

2. New transmission lines must be placed as close as possible to the existing transmission lines.
3. The removal of plant material must be kept to a minimum.
4. All attempts must be made to avoid exposure of dispersive soils.
5. Re-establishment of plant cover on disturbed areas must take place as soon as possible once construction activities in the area have ceased.
6. Ground exposure should be minimised in terms of the surface area and duration, wherever possible.
7. Construction that requires the clearing of large areas of vegetation and excavation should ideally occur during the dry season only.
8. Construction during the rainy season (November to March) should be closely monitored and controlled.
9. The run-off from the exposed ground should be controlled with the careful placement of flow-retarding barriers.
10. The soil that is excavated during construction should be stock-piled in layers and protected by berms to prevent erosion.
11. The placement of the flow retarding barriers must occur in consultation with the ECO and as part of an overall storm water management system during the construction phase.
12. Without compromising the sensitive water balance of the area, dust suppression must take place.
13. Sufficient brush packs must be re-established on areas of exposed soil.
14. Areas where erosion occurs as a result of construction activities must be restored.
15. Berms must be constructed in the roads to prevent erosion.
16. Contractors must drive on existing access roads as far as possible to prevent the formation of unnecessary accessory tracks for access roads.
17. The removal of vegetation at the construction camps should be avoided, and should it occur, these areas need to be re-vegetated with indigenous species.
18. All possible efforts must be made by the contractors to strip topsoil to a maximum depth of 150 mm.
19. Topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.
20. Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.
21. Topsoil stockpiles must be kept separate from subsoils.
22. Excavated and stockpiled soil material are to be stored and bermed on the higher lying areas of the footprint area and not in any storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate.
23. The topsoil should be replaced as soon as possible on to the backfilled areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.
24. Stockpiles susceptible to wind erosion are to be covered during windy periods.

25. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.
26. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site.
27. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.

Table 9: Loss of agricultural production potential

| | | | |
|------------------------------|---|--|----------------------|
| Impact Source(s) | <ul style="list-style-type: none"> • Clearing of land for the construction of the pylon foundations • Presence of guys for pylons • Presence of the transmission lines over cultivated fields and orchards | Status | - |
| Nature of the Impact | Loss of topsoil and soils with high agricultural potential; disruption to agricultural production activities | | |
| Receiving Environment | Farmers and landowners along the servitude | | |
| Magnitude | Extent (footprint; site; regional; national; international) | | SITE |
| | Duration (short term; short-medium term; medium term; long-term; permanent) | | PERMANENT |
| | Intensity (low; medium; high) | | MEDIUM |
| | Probability (probable; possible; likely; highly likely; definite) | | HIGHLY LIKELY |
| ME | Mitigation Efficiency (high; medium-high; medium; low-medium; low) | | MEDIUM |
| Significance | Without mitigation (WOM) | Extent + Duration + Intensity + Probability 2 + 5 + 3 + 4 = 14 MEDIUM TO HIGH | |
| | With mitigation (WM) | WM = WOM x ME 14 x 0.6 = 8.4 MEDIUM | |

8.2.1.2 Soil erosion: Construction Phase

Source of the impact:

Clearing of vegetation on site for the construction of the access roads and for foundations for the pylons

Description of the impact:

In view of the fact that the recommended transmission line route is parallel to existing transmission line servitudes for almost the entire length of the line, there should be minimal need for the clearance of new access roads. It should be possible to use existing access roads for construction purposes. However, where soil is disturbed for new access roads, and where pylon foundations are created, localised erosion could occur. The degree of erosion would be dependent on the gradient (areas along the steep escarpment would experience much greater erosion than elsewhere) and the soil type. Shallow sandy soils along the escarpment edge would erode quickly, due to the high rainfall experienced along the escarpment.

Significance:

The extent of the impact is rated as footprint, since the extent of the excavations required for pylon foundations is only a few square meters, and because there are existing access roads along the servitudes. The duration would be medium-term, since erosion would be discontinued once vegetation has re-established within a few growing seasons. Intensity is rated as medium since vegetation growth and other natural processes would continue in the areas around the erosion. The probability of the impact occurring is rated as 'likely'. This results in a significance rating of medium. As a result of the implementation of the mitigation measures, the significance will be reduced to low-medium. The mitigation efficiency is rated as medium-high.

Mitigation Measures:

1. Excavation for pylon foundations must be restricted to the minimum possible size. If places where very loose soils are encountered, the sides of the excavations must be supported artificially to avoid the necessity to dig wide holes in order to get to the required depth.
2. Lines must be strung by helicopter along the edge of the escarpment in the vicinity of the farm Rietspruit 473. There are no existing access roads along the steepest part of the servitude in this area. No further lengthening of the existing access road may take place.
3. The removal of plant material must be kept to a minimum.
4. Where possible, grass sods that have been removed must be stored temporarily on site and should be replanted to encourage re-establishment of vegetation on cleared areas.
5. All attempts must be made to avoid exposure of dispersive soils.
6. Re-establishment of plant cover on disturbed areas must take place as soon as possible once construction activities in the area have ceased.
7. Ground exposure should be minimised in terms of the surface area and duration, wherever possible.
8. Construction during the rainy season (November to March) should be closely monitored and controlled. No vehicle access should be allowed to boggy or wetland soils during the wet season.
9. The run-off from the exposed ground should be controlled with the careful placement of flow-retarding barriers.
10. The placement of the flow retarding barriers must occur in consultation with the ECO and as part of an overall storm water management system during the construction phase.
11. Sufficient brush packs must be re-established on areas of exposed soil.
12. Areas where erosion occurs as a result of construction activities must be restored.
13. Berms must be constructed in the access roads to divert storm water into the vegetated veld where it can infiltrate the soil.
14. Contractors must drive on existing access roads as far as possible to prevent the formation of unnecessary accessory tracks for access roads.

15. The removal of vegetation at the construction camps should be avoided, and should it occur, these areas need to be re-vegetated with indigenous species.
16. Topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.
17. Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.
18. Topsoil stockpiles must be kept separate from subsoils.
19. Stockpiles susceptible to wind erosion are to be covered during windy periods.
20. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.
21. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site.
22. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.

Table 10: Soil erosion: Construction Phase

| | | | |
|------------------------------|--|--|---|
| Impact Source(s) | Clearing of vegetation for the construction of the transmission lines | Status | - |
| Nature of the Impact | The erosion of soils could lead to sedimentation of drainage lines | | |
| Receiving Environment | Farmers and other users of the drainage lines | | |
| Magnitude | Extent (footprint; site; regional; national; international) | FOOTPRINT | |
| | Duration (short term; short-medium term; medium term; long-term; permanent) | MEDIUM | |
| | Intensity (low; medium; high) | MEDIUM | |
| | Probability (probable; possible; likely; highly likely; definite) | LIKELY | |
| ME | Mitigation Efficiency (high; medium-high; medium; low-medium; low) | MEDIUM-HIGH | |
| Significance | Without mitigation (WOM) | Extent + Duration + Intensity + Probability 1 + 3 + 3 + 3 = 10 MEDIUM | |
| | With mitigation (WM) | WM = WOM x ME 11 x 0,4 = 4,4 LOW-MEDIUM | |

8.2.2 TERRESTRIAL ECOLOGY

8.2.2.1 Disturbance of sensitive ecosystems

Source of the impact:

The following activities will contribute to the disturbance of sensitive ecosystems:

- Construction activities associated with erection of the pylons
- Trampling by construction vehicles in the transmission line servitude; and
- Clearance of vegetation for construction camps and access roads.

Description of the impact:

There are a number of sensitive ecosystems that have been identified along the recommended route and more broadly within the study area. These ecosystems include:

- Wetlands / water bodies (primarily in the high altitude grassland between Prairie and Hendrina);
- Rocky granite outcrops (primarily in the lowveld in the region between Alkmaar and Marathon);
- Cave Ecosystems (restricted to a narrow band in dolomitic geological formations east of the escarpment)
- Ecological Corridors (e.g. the escarpment area with its mosaic of grassland and indigenous forest, and the Crocodile River Valley).

It is unavoidable for the transmission line to pass through the two mentioned ecological corridors, as identified by the Mpumalanga Parks Board. However, the impact of transmission lines on the movement of species and within such a corridor is minimal, since it does not present an impenetrable barrier. In fact, the open grassland that is maintained in the transmission line servitudes within exotic plantations itself acts as a valuable ecological corridor within an otherwise transformed landscape.

Although the potential presence of cave ecosystems has been identified, there are no such systems that have been positively identified along the recommended transmission line route.

Granite rocky outcrops are very numerous within the lowveld area where the proposed route is located. There are a number of small rocky outcrops that would be crossed by the proposed transmission line (see Figure 22).



Figure 22: Rocky outcrops crossed by the existing transmission lines in the Alkmaar area of the lowveld

Wetlands and water bodies are the will be the most significantly affected by the transmission lines. Although the transmission lines are not proposed to pass directly over any pans, dams or other features where surface water is present, there are numerous areas along the route where surface seepage is evident during the rainy season (see Figure 23). Even though these areas may appear like normal grassland during the dry season, they are transformed into wetlands during the rainy season, and are therefore important habitats for wetland flora and fauna.



Figure 23: An example of seepage zones being crossed by existing transmission lines in the Hendrina-Prairie portion of the route

The degree of disturbance of these systems will depend on the placement of pylons. Even though a transmission line may pass over a seepage zone, the impact can be minimal if pylons are placed either side of a seepage zone. The level of impact will also depend on the route that construction vehicles use to transport materials. If they should pass directly through seepage zones, the impact related to trampling of wetland vegetation could be severe.

Significance:

The extent is rated as “site”, as habitat destruction of faunal species will only occur within the boundaries of the servitudes or along the access road. The disturbance of the ecological process will be reduced after the construction phase, but the impact will continue to be felt during operation due to the continued presence of the transmission lines. Duration is therefore rated as medium-term. The intensity is rated as medium because the ecological functions and processes will be able to continue, since the activity does not involve complete clearance of the transmission servitude, but rather small scale disturbance at the pylon footprints and along a narrow linear corridor where the vehicles will move within the servitude. The rating of probability of the impact occurring is “definite”, since it is certain that there are seepage zones within the servitude that would be affected. Therefore, the significance of the impact before mitigation measures is rated as medium to high. The mitigation efficiency is rated as medium, since the sensitive seepage and wetland habitats can be easily avoided by judicious placement of the access roads and pylons. This results in the significance following mitigation to be regarded as low to medium.

Mitigation Measures:

1. The movement of heavy construction vehicles in the region characterised by seepage zones and wetlands should preferably be restricted to the dry season. If this is not possible, then the route that these vehicles follow must avoid wet areas, even if it means that vehicles have to use a long detour outside the servitude to get to the next pylon position.
2. Sensitive seepage zones, wetlands and rocky outcrops that should be avoided for pylon placement must be identified by an ecologist during a walkdown assessment. These recommendations must be strictly adhered to.
3. The contractor’s staff should be given basic training in the identification of wetlands and seepage zones in order to recognise and avoid these areas.
4. Construction vehicles must at all times use existing access roads, unless their continued use will cause accelerated erosion. No new tracks should be created through previously undisturbed vegetation and no scraping of new access roads may take place.
5. Disturbance to rocky outcrops must be minimised. Construction vehicles should not be allowed access to these outcrops.

Table 11: Disturbance of sensitive ecosystems

| | | | | |
|------------------------------|---|--|----------------------|----------|
| Impact Source(s) | Construction of transmission lines | | Status | - |
| Nature of the Impact | <ul style="list-style-type: none"> • Trampling of wetlands • Disturbance of habitat on rocky outcrops | | | |
| Receiving Environment | Sensitive ecosystems | | | |
| Magnitude | Extent (footprint; site; regional; national; international) | | SITE | |
| | Duration (short term; short-medium term; medium term; long-term; permanent) | | MEDIUM-MEDIUM | |
| | Intensity (low; medium; high) | | MEDIUM | |
| | Probability (probable; possible; likely; highly likely; definite) | | DEFINITE | |
| ME | Mitigation Efficiency (high; medium-high; medium; low-medium; low) | | MEDIUM | |
| Significance | Without mitigation (WOM) | Extent + Duration + Intensity + Probability 2 + 3 + 3 + 5 = 13 MEDIUM TO HIGH | | |
| | With mitigation (WM) | WM = WOM x ME 13 x 0.4 = 5.2 LOW TO MEDIUM | | |

8.2.2.2 Faunal habitat destruction

Source of the impact:

The following activities will contribute to habitat destruction:

- Construction activities associated with erection of the pylons; and
- Clearance of vegetation for construction camps and access roads.

Description of the impact:

Termite mounds, burrows, nests and vegetation on which small mammals, insects, amphibians and reptiles are heavily reliant will be destroyed, causing permanent displacement of these animals.

Significance:

The extent is rated as site, as habitat destruction of faunal species will only occur within the boundaries of the servitudes. This impact will cease after the construction phase, resulting in a rating of short-medium term duration. The intensity is rated as low because the functions and process will not be seriously affected by the activity. The rating of probability of the impact occurring is 'probable'. Therefore, the significance of the impact before any mitigation measures is rated as low-medium. The mitigation efficiency is rated as medium, resulting in the significance following mitigation to be regarded as low.

Mitigation Measures:

6. Careful consideration is required when planning where to place stockpiled construction material, topsoil and the access routes in order to avoid the destruction of habitats and minimise overall development footprint.

7. All road networks must be planned with care to minimise dissection or fragmentation of any important avifaunal habitat such as high-altitude pristine Lydenburg Montane Grassland and upland seep zones.
8. Construction in proximity to these particular habitats in the landscape must be avoided.

Table 12: Habitat destruction: Construction Phase

| | | | | |
|------------------------------|---|---|---------------------|---|
| Impact Source(s) | Construction of transmission lines; and Clearing of vegetation for construction camps / access roads | | Status | - |
| Nature of the Impact | Faunal disturbance | | | |
| Receiving Environment | Faunal habitat | | | |
| Magnitude | Extent (footprint; site; regional; national; international) | | SITE | |
| | Duration (short term; short-medium term; medium term; long-term; permanent) | | SHORT-MEDIUM | |
| | Intensity (low; medium; high) | | LOW | |
| | Probability (probable; possible; likely; highly likely; definite) | | PROBABLE | |
| ME | Mitigation Efficiency (high; medium-high; medium; low-medium; low) | | MEDIUM | |
| Significance | Without mitigation (WOM) | Extent + Duration + Intensity + Probability 2 + 2 + 1 + 1 = 6 LOW-MEDIUM | | |
| | With mitigation (WM) | WM = WOM x ME 6 x 0,6 = 4 LOW | | |

8.2.2.3 Establishment of invasive alien species

Source of the impact:

The following activities will contribute to the establishment of invasive alien species:

- Removal of soil cover; and
- Clearance of trees in the transmission line servitude.

Description of the impact:

Disturbance to natural vegetation is one of the triggers for the establishment of opportunistic invasive alien plant species. Such disturbance could occur either through the complete removal of vegetation and the resultant exposure of the soil surface, or through the chopping down of trees in the transmission line servitude, resulting in a change in the habitat condition for the grass and forb layer underneath the trees. It is apparent, especially in the low veld, that alien species such as *Lantana camara* have become well established in the areas that have been cleared of trees within the existing transmission line servitudes. Once alien species are established in the servitude, they could easily spread to adjacent areas, thereby reducing the agricultural productivity of the land.

Significance:

Extent is rated as site, since the impact could occur within the servitude and next to it. The duration is considered long term, since alien species such as Lantana are perennial. The intensity is rated as medium, since the propagation of indigenous species would continue, with the exception of the areas that had been colonised by invasive species. Probability is rated as highly likely, since species such as *Lantana camara* are already present in the current servitudes and a seedbank for these species is therefore already present in the affected area.

Mitigation Measures:

- Eskom should investigate the release of biological control agents for seriously invasive alien species such as Lantana.
- Chemical control must be applied to alien species in the servitude at least once per year during the growing season.

Table 13: Establishment of invasive alien species

| | | | |
|------------------------------|--|--|---|
| Impact Source(s) | <ul style="list-style-type: none"> • Removal of soil cover; and • Clearance of trees in the transmission line servitude. | Status | - |
| Nature of the Impact | Establishment and spread of invasive alien plant species | | |
| Receiving Environment | Natural ecosystems | | |
| Magnitude | Extent (footprint; site; regional; national; international) | SITE | |
| | Duration (short term; short-medium term; medium term; long-term; permanent) | LONG-TERM | |
| | Intensity (low; medium; high) | MEDIUM | |
| | Probability (probable; possible; likely; highly likely; definite) | HIGHLY LIKELY | |
| ME | Mitigation Efficiency (high; medium-high; medium; low-medium; low) | MEDIUM | |
| Significance | Without mitigation (WOM) | Extent + Duration + Intensity + Probability 2 + 4 + 3 + 4 = 13 MEDIUM TO HIGH | |
| | With mitigation (WM) | WM = WOM x ME 13 x 0,6 = 7.8 LOW TO MEDIUM | |

8.2.2.4 Impacts on birds**Sources of the impact:**

The following activities will contribute to the disturbance of sensitive ecosystems:

- Construction activities associated with erection of the pylons;
- Movement of noisy construction vehicles and other equipment in the transmission line servitude; and
- The presence of the transmission lines during operation.

Description of the impact:

Birds could be killed through collisions with the pylons and/or conductors / earth wires, or birds could be disturbed by construction activity and move off from their breeding and roosting areas. There is a high reporting rate for red data bird species in certain parts of the study area, particularly with relation to the following habitats:

- upland seeps – associated with cranes;
- endorheic pans – associated with flamingos; and
- montane grasslands (“climax grassland”) – associated with korhaans, bustards, Bald Ibis, etc.

Of the available alternative routes, the recommended route, PM1, has a lower sensitivity than PM2. Although HP1 has a higher sensitivity with relation to birds than HP2, the impacts along PH1 can be successfully mitigation by marking the transmission lines.

The impacts in terms of collisions would be greatest in situations where new transmission lines are construction in isolated areas far from existing transmission lines. Placing transmission lines close together improves the visibility of the conductors to birds, since many conductors are then grouped together. This is particularly important for the earth wires, which are thinner and less visible than the conductors themselves. The degree of disturbance to breeding and nesting would be dependent on the season of construction and the affected species.

Significance:

Extent is rated as regional, since breeding or roosting of birds outside the transmission line servitude may be affected. The duration of disturbance is considered short to medium term, since it is restricted to construction, but the duration of the impacts with respect to collisions is permanent. Intensity is considered as medium, since the presence of the power lines does not totally restrict the movement of birds. Probability is considered as likely. Bird collisions can be very effectively mitigation by placing bird deterrent devices on conductors and earth wires to improve their visibility to birds. Mitigation efficiency is therefore considered to be high. Significance before and after mitigation are therefore calculated to be medium to high and low respectively.

Mitigation:

- It is strongly recommended that new transmission lines must be placed parallel to and as close as possible to existing transmission line, so as to increase the visibility of the conductors for birds.
- A bird specialist must conduct a “walk-through” assessment of the recommended route prior to construction to identify areas where marking of lines would be necessary

- Earth wires must be fitted with bird “deterrent devices” in these selected sensitive areas.
- Annual monitoring of the transmission lines must be conducted for determine where collisions with the pylons or cables is taking place. Additional marking may then be necessary for areas where high collision rates are detected.
- The contractor must screen the route for any breeding activity of birds during construction and should avoid disturbance to the area around the breeding site during the breeding season. The contractor should contact the bird specialist if any breeding birds are found for advice on an appropriate buffer around the breeding site where construction must be avoided.
- Where possible, the cross-rope suspension type pylon must be used.

Table 14: Impact on birds

| | | | |
|------------------------------|---|--|---|
| Impact Source(s) | <ul style="list-style-type: none"> • Construction of pylons • Movement of vehicles and machinery during construction • Presence of the transmission lines and earth wires during operation | Status | - |
| Nature of the Impact | <ul style="list-style-type: none"> • Bird strikes • Disturbance to breeding and roosting of birds | | |
| Receiving Environment | Natural ecosystems | | |
| Magnitude | Extent (footprint; site; regional; national; international) | REGIONAL | |
| | Duration (short term; short-medium term; medium term; long-term; permanent) | LONG TERM | |
| | Intensity (low; medium; high) | MEDIUM | |
| | Probability (probable; possible; likely; highly likely; definite) | LIKELY | |
| ME | Mitigation Efficiency (high; medium-high; medium; low-medium; low) | HIGH | |
| Significance | Without mitigation (WOM) | Extent + Duration + Intensity + Probability $3 + 4 + 3 + 3 = 13$ MEDIUM TO HIGH | |
| | With mitigation (WM) | $WM = WOM \times ME$ $13 \times 0,2 = 2.6$ LOW | |

8.2.3 VISUAL IMPACTS

8.2.3.1 Landscape Impact: Altering the landscape character

Source of the impact:

These sources of the impact are as follows:

- The establishment of construction camps;
- The construction of access roads; and
- Construction and presence of transmission lines infrastructure in an otherw ise predominantly agricultural environment.

Description of the impact:

The above-mentioned activities will typically create disturbances which will result in the removal of vegetation and the exposure of the underlying soil during the construction phase. The access roads will be a permanent feature as regular maintenance works occur on site.

Significance:

The landscape character will be altered by the establishment of the transmission lines as the construction will occur in predominantly agricultural areas that are undisturbed in terms of industrial elements. However, the impact is mitigated by the fact that the transmission lines are proposed to be established parallel to existing transmission lines of the same size. Therefore, the extent of the impact is rated as within the boundaries of the site. The duration is rated as long term because the impact will last through to the entire operational lifetime of the development. The intensity is rated as high as there will be a loss of agricultural land, which contributes to the loss of the current sense of place. The probability of the impact occurring is rated as definite because it is certain that the transmission lines will be visible. The mitigation efficiency is rated as medium since the use of cross-rope suspension pylons can reduce the impact, but due to their large size they can never be hidden from view. Therefore, the significance after mitigation will be rated as medium.

Mitigation Measures:

1. Cross-rope suspension pylons must be used where possible, unless self-supporting pylons are being used in agricultural areas to minimise the disruption to agricultural activities.
2. New transmission lines must be placed as close as possible to existing transmission lines, in order to localise the extent of the impact. It is undesirable to create an entirely new area of impact.

Table 15: Landscape Impact: Altering the landscape character

| | | | |
|------------------------------|--|------------------|---|
| Impact Source(s) | <ul style="list-style-type: none"> • Establishment of construction camps; • Construction of access roads; and • Construction and presence of the transmission lines | Status | - |
| Nature of the Impact | Visual impacts of the transmission lines | | |
| Receiving Environment | <ul style="list-style-type: none"> • Landowners of servitudes area; and • Surrounding landowners | | |
| Magnitude | Extent (footprint; site; regional; national; international) | REGIONAL | |
| | Duration (short term; short-medium term; medium term; long term; permanent) | PERMANENT | |
| | Intensity (low; medium; high) | HIGH | |
| | Probability (probable; possible; likely; highly likely; definite) | DEFINITE | |
| ME | Mitigation Efficiency (high; medium-high; medium; low-medium; low) | MEDIUM | |

| | | |
|---------------------|--------------------------|--|
| Significance | Without mitigation (WOM) | Extent + Duration + Intensity + Probability 3 + 5 + 5 + 5 = 18 HIGH |
| | With mitigation (WM) | WM = WOM x ME 17 x 0,6 = 10.8 MEDIUM |

8.2.4 HERITAGE IMPACTS

8.2.4.1 Damage to heritage sites

Source of the impact:

- Curious construction workers; and
- Construction work.

Description of the impact:

There are a number of known heritage sites located in close proximity to the proposed transmission line corridor, including late iron age stone walled sites within and immediately adjacent to the existing servitude. Should power line pylons be placed without care, portions of or the entire heritage site may be destroyed.



Figure 24: An iron age stone-walled site within an existing transmission line servitude in the study area

Significance:

Damage to artefacts of heritage importance will extend to the boundaries of the footprint of the artefact. Once a heritage site is disturbed, the damage created will be permanent. The function of the artefact as a heritage site is thus permanently disturbed, which causes the rating of the intensity of the

impact to be high. Owing to the fact that there are known heritage sites within the proposed servitude, the probability is rated as 'likely'. Therefore the significance of the impact before mitigation is calculated as medium-high. The mitigation efficiency is based on a strict "no-access" policy being applied to sensitive sites identified during the walk-down assessment by specialists. Mitigation efficiency is rated as high. This results in the significance following mitigation of "low".

Mitigation Measures:

1. An archaeologist must take part in a detailed walkdown assessment of the recommended transmission line route to establish where there are heritage sites where pylons should NOT be placed. These areas must be demarcated prior to construction and a policy of no access to these sites must be strictly enforced.
2. Archaeological material, by its very nature, occurs below ground. Eskom should therefore keep in mind that archaeological sites might be exposed during the construction phase. If anything is noticed, work in that area should be stopped and the occurrence should immediately be reported to a museum, preferably one at which an archaeologist is available. The archaeologist should then investigate and evaluate the find.
3. Any mitigation measures applied by an archaeologist, in the sense of excavation and documentation, should be published in order to bring this information into the public domain.
4. Eskom must ensure that an archaeologist inspects the access routes and construction camps prior to their establishment. If a particular route impacts on a heritage site but can not be diverted, mitigation measures can be implemented:
5. The contractors and construction workers must be notified that archaeological sites might be exposed during the construction phase.
6. Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered must stop immediately and the Environmental Control Officer must be notified as soon as possible.
7. All discoveries must be reported immediately to a museum, preferably one at which an archaeologist is available, so that an investigation and evaluation of the find can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken.
8. Under no circumstances must any artefacts be removed, destroyed or interfered with by anyone on site.
9. Contractors and workers must be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in Section 51 (1) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999).

Table 16: Damage to heritage sites

| | | | | |
|------------------------------|---|--|------------------|---|
| Impact Source(s) | Construction of the transmission lines | | Status | - |
| Nature of the Impact | Damage to heritage sites | | | |
| Receiving Environment | Archaeological artefacts | | | |
| Magnitude | Extent (footprint; site; regional; national; international) | | FOOTPRINT | |
| | Duration (short term; short-medium term; medium term; long-term; permanent) | | PERMANENT | |
| | Intensity (low; medium; high) | | HIGH | |
| | Probability (probable; possible; likely; highly likely; definite) | | LIKELY | |
| ME | Mitigation Efficiency (high; medium-high; medium; low-medium; low) | | HIGH | |
| Significance | Without mitigation (WOM) | Extent + Duration + Intensity + Probability 1 + 5 + 5 + 3 = 14 MEDIUM TO HIGH | | |
| | With mitigation (WM) | WM = WOM x ME 14 x 0,2 = 2.8 LOW | | |

8.2.5 SOCIAL IMPACTS: QUALITY OF THE LIVING ENVIRONMENT

8.2.5.1 Quality of the Physical Environment

Source of the impact:

- Construction vehicles on site
- Construction activities

Description of the impact:

During the construction phase there will be a decrease in the quality of the physical environment. Noise levels and traffic will increase as a result of the construction activities, which may negatively impact on the tourism-related (accommodation) industry at Nelspruit. There will be an increase in the traffic and noise levels during the construction phase near the Assmang Chrome mine (adjacent to Prairie substation). The road surfaces would also be affected by the movement of earthmoving and construction vehicles along the main roads and access roads.

Significance:

Noise and dust

The impact of noise and dust will be experienced by adjacent landowners as well as those in use of the transportation networks in close proximity to the site. Therefore the extent rating is regional. This impact will only occur during the construction phase which results in the duration rating as short-medium term. The functions and processes will still continue with the dust and noise impacts, albeit in a modified way, resulting in a medium intensity rating. The probability rating is highly likely. Therefore, the significance is calculated as medium. With the implementation of the mitigation measures, the significance is rated as low-medium.

Road surfaces

The R39 running along the Marathon substation site as well as the N4 near the Prairie substation site will be affected. The extent of this impact will be regional. The impact on the road surfaces will last until the end of the development stages, resulting in a rating of long-term for duration. Travel on the roads will still be possible. However, the effect would still be seen by potholes and other damages to the road surfaces. Essentially, the functions and processes of the road will still continue, albeit in a modified way, resulting in a medium intensity rating. The probability of the impact occurring is definite. Therefore, the significance before mitigation is rated as medium-high. With appropriate mitigation as outlined below, the significance will reduce to medium.

Mitigation Measures:

1. The Community Management and Monitoring Committee (CMMC) must address construction activities related issues and traffic with Eskom.
2. Construction activities as well as the use of construction vehicles on the roads must only occur between 07:00 and 17:00.
3. Impose construction downtime from 17:00 to 07:00 daily, public holidays and over weekends.
4. Eskom Transmission must contribute toward the maintenance of the main access roads during the construction phase and ensure that the construction phase will inflict minimal damage to the road surface.

Table 17: Quality of the physical environment: Noise and Dust

| | | | |
|------------------------------|---|--|---|
| Impact Source(s) | Construction activities; Earthworks; and Removal of vegetation cover | Status | - |
| Nature of the Impact | Noise and dust pollution during construction | | |
| Receiving Environment | Adjacent landowners | | |
| Magnitude | Extent (footprint; site; regional; national; international) | REGIONAL | |
| | Duration (short term; short-medium term; medium term; long-term; permanent) | SHORT-MEDIUM | |
| | Intensity (low; medium; high) | MEDIUM | |
| | Probability (probable; possible; likely; highly likely; definite) | HIGHLY LIKELY | |
| ME | Mitigation Efficiency (high; medium-high; medium; low-medium; low) | MEDIUM | |
| Significance | Without mitigation (WOM) | Extent + Duration + Intensity + Probability 3 + 2 + 3 + 4 = 12 MEDIUM | |
| | With mitigation (WM) | WM = WOM x ME 12 x 0,6 = 7,2 LOW-MEDIUM | |

Table 18: Quality of the physical environment: Road surfaces

| | | | |
|------------------------------|---|---|---|
| Impact Source(s) | Movement of construction vehicles and earthmoving equipment | Status | - |
| Nature of the Impact | Impact on road surfaces | | |
| Receiving Environment | Adjacent landowners; Regional landowners and residents; and Tourists | | |
| Magnitude | Extent (footprint; site; regional; national; international) | REGIONAL | |
| | Duration (short term; short-medium term; medium term; long-term; permanent) | LONG TERM | |
| | Intensity (low; medium; high) | MEDIUM | |
| | Probability (probable; possible; likely; highly likely; definite) | DEFINITE | |
| ME | Mitigation Efficiency (high; medium-high; medium; low-medium; low) | MEDIUM | |
| Significance | Without mitigation (WOM) | Extent + Duration + Intensity + Probability 3 + 4 + 3 + 5 = 15 MEDIUM-HIGH | |
| | With mitigation (WM) | WM = WOM x ME 15 x 0,6 = 9 MEDIUM | |

8.2.5.2 Tourism sector growth

Source of the impact:

The construction of the transmission lines will change the land use of the area within the transmission line servitude from agricultural, forestry or farming to industrial.

Description of the impact:

Negative Impact

The area surrounding the substations (i.e. Machadodorp and Nelspruit) are prescribed to be high tourism potential areas for the future. This is evident by Nelspruit being one of the host cities for the 2010 Soccer World Cup in South Africa. The visual impact of the substations and transmission lines affects the natural state of the environment that these cities market themselves on. Therefore, the effect of the tourism draw card, i.e. the natural state of environment, will be reduced by the effect of the establishment of the transmission lines.

Positive Impact

The growth of tourism with the Nelspruit and Machadodorp area will cause a greater demand on electricity within the region. The purpose of this particular development is to supply the Highveld North and the Lowveld regions with electricity for the future. This is a positive impact of the development.

Significance:

Negative Impact

The tourism sector extends beyond the boundaries of South Africa, causing the rating of the extent of the impact to be International. The transmission

lines will be permanent features on the landscape. The function of the region from a tourism perspective is its natural landscape. The change in land use to transmission lines causes the natural function and process for that specific area to cease completely, resulting in a high intensity rating. The probability of this impact occurring is highly likely as the visual quality of the region is visible not only to tourists, but to residents as well. Therefore, the significance of the impact is rated as high. However, with the implementation of the mitigation measures prescribed, the significance of the impact can be reduced to medium to high. The mitigation efficiency is rated as low to medium.

Positive Impact

The provision of electricity to the Highveld North and Lowveld areas results in the extent rating of the impact to be regional. The demand for electricity within the region is higher than the supply that is expected for the next few years (Section 2.3). Therefore, the establishment of the transmission lines will have a long-term duration as the impact will last to the end of the operational life of the development. The intensity rating is high as this will alleviate the pressures on the current electricity grid within this region. The probability of the impact occurring is rated as likely. Therefore, the significance of this positive impact is high.

Mitigation Measures :

1. All visual impact mitigation measures recommended by visual impacts assessment must be implemented.
2. Cross rope suspension pylons must be used where technically feasible.
3. Place new transmission lines as close as possible to existing transmission lines, where possible, to localise the visual impact.

Table 19: Tourism sector growth: Negative Impact

| | | | | |
|------------------------------|--|--|----------------------|----------|
| Impact Source(s) | Construction of the transmission lines | | Status | - |
| Nature of the Impact | The tourism potential of the region is likely to drop as a result of the change in the visual quality of the region | | | |
| Receiving Environment | Residents and tourists of the Highveld North and Lowveld regions | | | |
| Magnitude | Extent (footprint; site; regional; national; international) | | REGIONAL | |
| | Duration (short term; short-medium term; medium term; long-term; permanent) | | PERMANENT | |
| | Intensity (low; medium; high) | | HIGH | |
| | Probability (probable; possible; likely; highly likely; definite) | | HIGHLY LIKELY | |
| ME | Mitigation Efficiency (high; medium-high; medium; low-medium; low) | | LOW-MEDIUM | |
| Significance | Without mitigation (WOM) | Extent + Duration + Intensity + Probability 3 + 5 + 5 + 4 = 17 HIGH | | |
| | With mitigation (WM) | WM = WOM x ME 17 x 0,8 = 13,6 MEDIUM-HIGH | | |

Table 20: Tourism sector growth: Positive Impact

| | | | | |
|------------------------------|--|--|------------------|----------|
| Impact Source(s) | Construction of the transmission lines | | Status | + |
| Nature of the Impact | Provision of electricity to the Highveld North and Lowveld regions | | | |
| Receiving Environment | Residents and users of tourism establishments within the Highveld North and Lowveld regions | | | |
| Magnitude | Extent (footprint; site; regional; national; international) | | REGIONAL | |
| | Duration (short term; short-medium term; medium term; long-term; permanent) | | LONG TERM | |
| | Intensity (low; medium; high) | | HIGH | |
| | Probability (probable; possible; likely; highly likely; definite) | | LIKELY | |
| ME | Mitigation Efficiency (high; medium-high; medium; low-medium; low) | | N/A | |
| Significance | Without mitigation (WOM) | Extent + Duration + Intensity + Probability 3 + 4 + 5 + 3 = 17 HIGH | | |
| | With mitigation (WM) | N/A | | |

8.2.5.3 Feelings in relation to the project

Source of the impact:

Uncertainty or fear generated by applications for development, where the impacts perceived in anticipation of the planned intervention could potentially be greater than the impacts ultimately resulting from the actual intervention.

Description of the impact:

The impacts referred to above include uncertainty, annoyance, and dissatisfaction resulting from failure of the project to deliver promised benefits, and an experience of moral outrage. The community expressed their safety concerns with regards to the allowing access to Eskom staff to their properties for maintenance of the transmission line servitudes. However, the community in general are very positive about the proposed improvement in reliability of electricity supply.

Significance:

The affected landowners are in the surrounding regions, which results in the extent of the impact rated as regional. The negative feelings with regards to the project will last to the end of the developmental phases. The intensity is rated as high as the livelihoods of the community adjacent to the transmission lines are affected. The probability rating is highly likely. The mitigation efficiency is rated as low because it is difficult to change the community's feelings with regards to Eskom as a company (encompassing all the divisions) within the context of this project. Therefore, the significance of the impact is rated as medium-high.

Mitigation Measures:

1. Eskom to inform community about other alternatives such as electricity generation alternatives at another forum.
2. Community Management and Monitoring Committee (CMMC) to approach local municipality to engage in discussions with Eskom Distribution as well as Eskom Generation about possible solutions.

Table 21: Feelings in relation to the project

| | | | |
|------------------------------|---|---|----------|
| Impact Source(s) | Perception of similar developments | Status | - |
| Nature of the Impact | Negative feelings towards the project | | |
| Receiving Environment | Continued unstable social exchange between Eskom officials and affected landowners | | |
| Magnitude | Extent (footprint; site; regional; national; international) | REGIONAL | |
| | Duration (short term; short-medium term; medium term; long-term; permanent) | LONG TERM | |
| | Intensity (low; medium; high) | HIGH | |
| | Probability (probable; possible; likely; highly likely; definite) | HIGHLY LIKELY | |
| ME | Mitigation Efficiency (high; medium-high; medium; low-medium; low) | LOW | |
| Significance | Without mitigation (WOM) | Extent + Duration + Intensity + Probability 3 + 4 + 5 + 4 = 16 MEDIUM-HIGH | |
| | With mitigation (WM) | WM = WOM x ME 16 x 1 = 16 MEDIUM-HIGH | |

8.2.5.4 Loss of plantations

Source of the impact:

The establishment of transmission line servitudes through plantation areas.

Description of the impact:

There are large areas of plantation forestry east of Machadodorp where there are existing servitudes through plantation areas, and where plantations have been established up to the edge of the servitude. The establishment of an additional 55m servitude in these areas will result in the loss of trees to landowners and/or tenants. Depending on the age of the trees, the associated financial loss could be substantial, not only in terms of the trees currently on the land that have to be cut down, but also in terms of future income-generation potential.

Significance:

The extent is rated as "site", as the impact occurs only within the transmission line servitude. The duration of the impact is rated as permanent because the impact will continue throughout the operation of the transmission line. The intensity of the deviant social behaviour is rated as high, since cultivation of plantation trees would not be able to continue in the affected area. The probability is definite. The significance of the deviant behaviour is thus medium to high. The mitigation efficiency is rated as medium. The impact will

is calculated as having a medium significance after the implementation of the mitigation measures.

Mitigation Measures:

1. Eskom must agree with the landowners and/or lessees of plantation land during the land negotiation process on appropriate financial reward for the loss of production from plantations.

Table 22: Loss of plantations

| | | | |
|------------------------------|---|--|----------|
| Impact Source(s) | Servitude establishment in plantations | Status | - |
| Nature of the Impact | Plantation forestry cannot continue | | |
| Receiving Environment | Landowners | | |
| Magnitude | Extent (footprint; site; regional; national; international) | SITE | |
| | Duration (short term; short-medium term; medium term; long-term; permanent) | LONG-TERM | |
| | Intensity (low; medium; high) | HIGH | |
| | Probability (probable; possible; likely; highly likely; definite) | DEFINITE | |
| ME | Mitigation Efficiency (high; medium-high; medium; low-medium; low) | MEDIUM | |
| Significance | Without mitigation (WOM) | Extent + Duration + Intensity + Probability 2 + 4 + 5 + 5 = 16 MEDIUM TO HIGH | |
| | With mitigation (WM) | WM = WOM x ME 16 x 0,6 = 9.6 MEDIUM | |

8.3 ASSESSMENT OF CUMULATIVE IMPACTS

Cumulative impacts result from actions, which may not be significant on their own, but are significant when added to the impact of other similar actions. In this instance the cumulative impact is related to the development of the transmission lines as well as the new substations at Prairie and Marathon.

The proposed expansion of the substation at Marathon and the location of the new substation in close proximity to the existing one at Prairie will allow for the optimisation of the existing infrastructure and concentration of impacts in an already disturbed area, which will prevent unnecessary environmental impacts through the creation of new access roads. No long access route will be required for the Prairie B substation, since it is located adjacent to an existing provincial road. Thus the preferred locations of the proposed substations will have a lower cumulative impact when compared with that of the other alternative locations further away from the existing substations.

From a socio-economic perspective, the construction of the transmission lines and substations will allow for an increased security of power supply as well as

enhanced economic growth potential, which will contribute to an overall material improvement of the Highveld North and Lowveld regions.

A cumulative impact with respect to other development beyond this project is the impact of this project combined with several other large infrastructure development projects in the Nelspruit area. In addition to this project, EIAs for other projects like a liquid fuel pipeline from Mozambique and the creation of the N4 ring road around Nelspruit are currently ongoing. Although the proposed routing of the transmission lines cannot be regarded to create significant cumulative impacts in association with these other projects, the transmission lines could result in cumulative impacts, since the transmission lines, the N4 ring road and the fuel pipeline are all linear projects that will run parallel to each other to the west of Nelspruit. These projects, considered together, have the potential to significantly affect the character of the Crocodile River valley between Nelspruit and the Schagen area (approximately 20km west of Nelspruit). Some I&APs have indicated their concern about the cumulative effect of these three individual projects on their land. This impact is particularly important where small land parcels are affected. If a small land parcel is affected by more than one type of development, it may affectively sterilise the land for its initial use. In such instances, applicants should consider buying the entire portion of land rather than only registering a servitude over it.

9 ACTIVITY SPECIFIC ENVIRONMENTAL IMPACTS

The following section briefly outlines the key environmental impacts associated with the listed activities as legislated by the NEMA and associated EIA legislation. According to NEMA, development must be socially, environmentally and economically suitable. The following section firstly assesses the impacts of the proposed development, with respect to the NEMA principles. Secondly, the impacts of each of the particular listed activities are analysed.

9.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998)

9.1.1 NEMA Principles

(4) (a) Sustainable development requires the consideration of all relevant factors including the following:

- (i) Disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied**

The transmission line is recommended to follow the shortest possible route and will therefore have the smallest possible footprint on sensitive ecological communities. The recommended alternative is the best possible compromise between technical and environmental considerations, and does not result in any environmental "fatal flaws". The implementation of the mitigation measures and the conditions in the EMP will result in the reduction of the significance of the disturbance to ecosystems and the loss of biodiversity.

- (ii) Pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied**

The EMP outlines the measures, which must be implemented by each party / contractor in order to avoid environmental degradation and the frequency at which it occurs. With cognisance of (i) above, full implementation of this EMP will result in the minimisation of pollution and degradation to the environment. Provided that the recommendations, mitigation measures and the EMP are effectively and strictly implemented, pollution and degradation of the environment will be avoided.

(iii) Disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided or where it cannot be altogether avoided, is minimised and remedied

Resources of heritage significance are a relative unknown within the Mpumalanga Province. However, with the implementation of the mitigation measures prescribed and the implementation of the conditions in the EMP, this will ensure the minimisation of the impact on heritage resources within this region.

(iv) Waste is avoided or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner

Waste generated by the establishment of the transmission lines is restricted to construction-related waste during the construction phase. During the operational phase, the waste is related to general solid waste on the substation sites as well as hazardous wastes such as transformer oil, which is not produced frequently. No waste is expected to be produced by the operation of the transmission lines during the operational phase.

(v) Use and exploitation of non-renewable natural resources is responsible, equitable and considers the consequences of the depletion of the resource

The only non-renewable resource that will be affected by the transmission lines is soil. Although soil is renewable over very long periods of time, it is considered non-renewable for practical purposes, since the recreation of agriculturally viable soil takes longer than a human lifetime. In this instance, the loss of agriculturally viable soil will be minimised by the judicious placement of pylons. Pylon positioning will be optimised during the walkdown assessment of the route and in association with agricultural landowners.

(vi) Development, use and exploitation of renewable resources and the ecosystems, of which they are part, do not exceed the level or 'critical limits' beyond which their integrity is jeopardised

It is unlikely that this development will exceed the critical limits beyond which the integrity of renewable resources or ecosystems is jeopardised. The development does not consume renewable resources. As far as ecosystems are concerned, the development will transform very small portions of ecosystems that are not critically threatened or in imminent danger of collapse. Even though the transmission line will cross or pass close to sensitive ecosystems, the nature of the transmission line is not such that it fundamentally changes the ecological conditions through removal of vegetation cover.

9.1.2 EIA Regulations as promulgated in terms of NEMA

9.1.2.1 Government Notice Regulation 386 (Basic Assessment)

- 1. (m) The construction of facilities or infrastructure, including associated structures or infrastructure, for any purpose in the one in ten year flood line of a river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including: canals, channels, bridges, dams and weirs.**

The placement of pylons in watercourses should be avoided by identifying such features during the walkdown assessment and demarcation of these areas during the construction phase.

- 7. The above ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic metres but less than 1 000 cubic metres at any one location or site.**

No exact figures are available at this stage of the volumes of petrol or diesel that will be stored at construction sites. Quantities, if any, will probably be only slightly more than 30m³ and will probably be stored at the substation sites rather than along the transmission line route. Since the proposed substations are very close to existing substations, temporary fuel storage facilities can be established at the existing substations where controlled conditions have already been established.

- 12. The transformation or removal of indigenous vegetation of 3 hectares or more or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).**

The construction of the transmission lines will not involve large scale clearing of vegetation. Only the positions where pylons foundations will be placed will be cleared – this clearance will be limited to a few square meters per pylon. Therefore, this listed activity is deemed not applicable. Apart from this, no critically endangered or endangered ecosystems have been identified in terms of the National Environmental Management: Biodiversity Act, 2004.

- 14. The construction of masts of any material or type and of any height, including those used for telecommunication broadcasting and radio transmission, but excluding:-**
- (a) masts of 15 metres and lower exclusively used**
 - (i) by radio amateurs; or**
 - (ii) for lighting purposes**
 - (b) flag poles; and**
 - (c) lightning conductor poles.**

Small masts for telecommunication purposes are only likely to be erected at the substations and not along the transmission lines.

- 15. The construction of a road that is wider than four (4) metres or that has a reserve wider than six (6) metres excluding roads that fall within the ambit of another listed activity or which are access roads of less than 30 metres long.**

The access roads for transmission lines will be limited to tracks. These access roads should not be scraped, but should be created (where necessary) simply by driving across the existing vegetation. Since it is recommended that the transmission line must follow existing servitudes, it is unlikely that new access roads would have to be created.

- 16. The transformation of undeveloped, vacant or derelict land to establish infill development covering an area of 5 hectares or more, but less than 20 hectares.**

Infill development would not be applicable to the transmission lines.

9.1.2.2 Government Notice Regulation 387 (Scoping / EIA)

- 1. (l) The construction of facilities or infrastructure, including associated structures or infrastructure, for the transmission and distribution of above ground electricity with a capacity of 120 kilovolts or more.**

This impact has been addressed in this report.

- 2. Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more.**

Given the 55m width of the servitude and the length of the transmission lines (approximately 185km), the area of the development would definitely be larger than 20 ha. This impact is addressed in this report.

10 CONCLUSIONS AND RECOMMENDATIONS

The purpose of this report is to provide the relevant authority with sufficient information to make an informed decision regarding the potential impacts of the proposed development. Potential impacts were identified primarily through the experience of the EAP and the specialist team, as well as in consultation with I&APs.

10.1 ALTERNATIVES

This EIA Report identified three (3) alternative routes between Hendrina and Prairie as well as between Prairie and Marathon. Additional sub-alternative (e.g. PM5 and PM4) were identified on the basis of I&AP comments and specialist contributions. The alternative analysis resulted in the following recommendations:

- HP1 should be followed between Hendrina and Prairie substations; and
- PM1 should be followed between Prairie and Marathon substations.

In terms of the type of pylons, it is recommended that the cross rope suspension type pylon is used where technically feasible, due to its lower visual impact compared to the visual impact of self-supporting pylons. With regards to the suggestion of underground transmission lines, it is concluded that this is not a feasible option due to the excessive cost and the technical challenges, which make maintenance very difficult.

10.2 KEY ENVIRONMENTAL IMPACTS

Impacts rated as being of significance (medium-high or high) without mitigation are as follows:

Loss agricultural production potential: the construction of the transmission lines will not dramatically affect crop production on the highveld, as maize production can continue underneath transmission lines, but the transmission lines could have significant impacts on production of orchards in the lowveld, since there is a height restriction of 4m on trees below transmission lines.

Disturbance of sensitive ecosystems: sensitive systems such as wetlands and rocky outcrops could be disturbed if positions in which pylons are placed do not take environmental constraints into account. Wetland systems could also be disturbed by the passage of heavy vehicles and the resultant trampling of vegetation, especially if construction takes place during the rainy season. Provided that recommendations made in the construction EMP (based on detailed inspection of the route during a walk down assessment) are followed, such impacts can be largely avoided.

Establishment of invasive alien species: Invasive species such as Lantana will become established in transmission line servitudes following disturbance by the cutting down of trees in the servitude. If this impact is not managed properly, such species could spread to adjacent properties. This impact must be managed through regular surveillance and control during construction and operation.

Impact on birds: Since the recommended route is passes through high-altitude grasslands and close to important bird habitats such as pans, the transmission line may have an impact in the form of increased numbers of bird strikes. Provided that the new transmission lines is placed as close as possible to the existing lines, and that bird deterrent devices are installed in the recommended positions (to be indicated during the walk down of the route), then the significance of this impact can be mitigated to low .

Altering of the landscape character: Transmission lines will have a significant visual impact and will alter the character of the landscape and people's perception of it. This is particularly important in the Prairie to Marathon portion of the route, which is an important tourist region. Although there is little that can be done to mitigate these visual impacts, placing the new transmission line as close as possible to existing lines, as well as using cross rope suspension pylons, where possible, will reduce the significance to medium.

Damage to heritage sites: The escarpment region has large number of Iron Age heritage sites, which could be impacted if transmission pylons are placed incorrectly. Provided that recommendations of the walk down assessment and construction EMP with regards to the placement of pylons are followed, this impact can be avoided.

Impacts on road surfaces: This impact will be felt most significantly close to the substation sites, where most construction activity will take place. The impact on road surfaces along the remainder of the transmission lines route will be limited, since the construction of the transmission lines will be dispersed over a wide area.

Impact on tourism sector growth: The visual impacts of the transmission lines may have a negative impact on the rate of tourism growth to the region. This can be mitigated by placing the new lines as close as possible to existing lines and by using cross rope suspension towers, where technically feasible.

Feelings in relation to the project: Feelings in relation to electricity transmission and distribution projects include uncertainty, annoyance, and dissatisfaction resulting from disputes with the applicant and failure to deliver promised electricity supply benefits. Most of these feelings are related to historical disagreements and there is little that the current project can do to change these perceptions.

Loss of plantations: Since the recommended transmission line route passes through extensive areas of plantation forestry, portions of these plantations will be cleared and the opportunity to continue forestry in these sections will be lost. This can be mitigated through appropriate financial compensation for the loss.

Positive impacts

Tourism sector growth; as a result of the long-term provision of electricity to the Highveld North and Lowveld regions.

Cumulative impacts:

The cumulative impacts assessed are associated with the development in its entirety. The transmission lines, together with other planned linear infrastructure in the Crocodile River valley west of Nelspruit, will potentially significantly affect the character of the landscape, particularly when considering the proposed N4 road around Nelspruit. However, the substations do not add substantially to the cumulative impacts of these activities, due to the non-linear nature of the substations. The cumulative effect of these activities may be severe on landowners with small properties.

10.3 MITIGATION AND ENHANCEMENT

Mitigation measures suggested by I&APs have been taken into consideration in order to avoid or reduce potential negative impacts. The proposed development also has a number of positive impacts for the region, including improved socio-economic conditions for the Mpumalanga Province.

A variety of mitigation measures have been identified that will serve to mitigate the scale, intensity, duration or significance of the impacts that have a medium and high significance rating. These include guidelines to be applied during the construction and operational phases of the project. The Environmental Management Plan (EMP) contains more detailed mitigation measures. This EMP is must be supplemented by a more detailed Construction EMP, to be compiled on the basis of a walk down assessment of the route by the following specialists:

- A bird specialist;
- A heritage specialist;
-

The mitigation measures and recommendations made in the following specialist studies must be adhered to:

- Geotechnical Report;
- Soil and Agricultural Potential Assessment;
- Terrestrial Ecological Assessment;

- Avifaunal Assessment;
- Visual Impact Assessment;
- Heritage Impact Assessment; and
- Social Impact Assessment.

10.4 CONCLUSION

The construction and operation of the Hendrina-Prairie-Marathon transmission lines is a development that has the potential to negatively impact on the environment. However, no critical flaws were identified with respect to any of the environmental parameters that have been studied, and the impacts can be effectively mitigated to acceptable levels. Transmission lines do not totally transform the landscape, and the actual physical footprint of the pylons are very small, thus allowing natural processes to continue in the transmission line servitude. The most significant impacts of the transmission lines are on social conditions, and particularly visual impact, since this impact cannot be totally avoided. Visual impacts can, however, be mitigated by using pylons with lower visibility, where technically feasible, and by placing new transmission lines parallel to existing transmission lines, so as to localise the impact along a corridor that has already been affected..

It can be concluded that the proposed transmission lines will not conflict with the principles of the National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA] and should, therefore, be authorised. The Public Participation Process (PPP) has been duly undertaken as per the NEMA and the issues of I&APs have been adequately addressed. It is therefore recommended that the proposed development should proceed subject to the implementation and enforcement of the recommendations and mitigation measures contained in this EIA Report and EMP.

10.5 RECOMMENDATIONS

The following key recommendations are made:

- HP1 should be followed between Hendrina and Prairie substations;
- PM1 should be followed between Prairie and Marathon substations. However, PM 1 could be followed between the farms Belmont 289 JT and Rietvlei 473 JT, should technical constraints of the terrain and dwellings make it impossible to construct along PM in between the afore-mentioned farms.
- DEAT should authorise a corridor of 1km wide to allow placement of pylons within the corridor to avoid sensitive environmental features. However, within this corridor, Eskom must attempt to place new pylons as close as possible to the existing pylons to localise the impact.
- The exact placement of pylons (and areas where pylons should not be placed) must be confirmed during a walkdown assessment of the recommended route.

- The authorisation of the transmission lines must be followed by a walkdown assessment of the route by an ecologist, a bird specialist and an archaeologist. These specialists must identify site-specific sensitive features along the route and indicate appropriate pylon placement and other detailed mitigation measures;
- A Construction EMP must be produced based on the above-mentioned walkdown assessment. This EMP must be binding on the construction contractor.

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APPENDICES

Appendix 1: Correspondence with DEAT

- a) Correspondence received from DEAT
- b) Plan of Study for EIA
- c) Application Form

Appendix 2: Public Participation

- a) Proof of Site Notices
- b) Written Notices Issued to Interested and Affected Parties
- c) Proof of Newspaper Advertisements
- d) Communications to and from Interested and Affected Parties
- e) Flyers Distributed to Interested and Affected Parties
- f) Attendance Register for Public and Key Stakeholder Meetings
- g) Comment and Response Report
- h) Copy of the Register of Interested and Affected Parties
- i) Proof of Delivery for Knock and Drop Deliveries
- j) Other

Appendix 3: Technical Information

- a) Article on Underground cables vs. Overhead cables

Appendix 4: Specialist studies

- a) Geotechnical Assessment
- b) Soil and Agricultural Potential Assessment
- c) Ecological Assessment
- d) Avifaunal Assessment
- e) Visual Impact Assessment
- f) Heritage Impact Assessment
- g) Social Impact Assessment

Appendix 5: Detailed maps of alternative alignments

Appendix 6: Environmental Management Plan