom will notify customers at least 10 days in advance through the appropriate media – either in writing, electronically (SMS) or telephonically. The onus rests on the Customer to ensure that all their contact details are updated on the Eskom system. Should its best attempts to communicate fail, the work will proceed regardless.

Planned activities such as vegetation control, live-line work and line inspections.

- Eskom will notify customers at least 48 hours in advance through the appropriate media – either in writing, electronically or telephonically. Should its attempts to communicate fail, the work will proceed.

Unplanned/unscheduled visits

- Rapid power restoration without any delay is in the interest of both Eskom and the customer. This is dependent on free movement.
- All Eskom staff as well as representatives of Eskom contractors will carry identity cards containing their photographs to indicate whether they are Eskom employees or Eskom contractors. In addition, customers may request a work order number to be verified with the Contact Centre. Vehicles must be clearly marked.

The impact has been assessed as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Short term	Medium	Probable	Medium	Low
Alternative 2	Local	Short term	Medium	Probable	Medium	Low

Impacts associated with fire breaks and servitude maintenance

- The servitude areas have to be maintained to ensure the safety of the Eskom hardware, but in particular the safety of the landowner and his property. Should the servitude not be maintained this could result in danger to the power line as well as damage to the property of the landowner.
- The impacts on flora and fauna systems during the operational phase are generally low without any mitigation and the implementation of mitigation measures will reduce the impact further to lower significance.

Mitigation of the impact associated with fire breaks and servitude maintenance

- In the case of 33kV, 88kV and 132kV distribution power lines, Eskom obtains the rights to a servitude.
- A servitude is a real right which Eskom obtained in order to construct its infrastructure upon the affected property and it is registered in the Deeds Office against the title deed of the affected property. The effected owner normally gets compensated for this right according to market related values. The servitude stays effective even if a property is transferred to another owner.
- The National Veld and Forest Fire Act (Act 101 of 1998) places an obligation on the owner to ensure compliance and hence creation of fire-breaks amongst other. The Act defines owner as follows: “owner” has its common law meaning and includes— (a) a lessee or other person who controls the land in question in terms of a contract, testamentary document, law or order of a High Court;
- The Eskom understanding is that Eskom needs to ensure compliance to the Act where it has purchased a property (hence being the owner) such as a substation. Eskom is not considered as the owner for rights obtained via a wayleave agreement or servitude. Hence, the requirements for creating firebreaks or joining Fire Protection Agencies are applicable as far as where Eskom has a substation and not for power lines. These opinions were reflected in the specifications – thus, the Vegetation Management Standard does not specify requirements for fire breaks.
- Fire Risk Management is dealt with under a procedure titled “Distribution Fire Risk Management”, reference SCSASAAJ6. Grass fires are dealt with in this procedure stating that vegetation and equipment must be maintained. A specific procedure deals with fire risk management for substations where the chipped stone needs to be maintained to prevent vegetation growth.
- Eskom Distribution does not make use of the practice to burn fire breaks, since this is not a legal requirement. Rather, it relies on the maintenance of vegetation in accordance to its Vegetation Management Standard to reduce the risk of fires starting from Eskom infrastructure.
- Eskom Distribution Division does not remove the grass below power lines since this does not pose a safety risk and will create the potential for erosion, causing environmental degradation and hence legal liability. It will furthermore be an economically unsustainable exercise for Eskom given the amount of power lines throughout South Africa.

The impact has been assessed as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Long-term	Low	Probable	Low	Low
Alternative 2	Local	Long-term	Low	Probable	Low	Low

Possible Public Health Hazards

Concerns are generally raised during public participation with regards to the impact of the “electrical current” on residents. Drawing on the existing body of research, the World Health Organisation has stated that it is becoming increasingly unlikely that exposure to EMFs constitutes a serious health hazard, although it concedes that some uncertainty remains. The 31 m servitude area limits the constant exposure to these EMFs and according to the Eskom regulations no one is allowed to live within the servitude. These health concerns should not be dismissed as irrelevant. As all the Route alignments would traverse for certain sections close to densely populated areas, concerns in this regard remain, should individuals illegally erect dwellings in the servitude area.

Mitigation

- Eskom should undertake regular inspections of the servitude and put a strategy in place, together with the Local Municipality, to deal with illegal “squatting” in the servitude areas.
- The safety exclusion zone should be strictly adhered to.

The impact has been assessed as follows:

Corridor	Extent	Duration	Intensity	Probability	Significance without mitigation	Significance with mitigation
Alternative 1	Local	Medium	Low	Probable	Low	Low
Alternative 2	Local	Medium	Low	Probable	Low	Low

2.4 IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING AND CLOSURE PHASE

It is not envisaged that the power line will be decommissioned. This project is part of the future infrastructure to supply the Eskom Distribution network. Should this application not be approved, this can result in major disturbances in energy provision.

As indicated, it is generally assumed that the decommissioning process is the reverse of the construction process and as such the indicated impacts will also be relevant to decommissioning phase.

Nuisance Factors

These are likely to be of most significant during the construction phase. These include noise and dust pollution. The magnitude of these potential impacts will be dependent on a number of factors including proximity of construction sites to settlements, other public amenities including roads, location of the construction camp site. These impacts are addressed under the impacts that may result from the construction phase. In addition the EMPr proposes appropriate measures to address these.

Waste management

Waste generated has to be managed accordingly which would entail correct on site storage, transportation and disposal. Waste has to be categorised between nonhazardous and hazardous waste, which will require different disposal method. These are to be articulated in the EMPr. Waste to be generated will include domestic waste, construction rubble, unused or damaged material such as the conductor wire, insulators, etc. The disposal of materials will have to be at appropriate landfill sites licensed in terms of section 20 (b) of the National Environment Management Waste Act, 2008 (Act No 59 of 2008). A copy of the service agreement, to verify the disposal sites that will be accepting the waste, should be submitted to the Dept of Water Affairs.

Soil Erosion

The removal of the land cover during construction will expose surface soils to erosion, of which will results in the loss of topsoil, soil nutrients, sedimentation of nearby water systems and the creation of gullies. The rate of soil erosion is generally accelerated in areas with slopes greater than 20° and along un-vegetated slopes. As mentioned earlier in this report, Eskom Distribution does not make use of the practice to burn fire breaks, since this is not a legal requirement. Rather, it relies on the maintenance of vegetation in accordance to its Vegetation Management Standard to reduce the risk of fires starting from Eskom infrastructure.

In addition, Eskom Distribution Division does not remove the grass below power lines since this does not pose a safety risk and will create the potential for erosion, causing environmental degradation and hence legal liability.

Should decommissioning of this project be required, then the potential for erosion based on the soil composition across the study area will have to be determined as well as possibly areas of high risk in terms of the slope. The route of the power lines as well as the substation sites will have to be rehabilitated. Once the decommissioning is completed, the contractor has to obtain written consent from the relevant landowner that the construction site, construction areas, access routes, etc. are sufficiently and adequately rehabilitated to the landowner's satisfaction.

Soil Contamination

Incidents of soil contamination due to accidental spillages of various contaminants such as fuel, lubricants and paints are likely during construction, whereas during the operation has the same risk due to spillages from transformers. Such incidents have a potential to pollute surface and underground water sources through runoff and seepage. The construction EMPr outlines appropriate measures and procedures to address these effects. These measures are also applicable to decommissioning.

Residual contamination

There is usually no residual contamination that remains after the decommissioning of power lines but there may be some transformer oils remaining in a decommissioned substation. Appropriate measures to address this should be outlined in the EMPr required for decommissioning.

2.5 CUMULATIVE IMPACTS

Cumulative effects are caused by the accumulation and interaction of multiple stresses affecting the parts and the functions of ecosystems. For our purpose, cumulative effects are defined as the changes to the environment caused by an activity in combination with other past, present, and reasonably foreseeable human activities.

Bearing in mind that the magnitude, extent and duration of environmental effects depend on the characteristics of a development activity in a particular location.

Currently the proposed power line is located in a developing area with some residential areas, existing substations, power lines, roads, etc. The proposed route follows a corridor of existing disturbance. The cumulative effect for constructing the electricity infrastructure in this will be low.

In time the overall cumulative impact on this area is likely to increase as various mining companies have mineral rights over a significant portion of the immediate area and are likely to expand their mining operations in these sections. It is thus critical that major role players in the region's economy create long term strategic plans that will accommodate and enhance a wide range of economic activities.

Equally important is the need for Eskom to align all the projects that are planned for the area in order to minimise the potential negative impacts and enhance potential positive outcomes. It is therefore crucial for Eskom to liaise very closely with the various municipalities to mainstream Eskom projects into the Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs) of the respective municipalities.

As indicated in the report, the grassland plains within the study area are not seen as floristically sensitive with regards to powerline corridors. Existing impacts relate to cultivated lands, coal mining, cattle farming, urbanisation, general human activity and movement through them.

In spite of the above, the project could cause a significant impact where clearing for construction and access purposes, etc. is required. Insensitive clearing can cause the destruction of habitat. The cumulative impact on this area is likely to increase should various mining companies expand their mining operations in these sections.

It is therefore important that the proposed Eskom project adhere to the stipulated mitigation measures to limit impact to the natural habitat, to surface water, erosion etc.

Should this be implemented, then no cumulative impacts on the ecology of the environment are identified as possibly being beneficial.

As mentioned in this report, due to the physical nature (and small footprint) of the powerlines, the overall impact to the natural environment is minimal over the medium- to long-term. This relative to other impacts in the region such as open-cast coal mining, agriculture and urbanisation. The initial (short-term) construction phase will have a higher initial impact on the environment, but this is still seen as being relatively low.