# Specialist Basic Assessment report:

# Proposed Letaba/Lenyenye project.

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## Introduction

This report is to discuss the biological survey (excluding the avifaunal component) conducted for the project. During the survey, a 100m corridor was investigated for the proposed power line (Figure 1).

## Project Description

The brief for the project supplied by Nzumbululo Heritage Solutions was:

- The 132kV power line will connect the new Letaba substation and the existing Lenyenye.
- Two alternatives were investigated.

## Project locality

The project is located to between Nkowankowa and Lenyenye (Limpopo Province) (Figure 1).

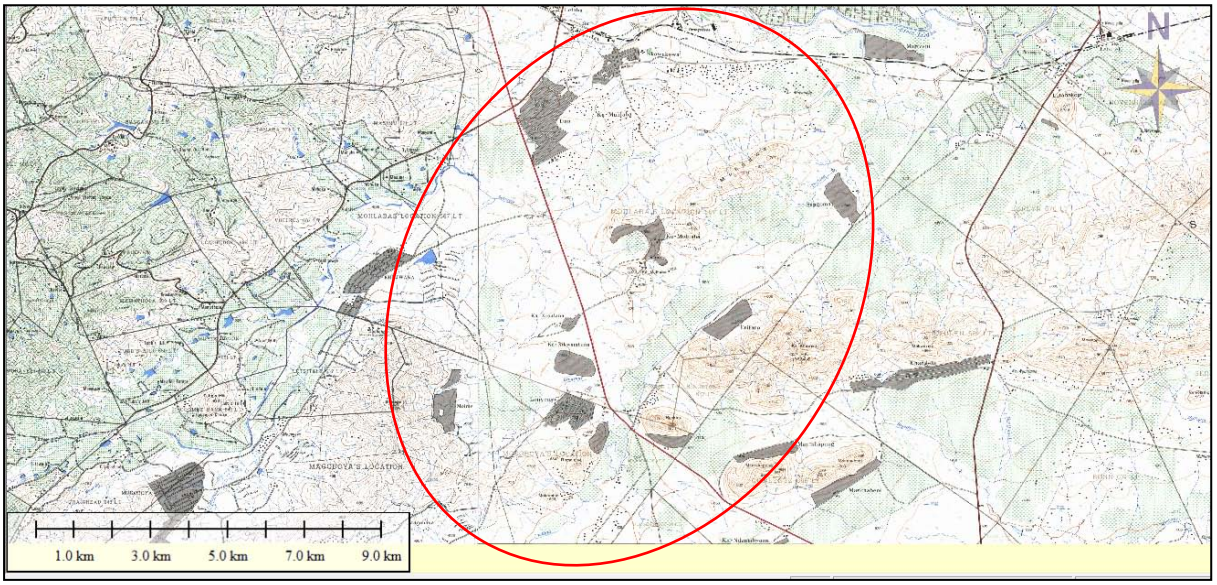


Figure 1: Approximate study site for the new power line.

Addendum 1 is a summary of impacts, mitigation and management action suggested. Addendum 2 is a summary of possible mammals in the area, with the probability of encountering them on a permanent basis (i.e. not moving through) on the study site. Addendum 3 is the list of red data species from the SANBI Précis Lists (¼° squares).

**Assumptions and limitations**

**Availability of baseline information**

Baseline information about the plant community of the site was obtained from Mucina and Rutherford (2006). For the animal study, the State of the Environment Report of the Limpopo Province (2004) and Skinner and Chimimba (2005) were consulted. The desktop survey provided adequate baseline information for the area and therefore this was not a constraint.

**Constraints**

The survey was conducted during daytime only. All the different habitats at the site was investigated and it was therefore possible to complete a rapid survey and obtain information on the biological community (excluding avifaunal) that are present and the site, or that are likely to occur there.

Bio-physical constraints

Weather conditions during the period were warm with a light wind blowing. It seems that the region has received some rainfall prior to the site visit as the vegetation was green and lush. There was no standing water present and this will have obvious implications on the biodiversity that are likely to occur in the area. Nevertheless, the conditions during the survey were ideal for a survey of this nature.

Confidentially constraints

There were no confidentially constraints.

**Implications for the study**

Apart from the prevailing weather conditions at the site, there were no other significant constraints that would negatively impact upon the study. There is sufficient good quality data available in the literature that partially negates the negative effect that the type of survey had on the quality of the assessment.

## Methods

### Desktop study

Prior to the site visit and field survey, information of the study site was available. The appropriate 1:50 000 maps were used to identify the major habitat features such as roads, railways, drainage channels, old cultivated fields, wooded areas, wetlands, koppies etc in the area. Prior to the site visit, a desk top study was conducted to generate lists of species historically recorded at or near the site, or that are likely to occur at the site.

### Field survey

The field survey was planned to include all the different habitat types and to target threatened species that may occur in the area, to determine the likelihood of their presence and how the proposed activities will impact upon them.

During the survey, a walk-about was conducted to investigate the current vegetation and animal status in the proposed corridor for the new power line. All activity of animals was noted and a general plant list was completed. Photographs of important features were taken and will be included in the report. Sixteen red data species (SANBI, 2012) occur in the ¼ degree for the study site, but due to its habitat requirements, it is highly unlikely to occur on the study site. One protected tree occur in the veld type (Mucina and Rutherford, 2006) namely *Sclerocarya birrea*. The following species are listed in the SANBI Précis lists for the ¼ degree of the study site and their presence/absence must be confirmed once the final route is selected: *Combretum imberbe, Philenoptera violacea, Pterocarpus angolensis, Podocarpus latifolius, Podocarpus falcatus* and *Breonadia salicina*.

### Vegetation

The vegetation falls within the Savanna Biome (SV) and the units form part of the Lowveld (l) vegetation units. Three vegetation types are associated with the study area, the Granite Lowveld (SVl 3), the Gravelotte Rocky Bushveld (SVl 7) and the Tzaneen Sour Bushveld (SVl 8) (Fig 3 and 4) (Mucina and Rutherford, 2006).

The Granite Lowveld (SVl 3) was known as the Arid Lowveld (Acocks, 1953) or Mixed Lowveld Bushveld (Low and Rebelo, 1996) while the Gravelotte Rocky Bushveld (SVl

7) was referred to as the Arid Lowveld (Acocks, 1953) and the Mixed Lowveld Bushveld (Low and Rebelo, 1996). The Tzaneen Sour Bushveld was previously known as the Lowveld Sour Bushveld (Acocks, 1953) or Sour Lowveld Bushveld (Low and Rebelo, 1996).

The Granite Lowveld is found in the Limpopo and Mpumalanga provinces and extends into Swaziland with the altitude ranging between 250 – 700 m. In general the vegetation varies from tall shrubland with a few trees to moderately dense low woodlands on the deep sandy soils in the higher areas. In the lower lying areas dense thickets to open savanna is dominating (Mucina and Rutherford, 2006).

The Gravelotte Rocky Bushveld is only found in the Limpopo Province and the altitude varies between 450 and 950m. It is known for its open deciduous to semi-deciduous woodlands and the inselbergs and rocky slopes are in stark contrast to the surrounding plains (Mucina and Rutherford, 2006).

The Tzaneen Sour Bushveld extends in a band along the foot slopes of the north-eastern escarp, from the Soutpansberg to the Transvaal Drakensberg and the altitude range between 600 and 1 000 m. this veld type is found on the lower slopes of the escarpment with undulating plains dominating along the low to high mountains. The tall grass layer is known for the well developed open parkland bushveld (Mucina and Rutherford, 2006).

**Geology and soils**

The Granite Lowveld is found from north to south the Swazian Gudplaats Gneiss, Mukhutswi Gneiss, Nelspruit Suite and Mpuluzi Granites form the main geological features. The granites and gneiss weathered into sandy soils in the higher areas with clay soils high in sodium in the lower areas (Mucina and Rutherford, 2006).

The Gravelotte Rocky Bushveld is known for its varied geology dominted by schist and amphibolites (Gravelotte and Giyani Groups) with some granite and quartzite hills present. The soils are mostly shallow and Mispah and Glenrosa very common (Mucina and Rutherford, 2006).

In the case of the Tzaneen Sour Bushveld, the potassium-poor gneiss of the Goudplaats gneiss and Archaean granite dykes underlie most of the area. Soils are dominated by Hutton, Mispah and Glenrosa and vary from shallow to deep, sandy to gravel and are mostly well drained (Mucina and Rutherford, 2006).

**Climate**

The Granite Lowveld falls in a summer rainfall area with dry winters and an annual MAP of 450 mm on the eastern flats to 900 mm near the escarp. Frost is infrequent but may occur occasionally at the higher altitudes near the escarp. The mean maximum and minimum temperatures vary between 39.5° C and -0.1° C across the vegetation type (Mucina and Rutherford, 2006).

Gravelotte Rocky Bushveld is associated with the summer rainfall areas with dry winters and the rainfall in the study area is approximately 550mm per annum. Frost in the lower areas is infrequent but can increase at higher altitudes. The temperatures vary between 36.4° C and 3.9° C (Mucina and Rutherford, 2006).

The Tzaneen Sour Bushveld falls within the summer rainfall area with dry to very dry winters. The annual MAP varies between 550 and 1 000 mm and frost is infrequent but may occur occasionally at the higher altitudes of the escarp. The mean maximum and minimum temperatures vary between 36.4° C and 5.7° C across the study area (Mucina and Rutherford, 2006).

**Conservation**

Although the Granite Lowveld is an extensive veld type, it is considered to be vulnerable and 17% of the targeted 19% has formal protection. About 20% is transformed, mainly by cultivation and settlements and erosion potential is low to moderate (Mucina and Rutherford, 2006).

Gravelotte Rocky Bushveld is considered as endangered with less than 1% conserved and the threats are forestry, mining and agriculture. Alien vegetation includes *Solanum mauritianum, Melia azedarach* and *Caesalpinia decapetala* with *Chromolaena odorata, Lantana camara* and *Psidium guajava* problematic in the more

subtropical areas. Erosion is low to high, depending on the slopes (Mucina and Rutherford, 2006).

The Tzaneen Sour Bushveld is considered as endangered by Mucina and Rutherford (1996) and as less as 3% of the targeted 19% is formerly conserved. About 41% is transformed with 9% under exotic plantations and 29% under cultivation. Exotics that impact severely include *Solanum mauritianum, Melia azedarach* and *Caesalpinia decapetala* with *Chromolaena odorata, Lantana camara* and *Psidium guajava* problematic in the more subtropical areas (Mucina and Rutherford, 2006).

Erosion is variable and range from low to high across the study area and this apply especially to the steeper slopes associated with the undulating landscape.

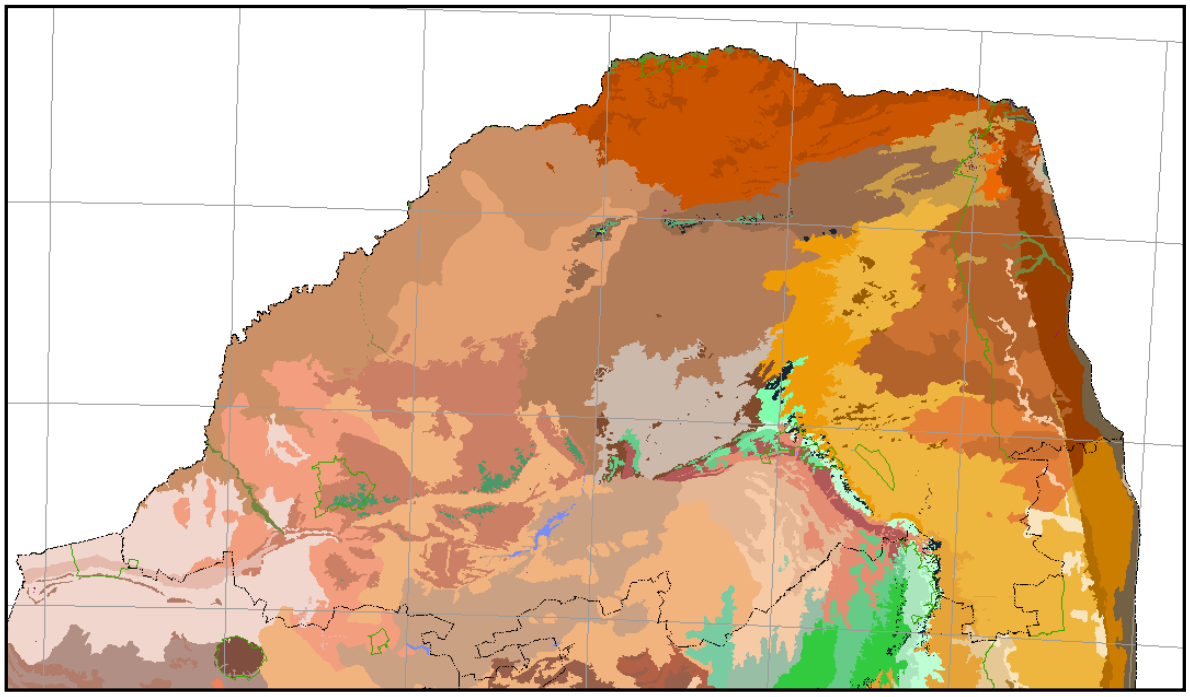

Figure 2: Regional vegetation map: vegetation map in the Limpopo Province according to Mucina and Rutherford (2006).

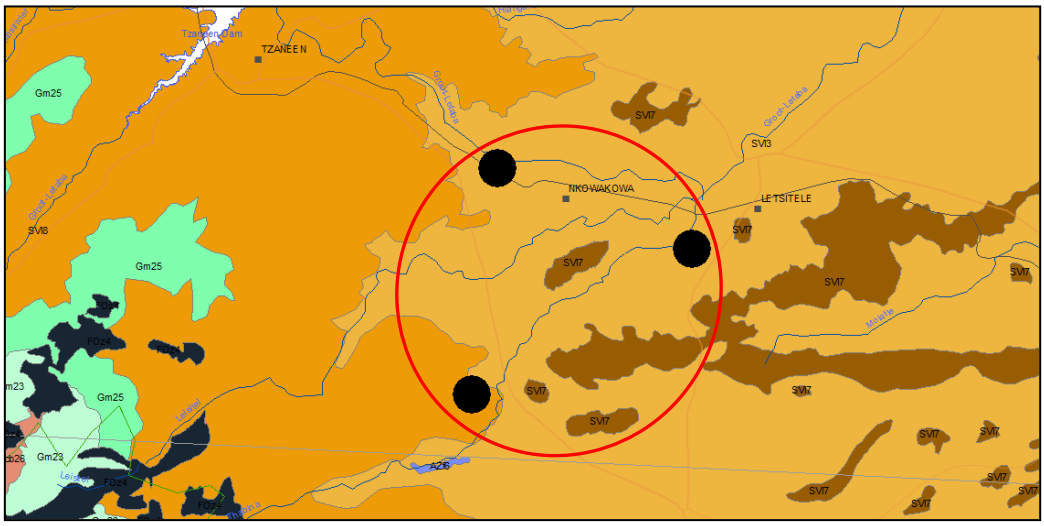


Figure 3: Vegetation types found in areas of the proposed project (circled in red).

## Results

Two alternative routes for the proposed new power line between the new Letaba and existing Makutswi substations were investigated (Figure 4 and 5).

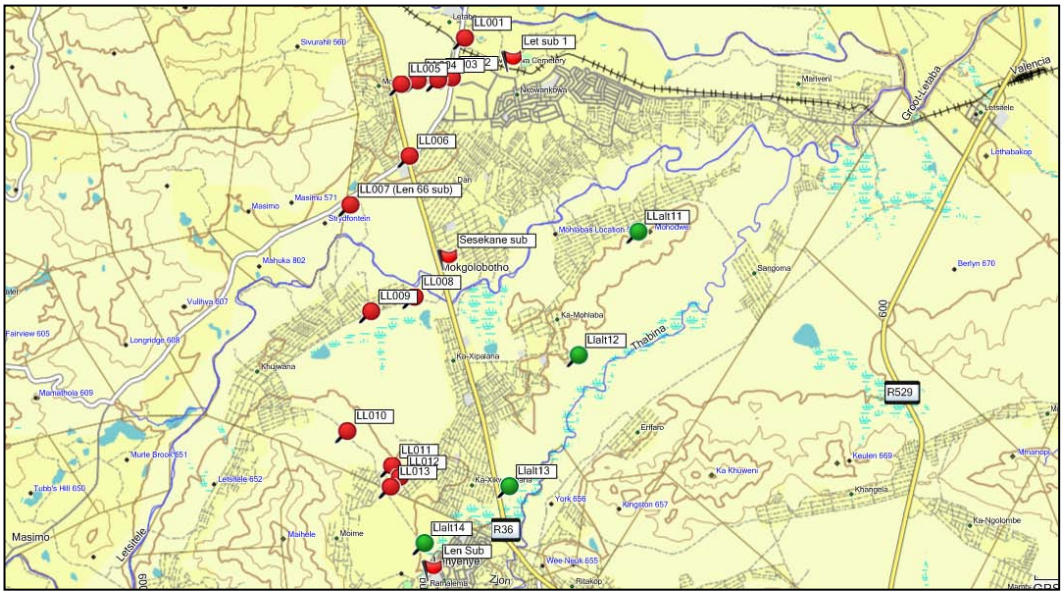


Figure 4: General corridor for the new power line between the new Letaba and existing Makutswi substations. Alternative 1 is in red and Alternative 2 marked in green.

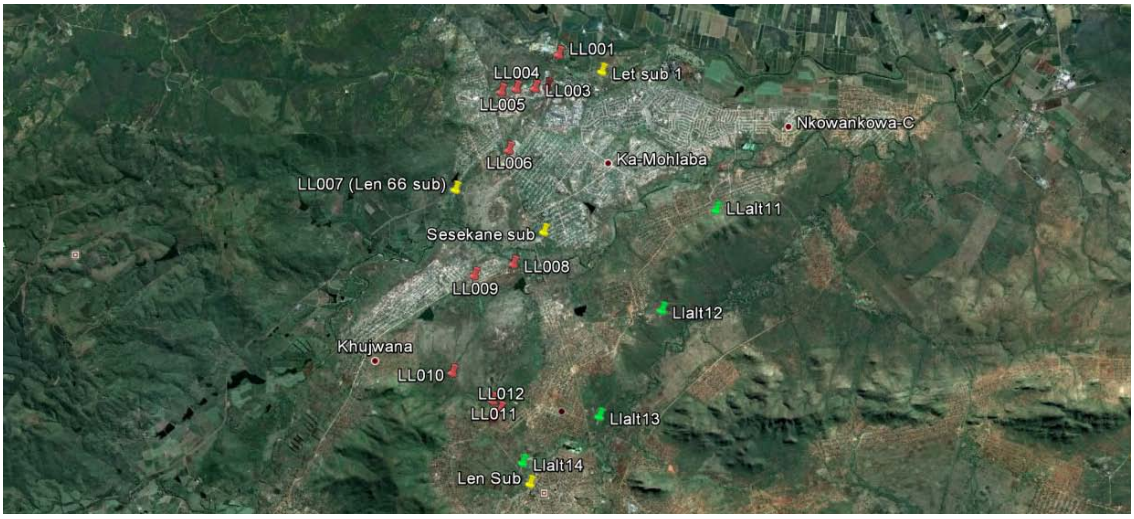


Figure 5: Aerial view of the two alternatives investigated.

## Alternative 1

This alternative (Figure 6 and 7) will cross the stream to the northwest of the Lenyenye substation before turning north just after crossing the stream. The proposed power line will then follow a corridor near the road between Lenyenye and Moime. The vegetation along this proposed corridor is severely modified and regular cultivation of the agricultural lands, grazing and wood harvesting are the main reasons for this changes. Erosion, as along the other corridors are evident. Some large *Sclerocarya birrea* are remaining in the small grass patches between lands and on farm boundaries, but should not be affected during construction. In the event that some trees do occur on the final route permits for cutting or trimming must be obtained prior to construction taking place.

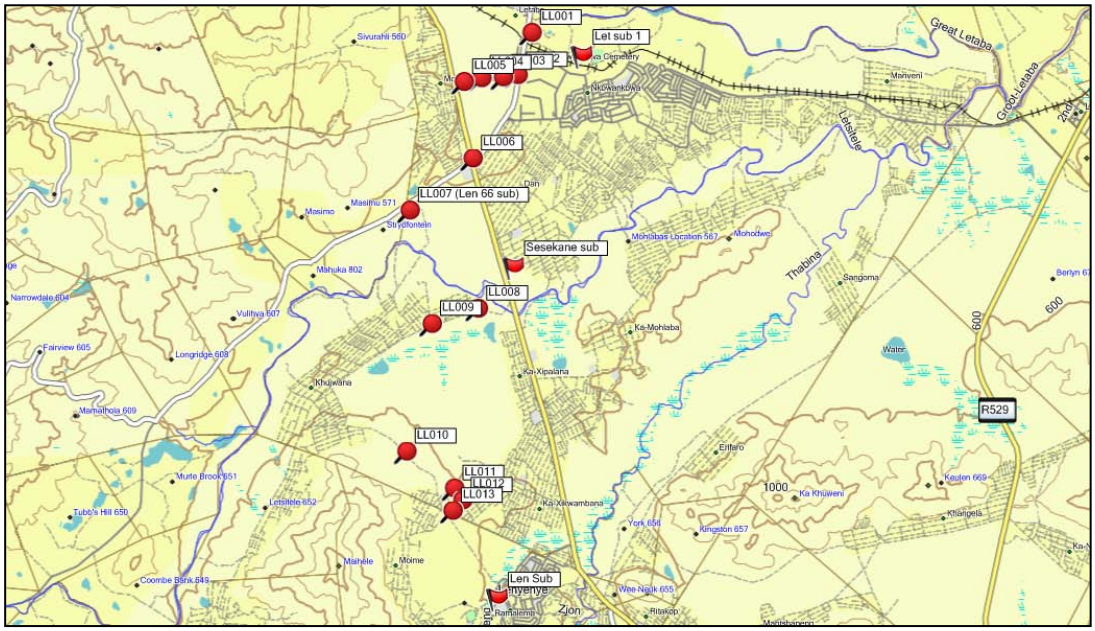


Figure 6: General route investigated for Alternative 1 for the Letaba/Lenyenye power line.

Protected trees must be mapped (GPS) during the walk down study and permits for cutting and trimming must be obtained before the clearing of the corridor can commence. The presence and/or absence on the final corridor of any of the protected listed (p 4) must be confirmed. Trees in the first sector (Figure 7 and 8) include *Acacia caffra, A. karroo, A. rehmanniana, A. sieberiana, Dichrostachys cinerea, Ficus sur, Terminalia sericea, Gymnosporia glaucophylla* and *Euclea divinorum* (Figure 9 – 16).

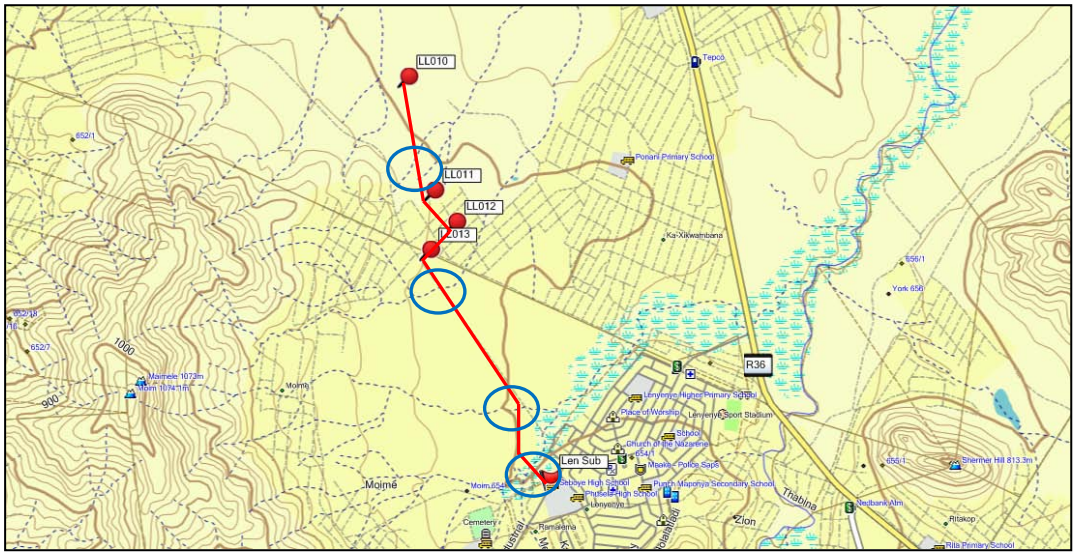


Figure 7: First sector of the proposed new power line from the Lenyenye substation to the new Letaba substation. The stream crossings are circled in blue.


Figure 8: First sector to the north of the Lenyenye substation – intensive agricultural activities can be observed.

Figure 9: Vegetation around the Lenyenye substation modified – in residential area.

Figure 10: Corridor to the west of the substation, following the existing power lines through the residential area.

Figure 11: Small stream to the west of the residential area.

Figure 12: Wood harvesting and dumping of refuse have a huge impact on the stream.

Figure 13: Example of illegal dumping in streams and gullies.

Figure 14: Small scale farming along the route.

Figure 15: New power line will follow the existing lines to Moime.

Figure 16: Corridor through Moime.

Two options for the route for the power line at Moime can be followed. Currently the route investigated was a “direct option” through the area. A second route to the east may be used (Figure 17), as it will ensure easier access between the houses.


Figure 17: Current proposed route through Moime (red line) with a possible deviation suggested (dashed red line).

To the north of Moime, some streams are encountered and the land use impacts include cultivation, a few old orchards, grazing and wood harvesting. The vehicle traffic through the streams must be avoided as far as possible, as these areas, especially on steeper slopes are prone to erosion once the soils are disturbed. All the activities results in the severely modified state of the natural vegetation and as a result many alien plant infestations are found. Many poorly developed roads (and no maintenance) are present and contribute to the erosion problem that will increase over time.

To the south of Khujwana, some streams (tributaries of the Letsitele River) are crossed. The crossing of the larger stream to the south of the village will post similar

issues as the other proposed routes. Care must be taken to avoid the larger trees in the riparian zone and if needed, application for permits to cut or trim the trees must be done in time (Figure 18 – 24). The stream crossings are considered as sensitive areas and are used by all biota as migration routes (good cover and other resources).

Figure 18: To the north of Moime, the new route follows the existing power line. Natural vegetation severely modified.

Figure 19: Example of stream crossings in the area.

Figure 20: Larger stream to the south of Khujwana.

Figure 21: Natural vegetation in the sector severely modified for cultivation, with strips of trees between the different patches.

Figure 22: Small orchards contribute to the modification of the landscape.

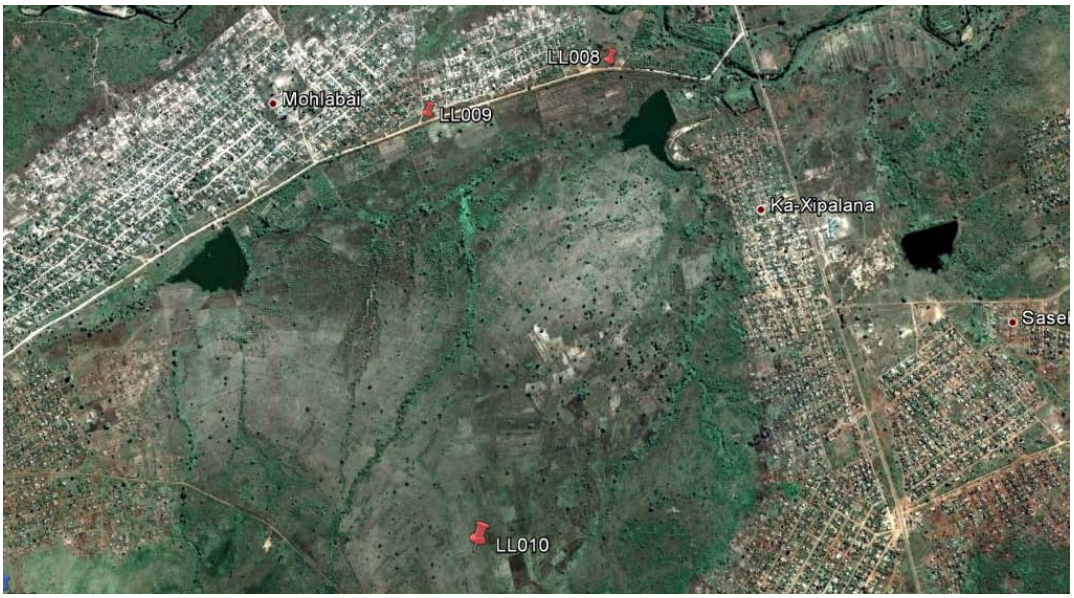


Figure 23: Aerial view of the middle sector of the route.

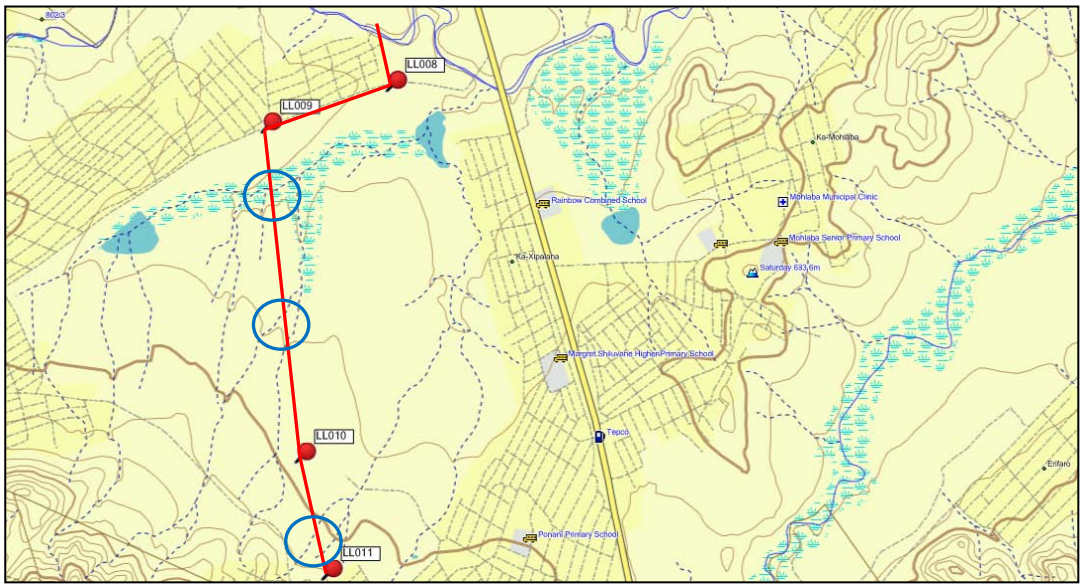


Figure 24: Middle sector, showing the streams feeding the Letsitele River – all stream crossings circled in blue.

To the north of Khujwana, the Letsitele River must be crossed. The corridor swings to the east to avoid cutting through the residential area, as this is a problem to find a suitable corridor between the houses. To the east of the residential area, the power line swings to the north, crossing the Letsitele River. Large trees in the riparian zone must be avoided and the selection site for the crossing of the river is important as the river in some areas is very wide (river and the larger flood zones). The placing of the

power line structures can pose a problem, as no structures must be placed in the river or the macro channels of the river. The pylons must be placed outside the 1:100 year flood line for the Letsitele River and at least 50m from the smaller streams and drainage lines. There are no river crossing at the crossing point and the bridge to the east must be used (Figure 25 and 26).

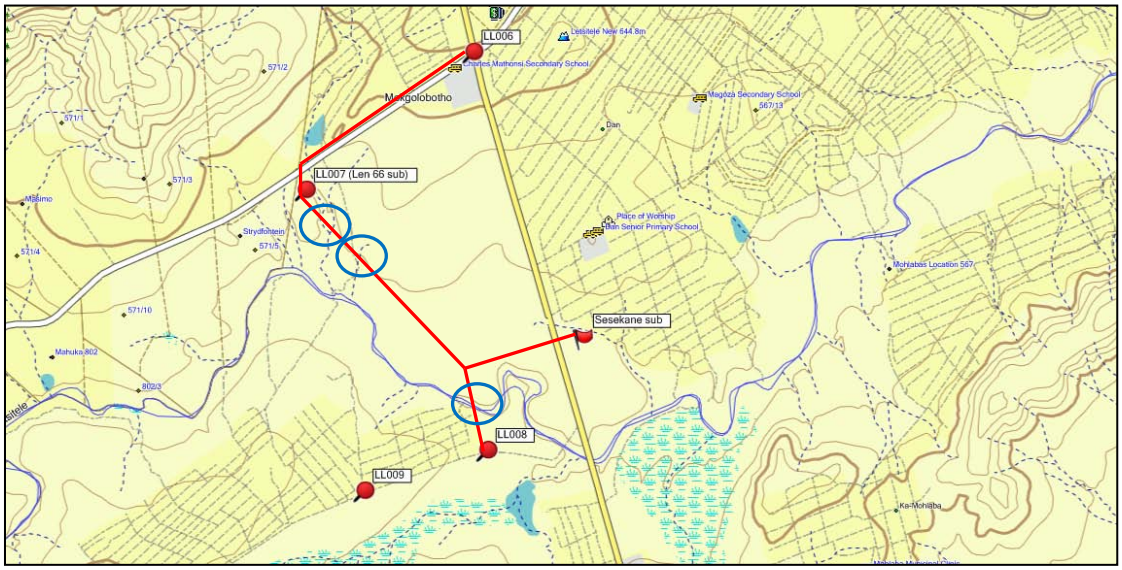


Figure 25: Proposed route to the north of the Letsitele River and the deviation to the new proposed Sesekane sub. Rivers and streams circled in blue.

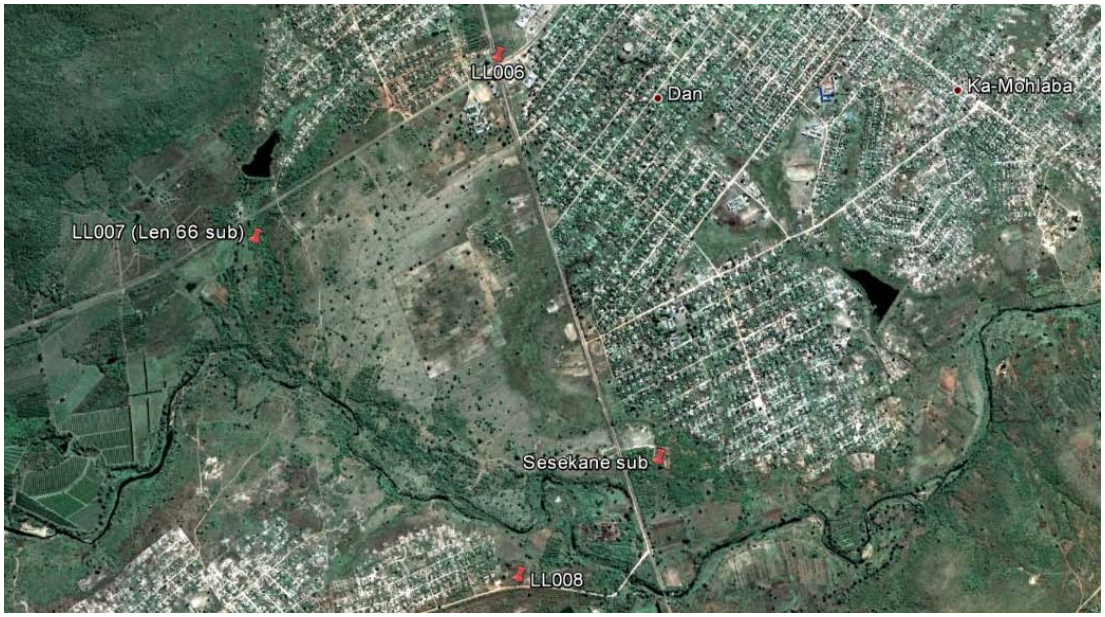


Figure 26: Aerial view of the sector showing impacts to the landscape.

To the north of the river, land use is dominated by cultivation of cash crops, orchards (along the river – Figure 26) and grazing. The wood collection further contributes to the modification of the natural vegetation. The T-off to the proposed new Sesekane substation is in this area. This power line crosses the R36 to the substation site to the south of the Dan cemetery. The vegetation at the substation site is modified and currently the orchards dominate the vegetation with very little plants present. Some of the species found in the narrow strips of "natural vegetation" between the orchards include *Sclerocarya birrea, Breonadia salicina, Piliostigma thonningii, Diospyros mespiliformis, Erythrina lysistemon, Peltophorum africanum, Ficus sycomorus, Gymnosporia glaucophylla, Terminalia sericea, Combretum collinum, Bauhinia galpinii, Euclea spp., Ziziphus mucronata, Dichrostachys cinerea* and exotics such as *Caesalpinia decapetala, Lantana camara* and *Melia azedarach* (Figure 27 – 35).

Figure 27: Corridor following existing power line near Khujwana.

Figure 28: Clearing of natural vegetation around the residential area.

Figure 29: Impacts of agriculture south of the Letsitele River.

Figure 30: Riparian vegetation of the Letsistele River in a fair to poor condition.

Figure 31: Natural vegetation to the north of the river in a fair condition where grazing is the main activity.

Figure 32: Old orchards present near the river.

Figure 33: Example of drainage lines along the corridor.

Figure 34: Riparian vegetation to the north in a fair condition.

Figure 35: Vegetation at the proposed Sesekane sub modified – old cultivation and orchards.

The natural vegetation to the Lenyenye (66kV) substation neat the Nkowankowa/Letsitele Valley road is modified as a result of grazing, cultivation and the recent informal settlements in the area. The streams are considered as sensitive and no vehicle must cross it during construction. At the Leneyenye (66kV) sub, the corridor swings east towards the R36.

At the junction of the R36 and the Nkowankowa/Letsitele Valley road the proposed corridor swings to the north, cutting to the east of the road and past the new low cost housing development to the industrial park to the east.

The natural vegetation for most of this sector is severely modified due to the housing development and clearing of vegetion (Figure 36 and 37).

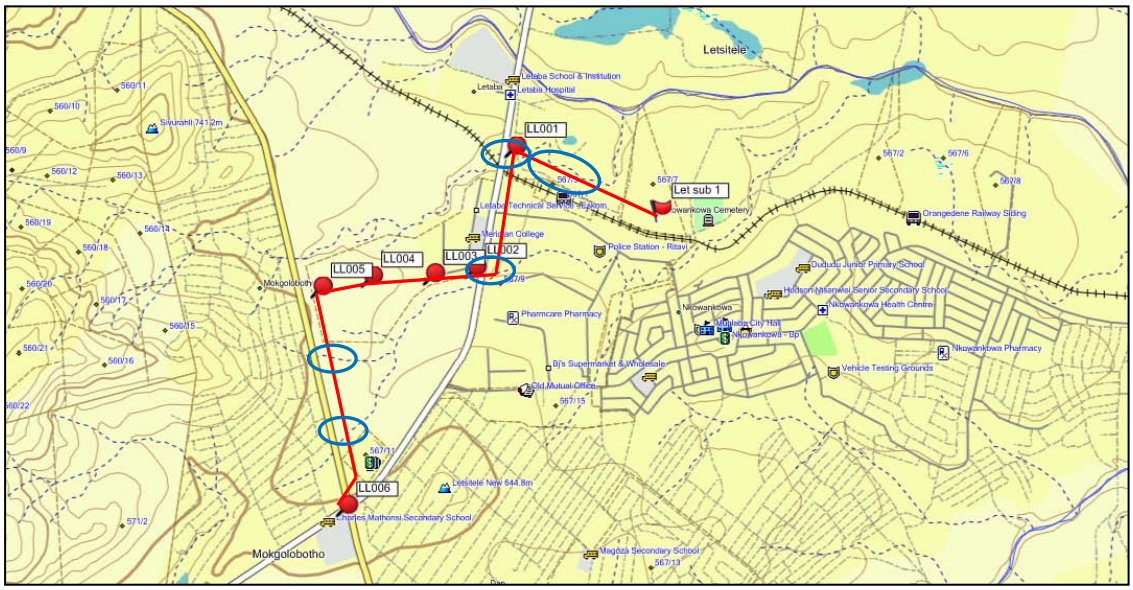


Figure 36: View of the last sector of the power line (Alternative 1) to the Letaba substation.

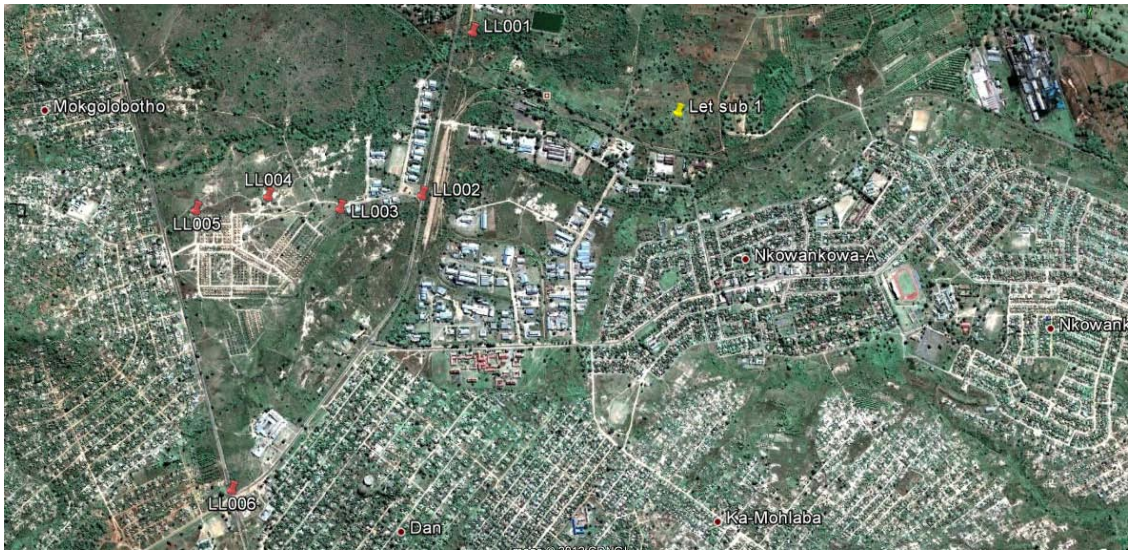


Figure 37: Aerial view of the last sector.

To the east of the R36 the natural vegetation is modified and it crosses a small stream. The power line can be placed to the east of the road and this can be used as access during construction. No vehicles must drive through the stream during construction. To the north of the new low costs housing development, the power line turns east. The natural vegetation is modified and *Peltophorum africanum, Bauhinia galpinii, Piliostigma thonningii* and *Terminalia sericea* are present. Nearer to the stream north of the corridor a few large *Ficus spp* are present. The corridor has some areas where sand mining left deep exposed areas and erosion is a problem. Dumping of all types of refuse was observed. To the south of the industrial area, the corridor passes between the factories and the small drainage line. The pylons may impact of the integrity of the trees along the stream, as it is a very narrow corridor. At the tar road, the power line swings to the north towards the Letaba substation. The vegetation along this last section is severely modified. The impact of the power line is this sector is very small (Figure 38 – 48).

Figure 38: View towards the Nkowankowa/Letsitele Valley and R36 crossing (along the R36).

Figure 39: Modified vegetation in the corridor next to the R36.

Figure 40: Impacts near the new low cost settlement.

Figure 41: Proposed corridor north of the settlement.

Figure 42: Dumping of refuse around the settlement.

Figure 43: Erosion in areas where sand mining was done.

Figure 44: Open area between the settlement and the industrial park.

Figure 45: Some vegetation in the corridor between the stream and industrial sites.

Figure 46: Stream crossing the tar road at the industrial park.

Figure 47: Clearing of all vegetation east of the tar road – future developments planned.

Figure 48: Corridor towards the Letaba substation modified – part of industrial and residential area.

The discussion for the Letaba substation site is in the Letaba/Tarentaalrand report.

## Alternative 2

This proposed corridor follows a route to the northeast from the Lenyenye substation, before crossing the R36. At Petanenge, the power line turns north towards the Letaba substation (Figure 49).

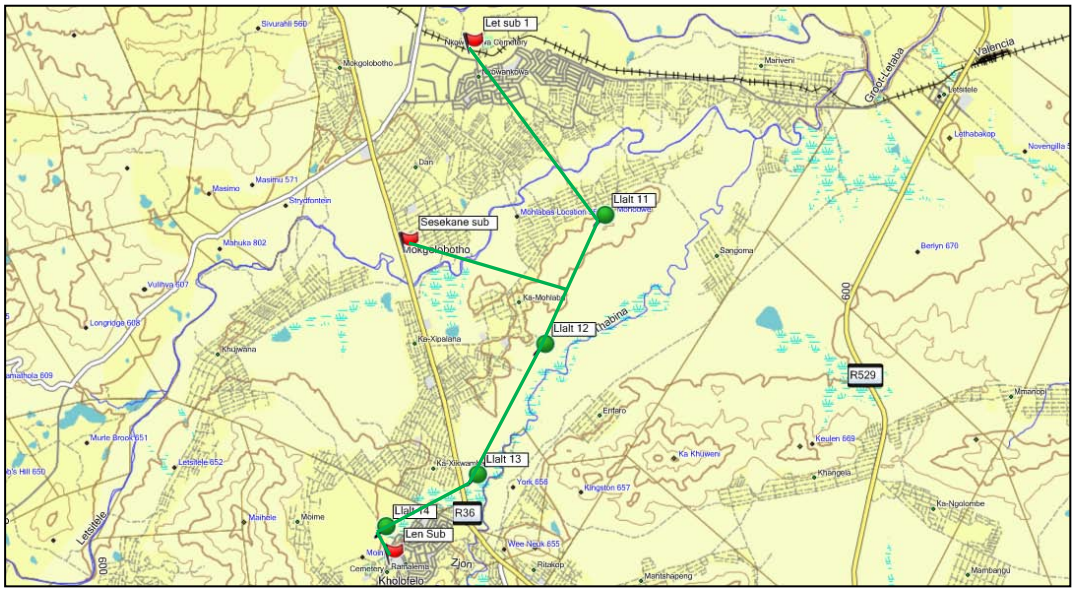


Figure 49: General route for Alternative 2 for the Lenyenye/Letaba power line.

The first sector of this route (Alternative 2) exits the Lenyenye substation to the north (similar to Alternative 1) and to the north of the Lenyenye River turns northeast towards the R36. After crossing the road, it follows the river (Figure 50 and 51).

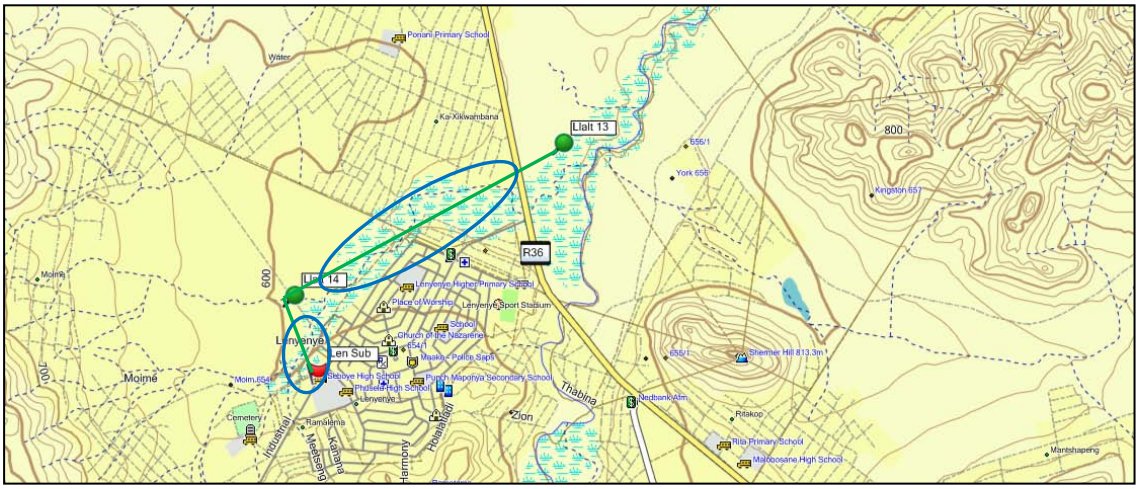


Figure 50: First sector of Alternative 2.

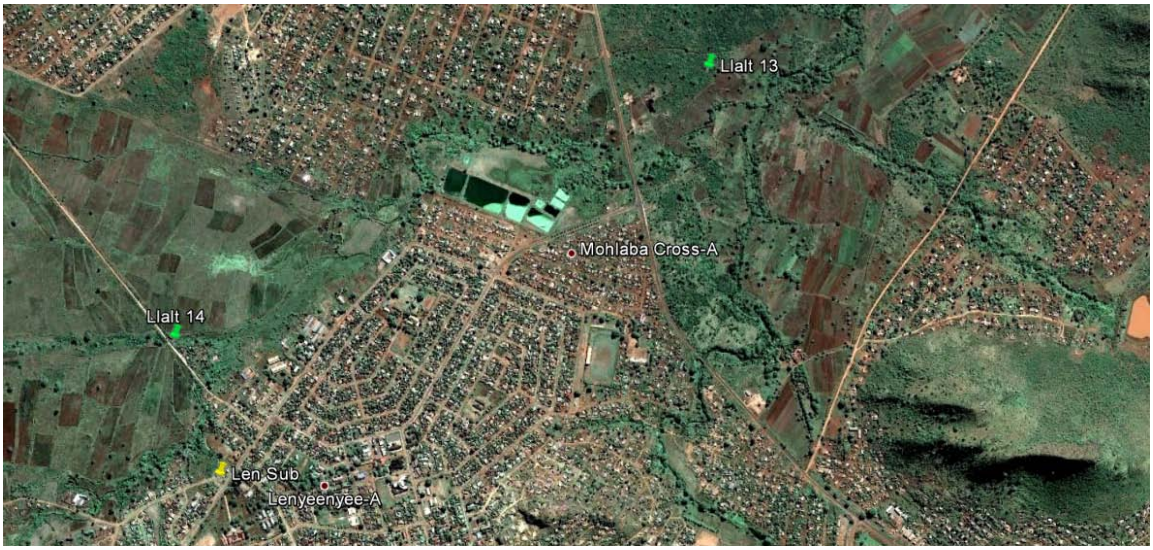


Figure 51: Aerial view of the first sector for Alternative 2.

At the Moime Stream, the route swings to the east. The natural vegetation is severely modified and the land use is dominated by agricultural activities – mainly cultivation of cash crops, with some grazing also taking place. The point where the corridor passes between Lenyenye and Ka-Xikwanbana is dominated by the Lenyenye River and it will be difficult to place the pylons outside the 50m restriction zone from the stream (Figure 49 and 50). To the east of the R36, a similar situation is encountered. The available land for the pylons is limited and it may encroach into the 50m buffer zone from the Lenyenye River (Figure 52 – 55).

Figure 52: to the north of the Lenyenye River, the corridor swings east, following the river course.

Figure 53: Dense vegetation is encountered along the river course – many exotics species present.

Figure 54: East of the R36 the vegetation along the river course is dense.

Figure 55: Some agricultural activities along the river course having a profound impact on the natural vegetation.

To the east of the R36, the corridor follows a route with no current access roads and the natural vegetation is in a fair to good condition. The corridor also crosses a low ridge, which will have a further negative impact on the landscape (Figure 56 and 57). The trees in the area include *Sclerocarya birrea, Breonadia salicina, Philenoptera violacea, Piliostigma thonningii, Diospyros mespiliformis, Erythrina lysistemon, Peltophorum africanum, Ficus sycomorus, F. sur, Gymnosporia glaucophylla, G. senegalensis, Terminalia sericea, Combretum collinum, C. apiculatum, Acacia galpinii, A. sieberiana, A. caffra, Bauhinia galpinii, Euclea spp., Ziziphus mucronata, Searsia pyroides, Kiggelaria africana, Carissa bispinosa, Dichrostachys cinerea* and exotics such as *Caesalpinia decapetala, Lantana camara* and *Melia azedarach*.

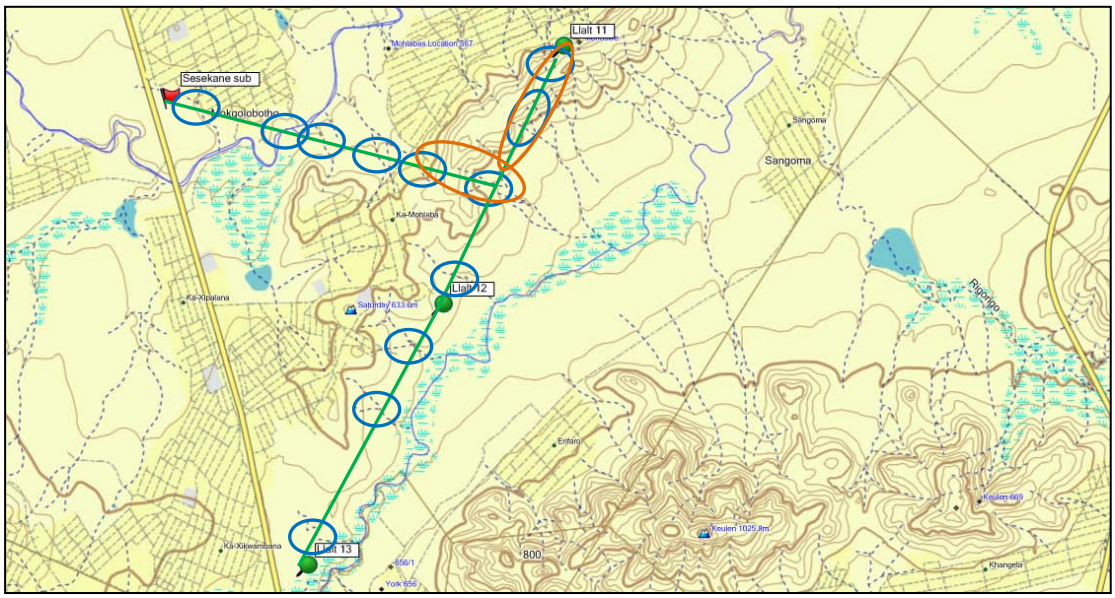


Figure 56: Second sector (Alternative 2) with many stream crossing (blue) and koppies (brown).

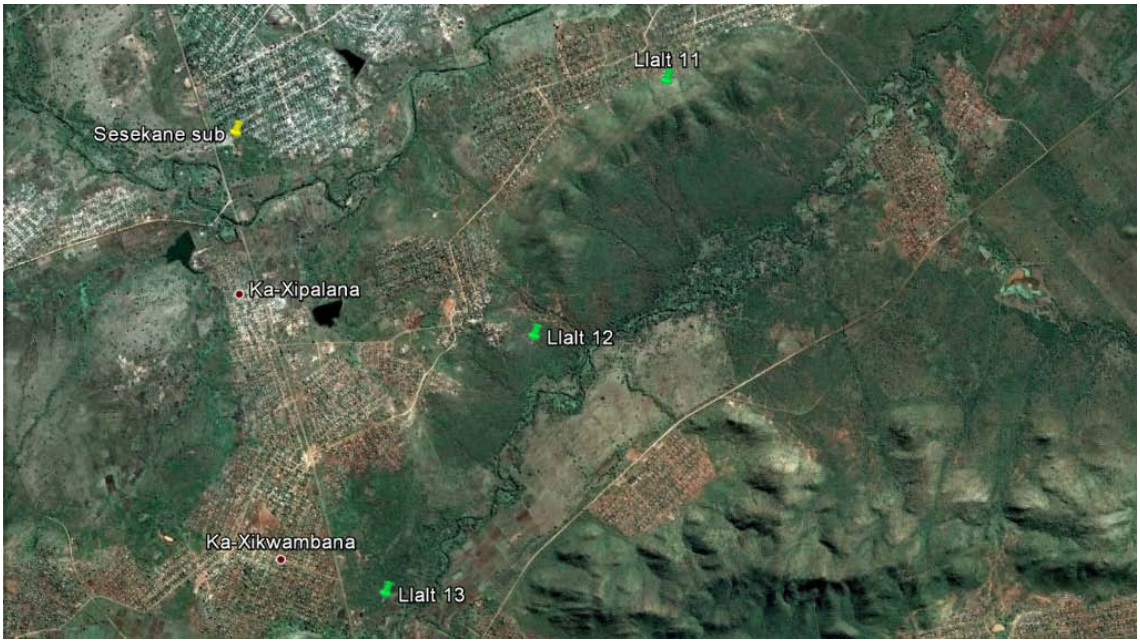


Figure 57: Aerial view of the sector indicating the many streams and koppies along the corridor.

The streams are sensitive areas and are considered as refuge areas for all biota, as many use it as migration routes between different areas it utilise. The same can be said from the koppies. As there are no roads, access is not possible and clearing during construction will have a very negative impact. This will also increase access for illegal wood collection and hunting by surrounding communities. The T-off line to the Sesekane substation crosses streams and areas with fairly good natural vegetation (Figure 55 and 56). Again, no access roads will result in the clearance of large quantities of vegetation during construction (Figure 58 – 61).

Figure 58: Natural vegetation in a fair to good condition.

Figure 59: Undulated landscape – grazing and wood collection observed.

Figure 60: Signs of old cultivated areas currently used for grazing present.

Figure 61: Some impacts in the lower lying areas present.

The last sector of the route swings to the northwest and cut through Mokgolobotho to Nkowankowa and to the Letaba substation. The route cuts through the residential areas and most of the natural vegetation is totally modified. A few drainage lines are present and the pylons must be placed outside of these areas. The pylons must be placed outside the 1:100 year flood line of the Letsitele River. Large trees are scares and include many exotic invasive, yet a few large *Sclerocarya birrea*. Permits for cutting and trimming are needed, even if the trees are in the residential area (Figure 62 – 65).

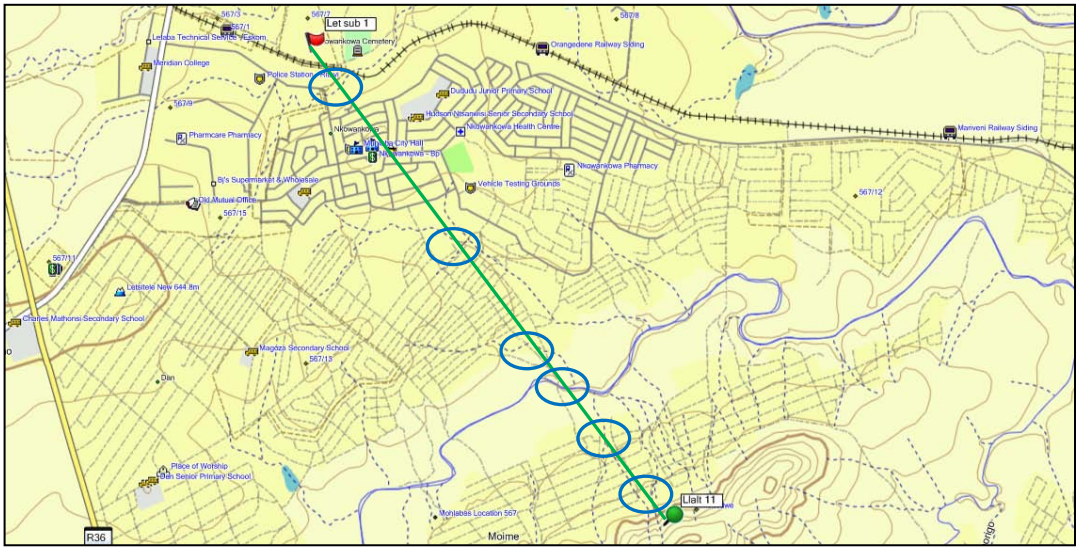


Figure 62: Last sector of the Lenyenye/Letaba power line (Alternative 2) – stream crossings circled in blue.


Figure 63: Last sector, Alternative 2, showing the crossing over the Letsitele River and some drainage lines in the residential areas.

Figure 64: Example of river/stream crossing.

Figure 65: Example of narrow corridor in the residential areas.

The only animal activity was related to the spoor and droppings of *Sylvicarpa grimmia* and *Lepus saxatilis* and the few burrows and spoor of small rodents.

## Summary

- Two alternative corridors for the new power line between the existing Lenyenye substation and the proposed new Letaba substation were investigated.
  Alternative 1:
- The corridor investigated had a vegetation cover in a “poor state” with impacts related to grazing, cultivation, wood collection, residential developments, industrial areas, sand mining, refuse dumping and other infrastructure development. The roads, residential areas and existing infrastructure have an impact in the area.
- From an ecological perspective, the option is viable, simply because of the close proximity to existing roads and impacts – lower need to clear large quantities of natural vegetation.
- The following protected tree species were seen on the site: *Breonadia salicina, Philenoptera violacea* and *Sclerocarya birrea*. The presence or absence of *Combretum imberbe* along the final route must be confirmed. A “walk down” inspection must be carried out once the final servitude corridor is known. During the process, all protected trees must be marked (GPS) and permits for cutting and trimming must be applied for, before any clearing of vegetation can take place.
- Sixteen red book data plant species is recorded for the site. The species listed (Addendum 3) occur in habitats not present along the corridor, as many are associated with the mountains and escarp to the south and southeast of the study area.
- Although some rare mammals can occur in the area (suitable habitat), no records on the property is found.
- River and stream crossing was found along the corridor. Limited traffic during construction must be allowed.
- With regard to biodiversity patterns, little if any impacts will occur.
    - The vegetation type occurs over a very large area and the narrow corridor for the power line will have no large-scale negative impact on it.
    - No red data plant species occur, apart from the protected tree species – no impact (High confidence).

- River, stream and drainage lines occur. If activities are limited to the servitude as access road, impacts will be low (high confidence).
- Various alien plant infestations were observed in the study or in the near vicinity. Clearing of soil can always lead to some infestations and the change of that happening is high. It is suggested that the "maintenance plan" of the site must include regular inspections to ensure no alien or exotic plants establish itself on site. The adjacent towns are a source of alien invasive plants and care must be taken to control it.
- Currently the site is in a poor condition and historic land use is observed. Apart from roads and the existing infrastructure, the grazing, cultivation, orchards, new town and industrial developments, wood collection and erosion contribute to landscape changes. Some overgrazing occurred on or near the site and this resulted in some encroachment in some areas.
- The activity (construction of the power line) will have no real impact on biodiversity processes. The only possible impact can be oil or fuel spillages that can occur during construction or the installation and maintenance of the transformers. It is always suggested that fuel and oil must not be stored on site during the construction phase and that containment dams or berms are constructed around transformers. In addition, a clear plan how to manage accidental spills must be included in the EMP for the site.
- This development won't have a negative impact on the region with regard to plants, plant communities and water courses – when looking at it in a regional perspective.

Alternative 2:

- The corridor investigated had a vegetation cover in a "poor to fair state" with impacts related to grazing, cultivation, wood collection, residential developments, industrial areas, refuse dumping and other infrastructure development. The roads, residential areas and existing infrastructure have an impact in the area.

- From an ecological perspective, the option is not viable, simply because of the lack of access and the area between the Thabina and Letsitele Rivers (low koppies) – will increase the need to clear large quantities of natural vegetation.
- The following protected tree species were seen on the site: *Breonadia salicina, Philenoptera violacea* and *Sclerocarya birrea*. The presence or absence of *Combretum imberbe* along the final route must be confirmed. A "walk down" inspection must be carried out once the final servitude corridor is known. During the process, all protected trees must be marked (GPS) and permits for cutting and trimming must be applied for, before any clearing of vegetation can take place.
- Sixteen red book data plant species is recorded for the site. The species listed (Addendum 3) occur in habitats not present along the corridor, as many are associated with the mountains and escarp to the south and southeast of the study area.
- Although some rare mammals can occur in the area (suitable habitat), no records on the property is found.
- River and stream crossing was found along the corridor. Limited traffic during construction must be allowed.
- With regard to biodiversity patterns, little if any impacts will occur.
    - The vegetation type occurs over a very large area and the narrow corridor for the power line will have no large-scale negative impact on it.
    - No red data plant species occur, apart from the protected tree species – no impact (High confidence).
    - River, stream and drainage lines occur. If activities are limited to the servitude as access road, impacts will be low (high confidence).
    - Various alien plant infestations were observed in the study or in the near vicinity. Clearing of soil can always lead to some infestations and the change of that happening is high. It is suggested that the "maintenance plan" of the site must include regular inspections to ensure no alien or exotic plants establish itself on site. The adjacent towns are a source of alien invasive plants and care must be taken to control it.
    - Currently the site is in a poor condition and historic land use is observed. Apart from roads and the existing infrastructure, the grazing, cultivation,

orchards, new town and industrial developments, wood collection and erosion contribute to landscape changes. Some overgrazing occurred on or near the site and this resulted in some encroachment in some areas.

- The activity (construction of the power line) will have no real impact on biodiversity processes. The only possible impact can be oil or fuel spillages that can occur during construction or the installation and maintenance of the transformers. It is always suggested that fuel and oil must not be stored on site during the construction phase and that containment dams or berms are constructed around transformers. In addition, a clear plan how to manage accidental spills must be included in the EMP for the site.

This development won't have a negative impact on the region with regard to plants, plant communities and water courses – when looking at it in a regional perspective.

Addendum 1 is a summary of the potential impacts related to the project (construction of the power line) and some mitigating and management suggestions are listed in the table.

Addendum 2 is a summary of mammals that historically occurred in the area. It also indicates habitat availability and possibility of occurrence on the site.

From the SANBI database, 2 species is listed as red data species, none likely to occur as habitat are present (Addendum 3).

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Addendum 1: Impacts and mitigating recommendations.

| Letaba/Lenyenye project | | |
|---|---|---|
| **Theme** | Natural environment | |
| | | |
| **Nature of issue** | Erosion | |
| **Stage** | Construction and maintenance | Possibility for erosion during construction possible due to soil types. |
| **Extent of impact** | Site, local and region | The impact will be moderate on-site, but limited to low on a regional scale. Silt will have a negative impact in streams and rivers, but will be very high for this project if not managed. |
| **Duration of impact** | Immediate | If not addressed on constant basis, permanent damage is a reality. |
| **Intensity** | Moderate | If not properly managed as part of operational plan, it will be high. |
| **Probability of occurrence** | High | Must be managed on daily basis. |
| **Status of the impact** | Project: negative<br>Environment: negative | If well managed, can be neutral for both. |
| **Cumulative impact** | Moderate to high. | If no maintenance is done, the impact will have a compounding impact on the environment. |
| **Level of significance** | Very low if controlled. | Will be very moderate-high if not managed. |
| **Mitigation measures** | • Limited traffic during construction.<br>• Constant rehabilitation during construction.<br>• Must have maintenance strategy as part of EMP.<br>• Use existing road (servitude) as access road | |
| **Level of significance after mitigation** | Low. | |
| **EMP requirements** | • No surface storm water generated as a result of the development may be directed directly into any natural drainage system or wetland.<br>• A surface runoff and storm water management plan, indicating the management of all surface runoff generated as a result of the development (during | |

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| | both the construction and operational phases) prior to entering any natural drainage system or wetland, must be submitted (e.g. storm water and flood retention ponds).<br>• No activity such as temporary housing, temporary ablution, disturbance of natural habitat, storing of equipment or any other use of the buffer/flood zone whatsoever, may be permitted during the construction phase.<br>• An on-site ecological management plan must be implemented for drainage lines including management recommendations as well as potential rehabilitation of disturbed areas. | |
| | | |
| **Nature of issue** | Construction – material, by products and construction sites. | This includes accommodation, storing of material and ablution facilities for all workers during construction. It is recommended that no workers stay on the construction sites at any time. No storing of hazardous material on site (oil, fuel) |
| **Stage** | Construction and maintenance | Must have strict environmental guidelines and management plan in place before clearing and construction can commence. |
| **Extent of impact** | Site, local and region | Can have a medium impact on site, related to pollution, but the impact in the region will be low. |
| **Duration of impact** | Immediate | If not addressed on constant basis, permanent damage is a reality. |
| **Intensity** | Low | If not properly managed as part of operational plan, it will be high. |
| **Probability of occurrence** | High | Must be managed on daily basis. |
| **Status of the impact** | Project: negative<br>Environment: negative | If well managed, can be neutral for both. |
| **Cumulative impact** | Marginal. | If no maintenance is done, the impact will have a compounding impact on the environment. |
| **Level of significance** | Low if controlled. | Will be very high if not managed. |
| **Mitigation measures** | • Proper ablution facilities on site. | This refers to storage of material, oil and fuel spills, ablution |

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| | • Constant management during construction.<br>• Must have rehabilitation strategy as part of EMP. | facilities and rehabilitation of construction sites at the completion of the project. |
| **Level of significance after mitigation** | Low. | Will have to form part of the EMP to ensure low impact/significance at completion. |
| **EMP requirements** | • During the construction phase, workers must be limited to areas under construction and access to neighbouring undeveloped areas must be strictly regulated.<br>• Construction should be limited to the daylight hours preventing disturbances to the nocturnal activities of certain species.<br>• Alien vegetation removal will continue through all phases of the development especially in the open spaces.<br>• All temporary stockpile areas - litter and rubble must be removed on completion of construction. All dumped material must be taken to an approved dump site in the area.<br>• Soil stockpiling areas and storage facilities must follow environmentally sensitive practices and be situated a sufficient distance away from drainage areas or drainage line – preferably off-site.<br>• The careful position of soil piles, and runoff control, during all phases of development, and planting of some vegetative cover after completion (indigenous groundcover, grasses etc.) will limit the extent of erosion occurring on the site. | |
| | | |
| **Nature of issue** | Pollution | Includes oil and fuel spills, erosion, storage of by-products and ablution facilities. |
| **Stage** | Construction and maintenance | Must have a strict environmental guidelines and management plan in place before clearing and construction can commence. |
| **Extent of impact** | Site, local and region | Can be severe if not well managed. Must be done on a daily |

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| | | basis (part of the EMP). |
| **Duration of impact** | Immediate | If not addressed on constant basis, permanent damage is a reality. Water pollution can be a severe problem. |
| **Intensity** | Low | If not properly managed as part of operational plan, it will be high. |
| **Probability of occurrence** | High | Must be managed on daily basis. |
| **Status of the impact** | Project: negative<br>Environment: negative | If well managed, can be neutral for both. |
| **Cumulative impact** | Marginal - compounding | If no maintenance is done, the impact will have a compounding impact on the environment. |
| **Level of significance** | Low if controlled. | Will be very high if not managed. |
| **Mitigation measures** | • Proper ablution facilities on site.<br>• Constant rehabilitation of erosion problems.<br>• Berms to contain spills.<br>• Proper storage facilities of construction materials.<br>• Waste management is very important. Proper storage and removal strategy must be in place.<br>• Must have rehabilitation strategy as part of EMP. | This refers to storage of material, oil and fuel spills, ablution facilities and rehabilitation of construction sites at the completion of the project. Due to the nature of the slopes and soils, water pollution can be a problem if not properly managed. |
| **Level of significance after mitigation** | Low. | Will have to form part of the EMP to ensure low impact/significance at completion. |
| **EMP requirements** | • Proper strategy to prevent erosion – see above.<br>• Berms and containment measures for fuels and oils, also around transformers to prevent spills during accidents and maintenance.<br>• Cleanup plan/strategy if spills occur.<br>• Proper facilities (ablution) to ensure no sewerage spills into streams and rivers.<br>• Proper storage of material during construction and cleanup after the construction is completed.<br>• Proper strategy to remove and dispose of oil from transformers. | |
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| **Nature of issue** | Alien vegetation | Includes all exposed areas – substation sites and servitudes for the power lines. |
| **Stage** | Construction and maintenance | Must have a strict environmental guidelines and management plan in place before clearing and construction can commence. |
| **Extent of impact** | Site, local and region | Can be severe if not well managed. Must be done on a daily basis (part of the EMP). |
| **Duration of impact** | Immediate | If not addressed on constant basis, permanent damage is a reality. Many exotics are present and can invade exposed areas during and after construction. |
| **Intensity** | Low | If not properly managed as part of operational plan, it will be high. |
| **Probability of occurrence** | High | Must be managed on regular basis. |
| **Status of the impact** | Project: negative<br>Environment: negative | If well managed, can be neutral for both. |
| **Cumulative impact** | Marginal - compounding | If no maintenance is done, the impact will have a compounding impact on the environment. |
| **Level of significance** | Low if controlled. | Will be high if not managed. |
| **Mitigation measures** | • Need to ensure all alien plants on construction sites are removed.<br>• Must clear alien vegetation on a regular basis.<br>• Must plant/re-seed with indigenous grasses as part of EMP.<br>• Disturbed areas around the construction sites should be re-vegetated.<br>• Exposed areas should be rehabilitated.<br>• Must have rehabilitation strategy as part of EMP. | |
| **Level of significance after mitigation** | Low. | Will have to form part of the EMP to ensure low impact/significance at completion. |
| **EMP requirements** | • Proper strategy to prevent invasive alien plants from establishing and this will further prevent pollution and erosion – see above.<br>• Regular maintenance and inspections and removal of alien plants. | |

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| | • Possible to link with Working for Water in this regard. | |
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| **Nature of issue** | Wood collection and illegal hunting | Includes all areas around the construction site and adjacent properties. Trees present as well as small game. |
| **Stage** | Construction and maintenance | Must have a strict environmental guidelines and management plan in place. |
| **Extent of impact** | Site, local and region | Can be severe if not well managed. Must be done on a daily basis (part of the EMP). |
| **Duration of impact** | Immediate | If not addressed on constant basis, permanent damage is a reality. Many exotics are present and can invade exposed areas during and after construction. |
| **Intensity** | Moderate | If not properly managed as part of operational plan, it will be very high. |
| **Probability of occurrence** | High | Must be managed on regular basis. |
| **Status of the impact** | Project: negative<br>Environment: negative | If well managed, can be neutral for both. |
| **Cumulative impact** | Marginal - compounding | If no maintenance is done, the impact will have a compounding impact on the environment. |
| **Level of significance** | Low-medium if controlled. | Will be very high if not managed. |
| **Mitigation measures** | • Must ensure no wood collection takes place (by construction workers for cooking).<br>• Although little game animals are present, care must be taken that no illegal hunting takes place – mostly by snares.<br>• The construction teams must be informed – strategy must form part of EMP. | |
| **Level of significance after mitigation** | Low. | Will have to form part of the EMP to ensure low impact/significance at completion. |
| **EMP requirements** | • Proper strategy to prevent hunting and wood collection.<br>• Regular inspections. | |
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| **Nature of issue** | Removal on natural vegetation | Includes the servitude for the power line. |

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| **Stage** | Construction and maintenance | Must have a strict environmental guidelines and management plan in place before clearing and construction can commence. |
| **Extent of impact** | Site, local and region | Limited removal of vegetation for the servitude of the power line is needed. The impact on site will be low to moderate, with very low impact on local and regional level. Can be severe if not well managed. Must be monitored on a daily basis (part of the EMP) to ensure no illegal removing or cutting occur. Use existing roads for access where possible. Acquire permits for cutting and trimming of protected trees. |
| **Duration of impact** | Permanent | The removal of plants from the corridor for the power line will have permanent impact. |
| **Intensity** | Low/moderate | Although the duration of the impact is of a permanent nature, the intensity is low on a local and regional scale. The immediate habitat surrounding the power line corridor is in a fair to good condition. The protection of the environment is the function of local and provincial authorities and this will be important. The construction of the power line will have negligible impacts if well managed. |
| **Probability of occurrence** | High | Again, the impact will be confined to the site of the substation. In the larger environment, the probability will be low. |
| **Status of the impact** | Project: negative<br>Environment: neutral | If well managed, can be neutral for both. |
| **Cumulative impact** | Marginal | If maintenance is poor, the impact will have a compounding result on the environment. One refers to illegal or unnecessary cutting of trees on the power line servitude during routine clearing of vegetation. This must be well managed by all role players (Eskom and conservation authorities). |
| **Level of significance** | Low-medium if controlled. | Will be very high if not managed. |
| **Mitigation measures** | • Limited plants need to be removed when clearing the servitude for the new power line. Clear guidelines and proper plans must be given to the contractor. Daily inspections are needed to prevent problems.<br>• Must clear alien vegetation on a regular basis. | A clear plan must be in place before the project commence. The contractor must clearly understand where to clear. The area should be marked. All trees to be cut must be marked. Trees to be trimmed should be marked and the contractor should understand what branches must be cut/trimmed. A |

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| | • Exposed areas should be rehabilitated with a grass mix that blends in with the surrounding vegetation. The grass mix should consist of indigenous grasses adapted to the local environmental conditions. The grass seeds should a variety of grass species including several pioneer species.<br>• Must have rehabilitation strategy as part of EMP. | policy should be in place to penalise the contractor. Eskom and conservation services should have an official on site to ensure no problems occur. |
| **Level of significance after mitigation** | Low. | Will have to form part of the EMP to ensure low impact/significance at completion. |
| **EMP requirements** | • Proper strategy to prevent invasive alien plants from establishing and this will further prevent pollution and erosion – see above.<br>• Regular maintenance and inspections and removal of alien plants.<br>• Possible to link with Working for Water in this regard. | |

Addendum 2: List of red data species and CITES species in Limpopo Province (LEDET State of the Environment Report, 2004). The probability of occurrence is obtained from Skinner and Chimimba (2005).

| Category | Common Name | Scientific Name | Does suitable habitat occur on site? (Yes/No) | Probability of the species occurring on site? (high/medium/low) |
|---|---|---|---|---|
| Critically Endangered | Black rhinoceros | *Diceros bicornis* | No | No |
| | Juliana's golden mole | *Neamblysomus julianae* | No | No |
| Endangered | African wild dog | *Lycaon pictus* | No | No |
| Vulnerable | African elephant | *Loxodonta africana* | No | No |
| | Gunning's golden mole | *Neamblysomus gunningi* | No | No |
| | Cheetah | *Acinonyx jubatus* | No | No |
| | Lion | *Panthera leo* | No | No |
| | Black-footed cat | *Felis nigripes* | No | No |
| Near Threatened | White rhinoceros | *Ceratotherium simum* | Yes | No |

| CITES Appendix | Common Name | Scientific Name | Does suitable habitat occur on site? (Yes/No) | Probability of the species occurring on site? (high/medium/low) |
|---|---|---|---|---|
| Appendix 1 | Black-footed cat | *Felis nigripes* | No | Very low |
| | Leopard | *Panthera pardus* | Yes | Very low |
| | Cheetah | *Acinonyx jubatus* | No | No |
| | Black rhinoceros | *Diceros bicornis* | No | No |
| Appendix 2 | African elephant | *Loxodonta africana* | No | No |
| | Chacma baboon | *Papio ursinus* | Yes | Low |
| | Vervet monkey | *Cercopithecus aethiops* | Yes | Medium |
| | Samango monkey | *Cercopithecus mitis* | No | No |
| | Greater galago | *Otolemur crassicaudatus* | No | No |
| | South African galago | *Galago moholi* | No | No |
| | Spotted-necked otter | *Lutra maculicollis* | No | No |
| | African clawless otter | *Aonyx capensis* | No | No |
| | Caracal | *Caracal caracal* | Yes | Very low |
| | Serval | *Leptailurus serval* | No | No |
| | African wild cat | *Felis sylvestris* | No | No |
| | Lion | *Panthera leo* | No | No |
| | Hippopothamus | *Hippopothamus amphibious* | No | No |
| | White rhinoceros | *Ceratotherium simum* | No | No |
| | Pangolin | *Manis temminckii* | No | No |

Addendum 3: List of Red data species from the ¼ degree square (SANBI, 2012).

| Family | *Genus and species* | Status | Habitat description | Probability of occurring on site |
|---|---|---|---|---|
| ANACARDIACEAE | *Searsia gracillima var. gracillima* | NT | Restricted to a small area to the northeast of Pretoria.<br>Rocky quartzitic outcrops in bushveld. | low |
| APOCYNACEAE | *Brachystelma minor* | NT | Wolkberg to Graskop.<br>Grassland, Shallow pockets of dolomite, tolerating both open and shady conditions. | low |
| APOCYNACEAE | *Mondia whitei* | EN | KwaZulu-Natal, Limpopo<br>Mainly swamp forest in South Africa and occasionally in riverine and coastal forest, further north it is found in Afromontane forest. It is currently restricted to lower elevations, although historically it was recorded in higher altitude midlands forest. | low |
| ASPHODELACEAE | *Aloe monotropa* | VU | Limpopo, Dublin Mine Kloof, southern Limpopo Province.<br>Occurs on steep, rocky slopes at the margins of closed woodland, 1000-1400 m. | low |
| ASPHODELACEAE | *Aloe thompsoniae* | Rare | Limpopo, Wolkberg Mountains<br>Montane mistbelt grasslands, rock crevices on steep cliffs, among large boulders, or in seepages or shallow soils at the edges of large exposed rock sheets. | low |
| CORNACEAE | *Curtisia dentata* | NT | Eastern Cape, Free State, KwaZulu-Natal, Limpopo, Mpumalanga<br>Evergreen forest from coast to 1800 m. | low |
| FABACEAE | *Argyrolobium muddii* | EN | Limpopo, Mpumalanga, Haenertsburg to Pilgrim's Rest.<br>Mistbelt Grassland. | low |
| HYACINTHACEAE | *Merwilla plumbea* | NT | KwaZulu-Natal, Mpumalanga<br>Montane mistbelt and Ngongoni grassland, rocky areas on steep, well drained slopes. 300-2500 m. | low |
| IRIDACEAE | *Hesperantha brevicaulis* | Rare | Eastern Mpumalanga Escarpment and the Wolkberg Mountains.<br>In damp moss between rock crevices on steep rocks and cliffs, around 1600 m. | low |
| LAURACEAE | *Ocotea bullata* | EN | Eastern Cape, KwaZulu-Natal, Limpopo, Mpumalanga<br>High, cool, evergreen Afromontane forests. | low |
| LAURACEAE | *Ocotea kenyensis* | VU | Eastern Cape, KwaZulu-Natal, Limpopo, Mpumalanga<br>Scarp and mistbelt forest. | low |
| ORCHIDACEAE | *Disa extinctoria* | NT | Limpopo, Mpumalanga<br>Crest of the escarpment in damp grassland and swamps, 1000-1300 m. | low |
| ROSACEAE | *Prunus africana* | VU | Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, North West<br>Evergreen forests near the coast, inland mistbelt forests and afromontane forests up to 2100 m. | low |
| SANTALACEAE | *Thesium gracilentum* | VU | Limpopo, Woodbush and Lekgalameetse.<br>Serpentine soils in northern escarpment bushveld. | low |

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| SCROPHULARIACEAE | *Nemesia zimbabwensis* | EN | Limpopo, Sekhukhuneland, Haenertsburg and Zimbabwe.<br>Associated with rocky outcrops, often on moist, rocky ledges in forest where they grow in pockets of sandy humus, 1800 m. | low |
| ZINGIBERACEAE | *Siphonochilus aethiopicus* | CR | Limpopo, Mpumalanga, Sporadically from the Letaba catchment in the Limpopo Lowveld to Swaziland. Extinct in KwaZulu-Natal. Widespread elsewhere in Africa.<br>Tall open or closed woodland, wooded grassland or bushveld. | low |