

4.1.5 Terrestrial Ecology

4.1.5.1 Flora

Information gathered from a desktop analysis and the site visit shows that there are various vegetation classifications that are prevalent within the study area. The vegetation units that are depicted within the study area are based on Mucina & Rutherford (2006) – Vegmap database, Low & Rebelo (1996) and Acocks (1988). Figure 13 depicts the Vegmap Classification.

Ecological Sensitivity

The bare rocky components of the landscape encompass the granite rocky outcrops, within the Legogote Bushveld and the Eastern Highveld Grassland units. The rocky outcrops provide suitable habitat to protected plants, small mammals and reptiles. The rocky outcrops function as islands within the landscape and are characterized by unique microclimates in which rare species thrive. They are therefore of High Ecological Function and of High Conservational Value for the biodiversity that they support.

The indigenous forests found within the Schoemanskloof Valley are mainly classified as the Northern Mistbelt Forest vegetation unit (Mucina & Rutherford, 2006). Indigenous Forests have a High Ecological Function because of their important role in water and soil conservation, nutrient cycling, providing oxygen sources and carbon sinks, and supporting large numbers of birds and insect assemblages.

The Mpumalanga Parks Board has identified key ecological corridors that are intrinsic to the maintenance of the biodiversity within the Mpumalanga Province. Figure 14 shows that these ecological corridors include river systems as they transport species over long distances from region to region. Simberloff *et al.* (2002) identifies the following additional reasons for the importance of ecological corridors:

- To provide movement corridors to increase and maintain gene flow between populations;
- To minimise demographic stochasticity¹,
- To stem inbreeding depression; and
- To fulfil an inherent need for movement.

The ecological sensitivity illustrated in Figure 14 shows the desktop analysis based on Vegmap (Mucina & Rutherford, 2006) and ecological corridors from the Mpumalanga Parks Board.

¹ A stochastic process is one whose behaviour is non-deterministic in that a state does not fully determine its next state (www.wikipedia.org).

4.1.5.2 Fauna

Distinct vegetation pockets and sensitive features exist within the study area and support a wide range of herpetofauna, mammals and invertebrates. Sensitive features mainly include aquatic systems (such as rivers, wetlands and rocky outcrops) within grassland vegetation systems and woodland vegetation systems.

4.1.5.3 Ecological Sensitivity

The bare rocky components of the landscape encompass the granite rocky outcrops, within the Legogote Bushveld and the Eastern Highveld Grassland units. The rocky outcrops provide suitable habitat to protected plants, small mammals and reptiles. The rocky outcrops function as islands within the landscape and are characterized by different microclimates in which rare species are more likely to occur. They are therefore of high ecological function and of high conservation value for the biodiversity that they support.

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The ecological sensitivity in Figure shows the desktop analysis based on Vegmap (Mucina & Rutherford, 2006) and ecological corridors from the Mpumalanga Parks Board.

4.1.5.4 Birds

Of the vegetation communities identified above, wetland areas and endorheic² pans (see Figure 11) are considered to be important breeding, roosting and foraging habitats for a number of Red Data listed bird species that are likely to occur in the area. Therefore, there have been three hotspot

² With no outlet for drainage

areas identified where impacts of the transmission lines could pose severe impacts if they are not properly managed (see Figure 15).

The majority of the Hendrina to Prairie portion of the transmission line is situated within the high-altitude Lydenburg Montane Grassland and upland seep zones. These vegetation communities provide an ideal habitat for three (3) crane species, i.e. *Anthropoides paradiseus* (Blue Crane), *Balearica regulorum* (Grey Crowned Crane) and *Grus carunculatus* (Wattled Crane).



Figure 11: An endorheic pan in the Belfast area

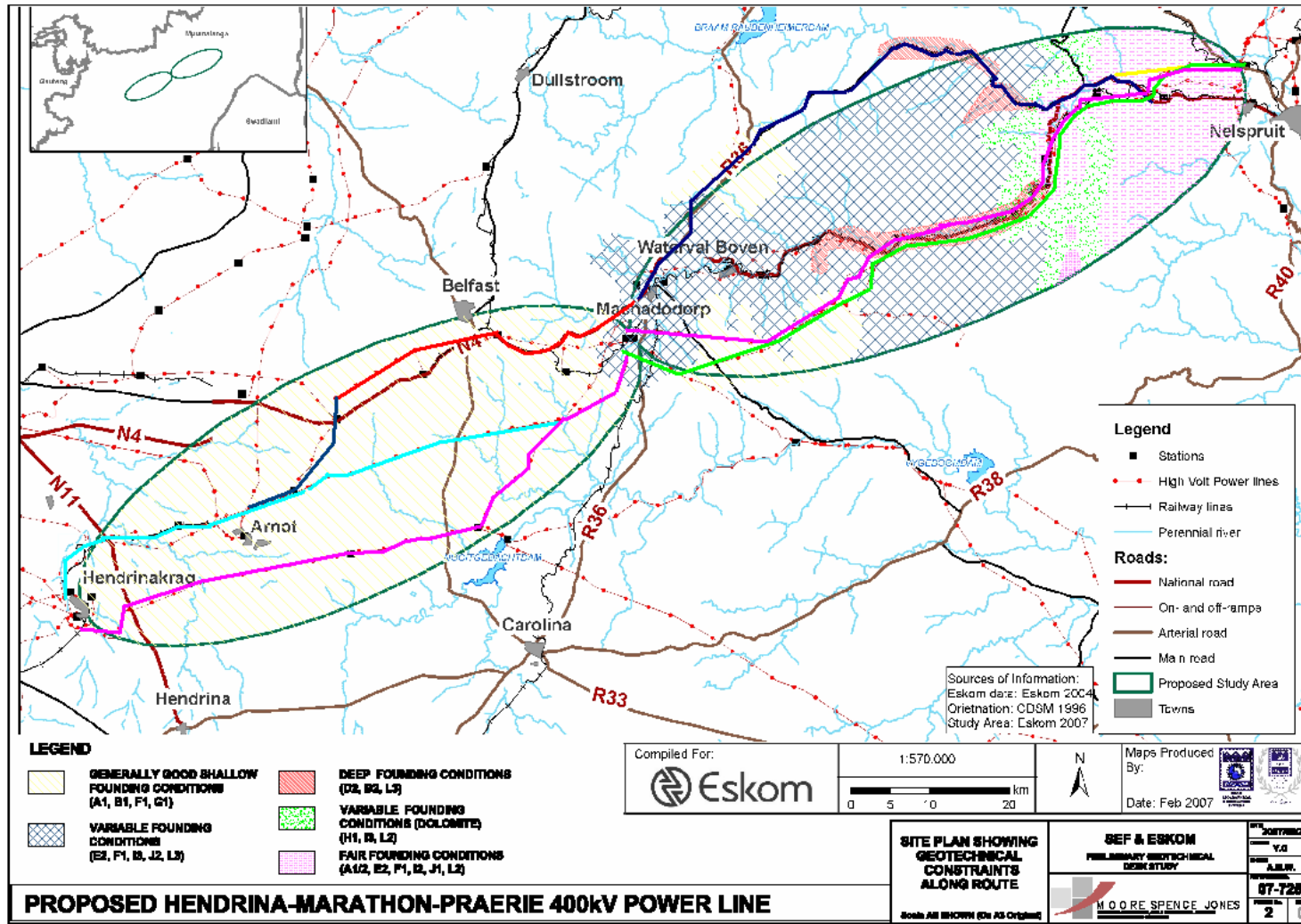


Figure 12: Geology of the study area (MSJ, 2007)

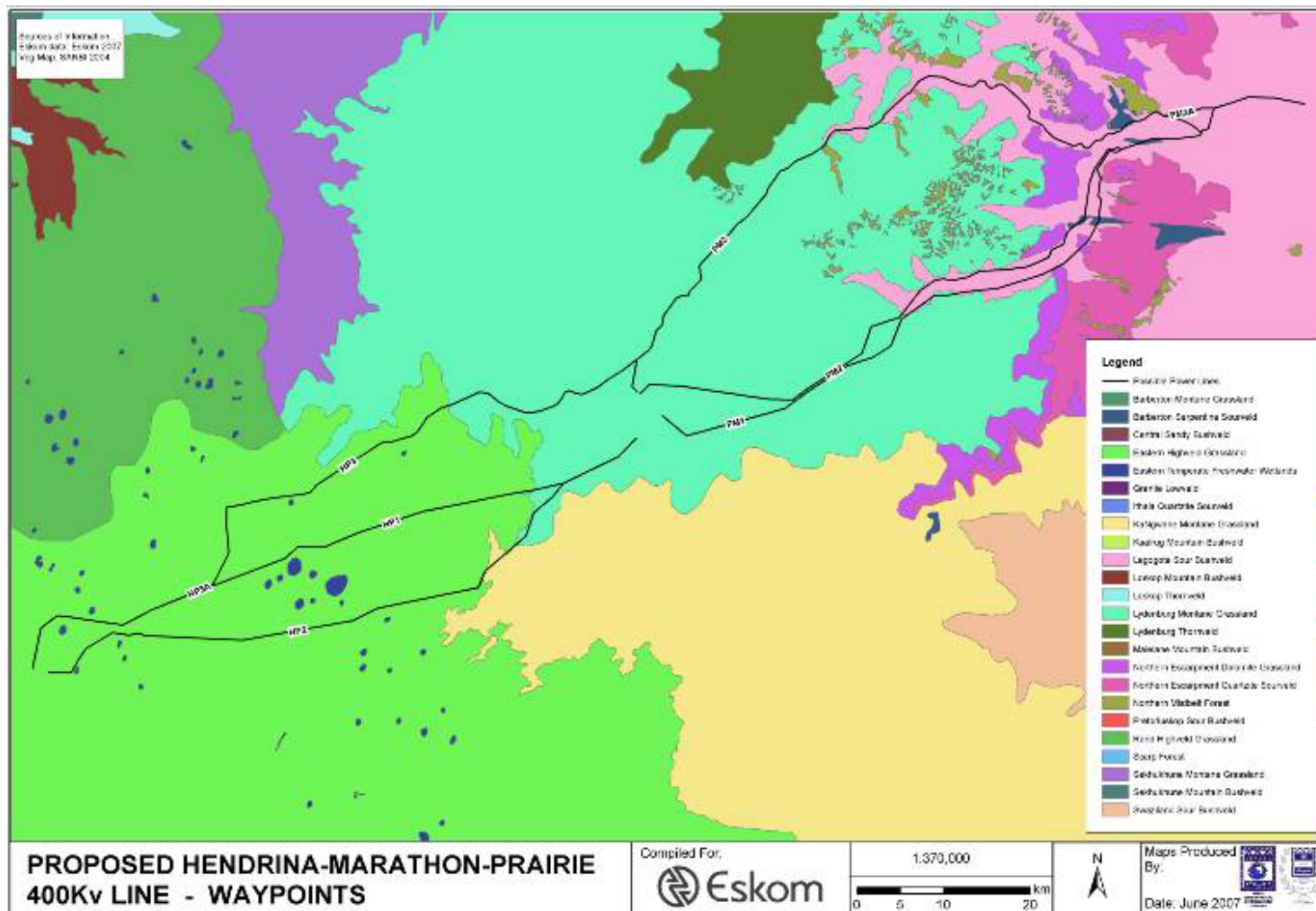


Figure 13: Flora classification with regards to Vegmap (Mucina & Rutherford, 2004)

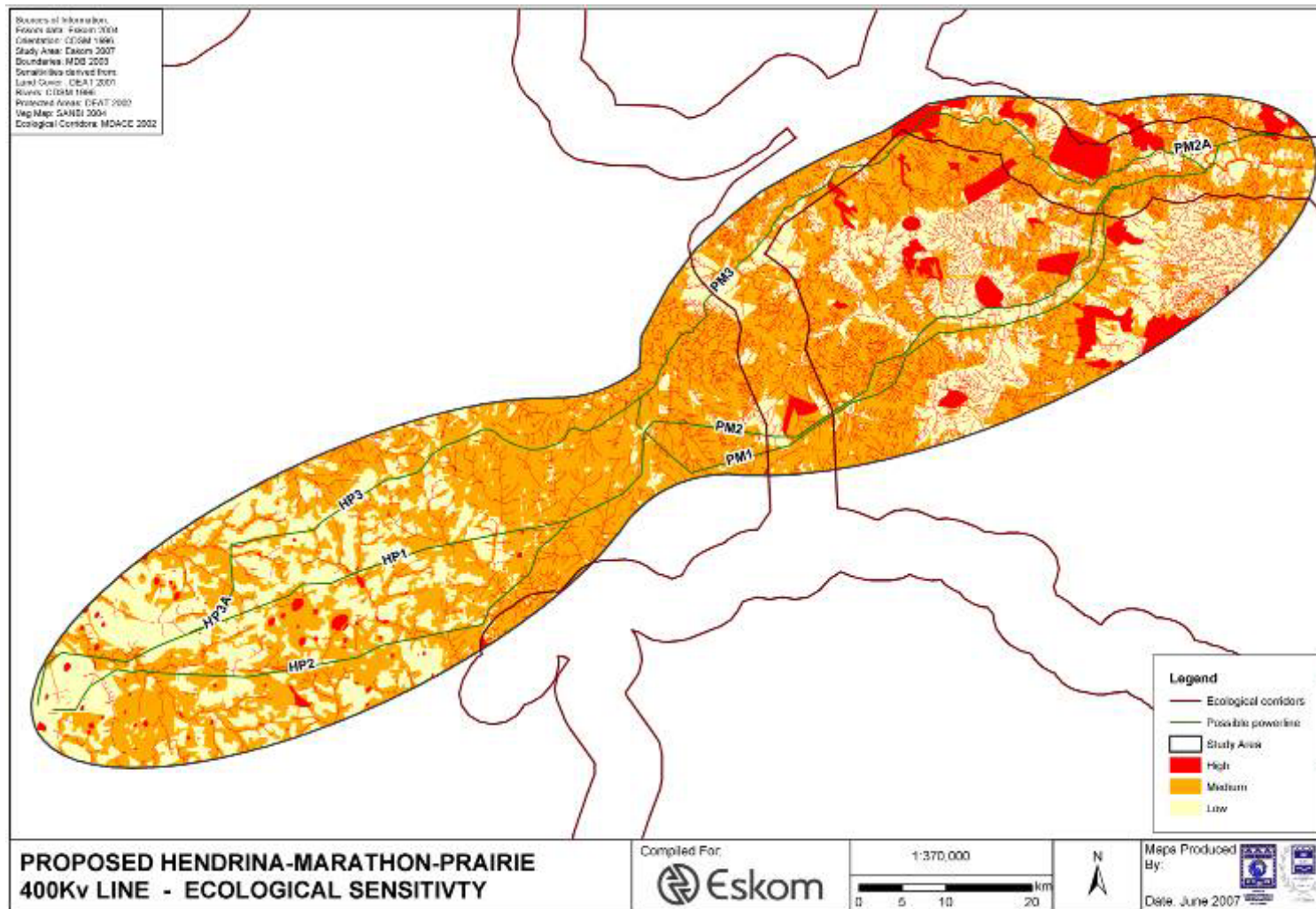


Figure 14: Ecological sensitivity of the study area

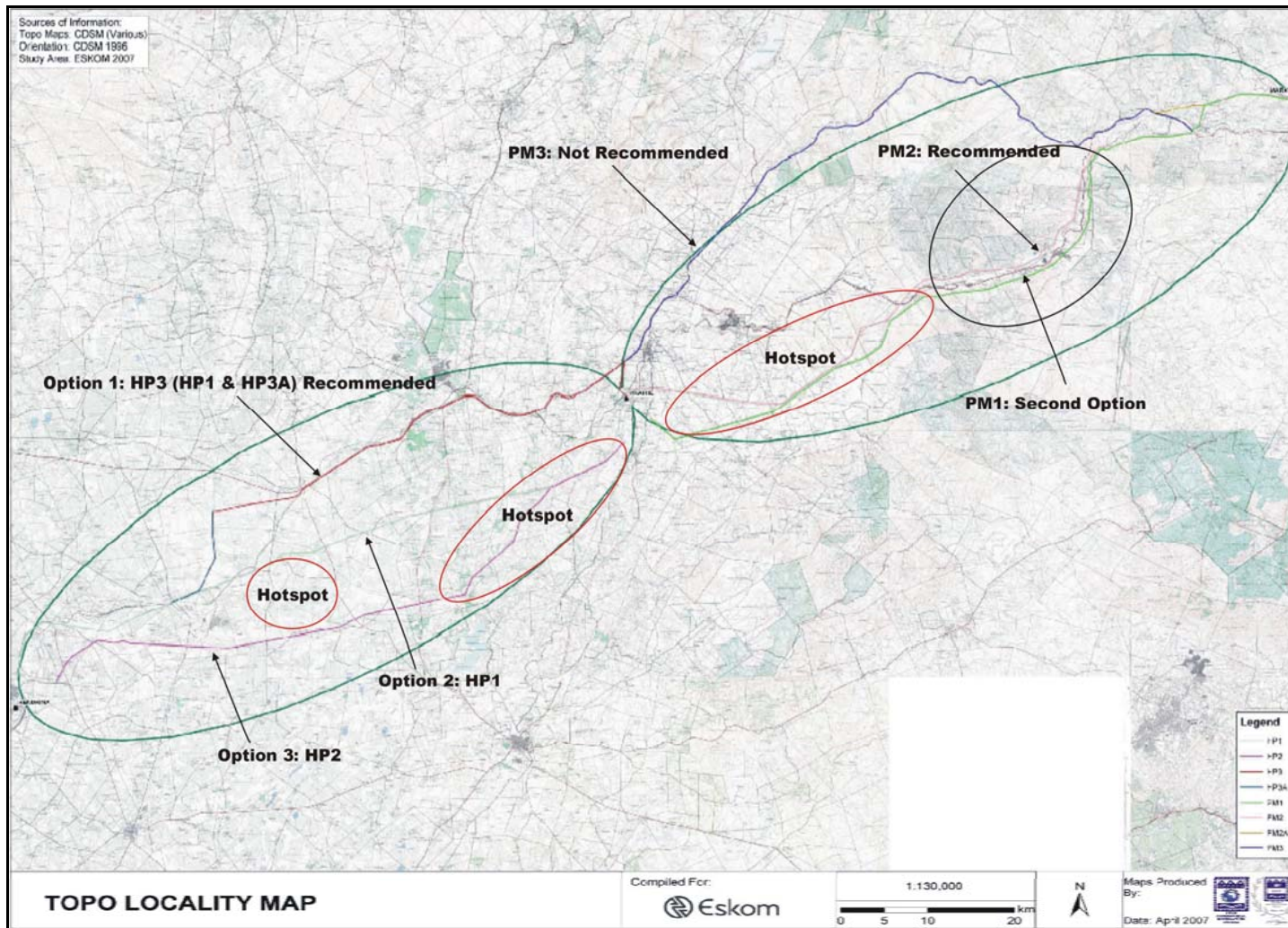


Figure 15: Bird hotspot areas identified

4.2 SOCIAL ENVIRONMENT

4.2.1 Visual environment

The transmission lines pose the biggest impact with regards to the visual aspect. The study area is characterised by the agricultural industry, forestry industry, mining and industry and the game farm industry. Hence, the landscape character is a dynamic concept within the study area. The infrastructure of the pylons / towers that support the transmission lines do not blend in with the natural environment as shown by the existing transmission lines in Plate 1.

4.2.2 Heritage Resources

There are many Iron Age sites of Heritage significance in the landscape of the study area, especially within the Grassland vegetation community along the Drakensberg escarpment that separates the Highveld from the Lowveld (Plate 9). Many of these resources are already affected by existing Eskom transmission lines.

The rock art found in the Lowveld is a threatened commodity as the paintings were done on granite surfaces. The art therefore fades over time and conservation methods will have to be adopted in order to preserve these resources.

According to van Schalkwyk (2007), the following archaeological artefacts are likely to occur within the study area:

- Tools dating to the Early Stone Age and Middle Stone Age historic times. These artefacts are considered to have a low significance as a result of its commonality.
- Rock shelters and caves located within suitable geological environments. The HIA (van Schalkwyk, 2007) indicates that not many sites are located within the study area.
- A large number of stone-walled archaeological sites dating to the Late Stone Age (i.e. c. AD 1640 – AD 1830's) [LSA] were identified within the study area. They were typically located on the Mpumalanga escarpment area. These sites are subdivided as follows:
 - Simple ruins which consist of an isolated circular enclosure; and
 - Complex ruins which consist of two or more contiguous circular or semi-circular enclosures.
- Van Schalkwyk (2007) describes the establishment of the towns within the study area by white settlers (farmers) during the 19th Century. The most significant heritage artefact of this era was the construction of the Pretoria – Lorenzo-Marques railway line during the 1880's. The following features of this railway line can still be found within the study area:
 - Bridges;
 - Culverts;

- Goods sheds; and
- Stations.
- There are many cemeteries relating to the Anglo-Boer War surrounding the railway line. Some battle sites are also located within the study area.
- A number of informal cemeteries also occur within the study area.
- Farming related structures, such as farmsteads, also occur within the study area.

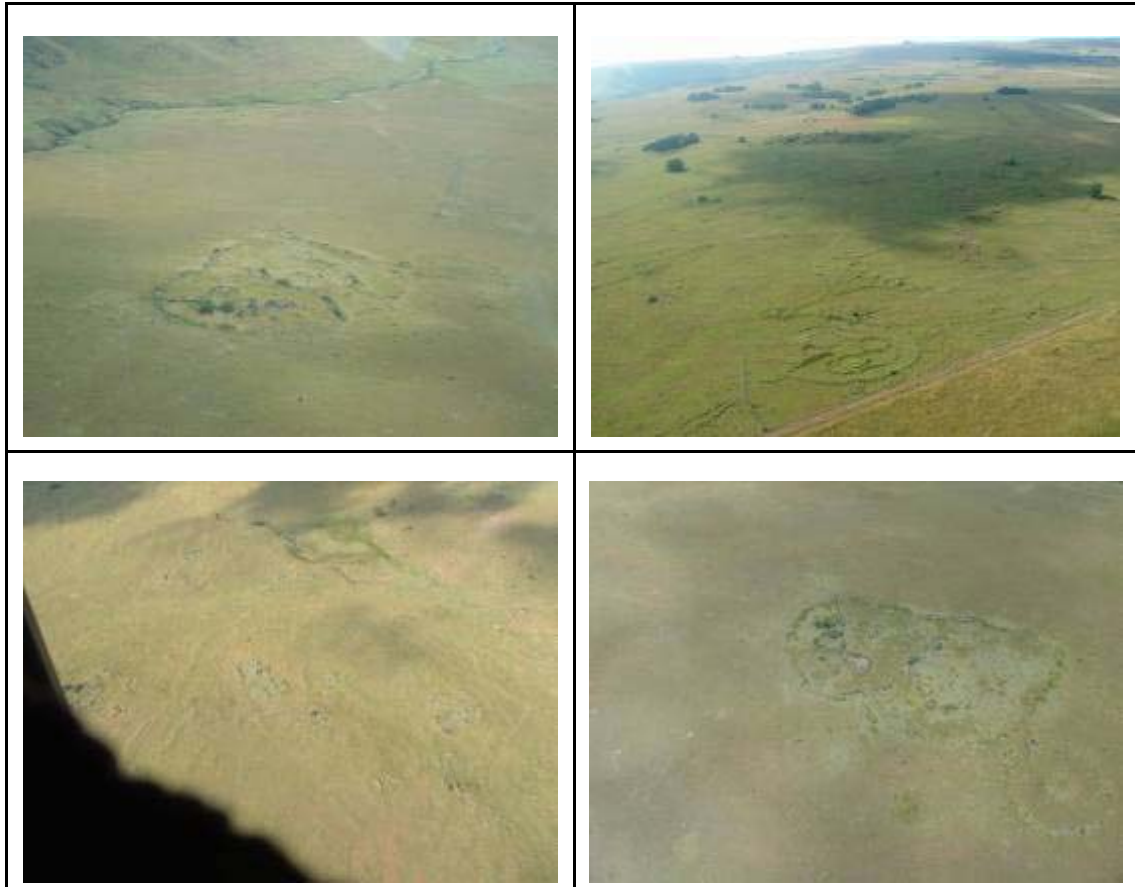


Plate 9: Iron Age heritage sites



Plate 10: Photo of a culvert forming part of the Pretoria – Lorenço-Marques railway line shortly after completion

4.2.3 Social Environment

According to Statistics SA (2001) there are 3.2 million people in the Mpumalanga Province, with a 52%/48 % female to male split. Less than 20% of the population is currently employed, which puts the unemployment rate in Mpumalanga Province very high compared to the national average of approximately 40%. Communities are generally involved in the following activities to sustain themselves:

- Maize and wheat agricultural practices in the Highveld;
- Citrus and sugar farming on the Low veld;
- Livestock agricultural practices;
- Trout farms including fly-fishing activities;
- Eco-tourism related businesses;
- Game farms and nature reserves; and
- Hospitality establishments such as bed.

Afrikaans, English, isiNdebele, siSwati, xiTsonga are generally spoken in Mpumalanga. This shows that there is a variety of cultures that are represented within the province that have different needs. The black population represents and white population groups respectively represent approximately 93% and 0.7% of the province's total population.

5 PUBLIC PARTICIPATION

5.1 PUBLIC PARTICIPATION PROCESS

The principles of NEMA govern many aspects of the EIA processes, including consultation with interested and affected parties (I&APs). These principles include the provision of sufficient and transparent information to I&APs on an ongoing basis, to allow them to comment, and ensure the participation of historically disadvantaged individuals, including women, the disabled and youth. A generic description of the public participation process is depicted in Figure 16.

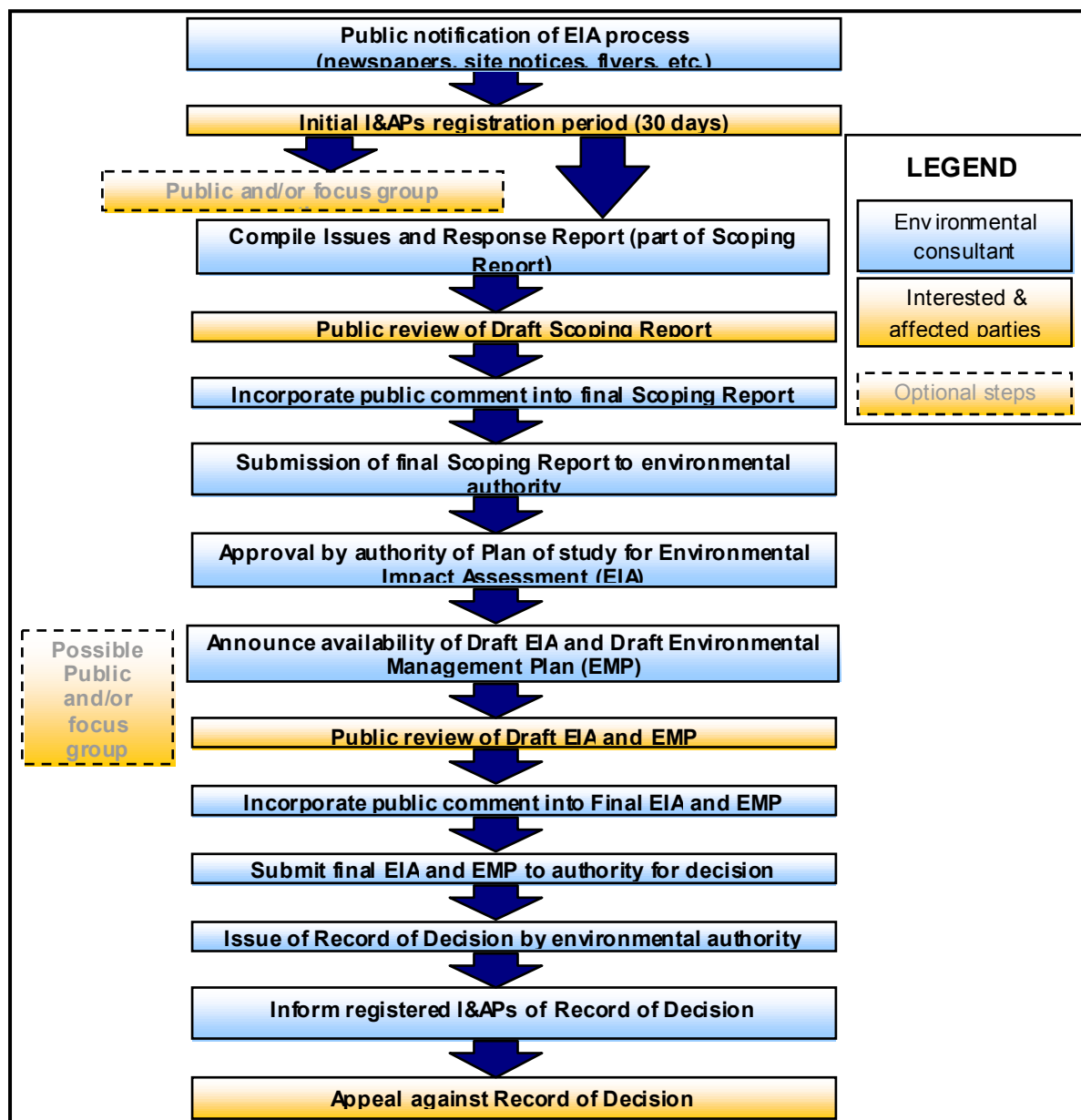


Figure 16: General public participation process showing steps where and how Interested and Affected Parties (I&APs) can be involved

5.2 PROCESS FOLLOWED TO DATE

The following process was undertaken to facilitate public participation for the proposed project. The initial registration period for I&APs commenced on **Friday, 22 June 2007** and terminated on **Wednesday, 15 August 2007**.

5.2.1 Identification of Interested and Affected Parties (I&APs)

Interested and affected parties (I&APs) representing the following sectors of society has been identified (See Appendix 2(h) for a complete I&AP distribution list):

- National, provincial and local government;
- Agriculture, including local landowners;
- Community Based Organisations;
- Non-Governmental Organisations;
- Water bodies;
- Tourism;
- Industry and mining;
- Commerce;
- Historically disadvantaged groups, including women, youth and the disabled;
- Research organisations; and
- Other.

5.2.2 Public announcement of the project

The project was announced as follows:

- Publication of two media advertisements (in English and Ndebele and English and Siswati) in each of the following newspapers (Appendix 2(c)):
 - Middelburg Observer (Friday, 22 June 2007);
 - Laevelder / Lowvelder (Friday, 22 June 2007);
 - Mpumalanga Agri (July 2007 publication); and
 - Boven Herald (July 2007 publication).
- On-site notices (in English and Ndebele and English and Siswati) advertising the EIA process were placed along main roads along the proposed routes and at public places accessible to the majority of I&APs, such as Milly's Star Stop near Machadodorp, the T-junction of the Schoemanskloof Road and the N4 National Highway, the existing Marathon substation site and at the Alternative 1 Marathon substation site during the week of **18 to 22 June 2007**. Please refer to Appendix 2(a) for photos of the on-site notices.
- Flyers in three different languages (English and Ndebele and English and Siswati) were distributed along the proposed routes and at post offices, filling stations and public venues (Appendix 2(e)).

- Letters were distributed by fax / post / email to I&APs on **Wednesday, 20 June 2007** (Appendix 2(d)).
- Background Information Documents (BIDs) and Registration and Comment sheets were distributed by fax / post / email to I&APs on **Wednesday, 20 June 2007** (Appendix 2(d)).
- The BIDs and Registration and Comment sheets were made available on SEF's website at <http://www.sefsa.co.za> and on Eskom's website at <http://www.eskom.co.za/eia>.
- Hand-delivery of flyers to identified, directly affected I&APs and / or landowners (other than the general public) who could not be otherwise reached during the week of on **18 to 22 June 2007** (Appendix 2(i)).

5.2.3 Meetings with I&APs

Invitations to attend a Public Open Day and Public Meeting were forwarded to all identified I&APs on **Friday, 13 July 2007**.

The SEF Project Manager, and Public Participation team as well as representatives of the applicant personally met with the following groups of I&APs:

- Local landowners;
- Farmers associations / agricultural unions;
- Local mines and industries;
- Business and tourism sectors;
- Historically disadvantaged individuals;
- Local and provincial government; and
- Environmental bodies.

Three Public Open Days and Public Meetings were held, of which the dates, venues and times are indicated in Table 3. The purpose of these meetings was to:

- Announce the proposed project and EIA;
- Obtain an indication of the initial issues of concern; and
- Encourage the ongoing participation of I&APs.

Table 3: Public open day and meeting venues

	Nelspruit	Machadodorp	Middelburg	Schoemanskloof valley
Date	24 July 2007	25 July 2007	26 July 2007	15 August 2007
Time	16:00 – 18:00	15:00 – 17:00	14:00 – 16:00	15:00 – 17:00
Venue	Nelspruit Community Forum	Milly's Conference Centre	Midway Inn Hotel	Schoemanskloof Farmers' Association Hall
Address	1 Ferreira Street, Nelspruit	On the N4 opposite Machadodorp	Jan van Riebeeck Street, Middelburg	On the R 36 in the Schoemanskloof valley

A poster presentation, providing project information was made at the public open day meetings and the key stakeholder meetings (Appendix 2 (j)). Information provided on the posters included:

- Study Area;
- EIA Process;
- Need and Motivation;
- Alternative transmission line routes and substation positions; and
- Environmental issues and specialist studies.

In addition, a presentation explaining the EIA process and providing a project description as well as the need and motivation for the proposed project was presented at the Public Meetings. The technical specialist from Eskom explained the geographical layout of the Low veld network and the phases in which they wish to address problems in the network. I&APs were provided with the opportunity to raise questions, which were addressed by the project team.

The proceedings are presented in the format of an Issues and Response Report which is included in Appendix 2(g). The comments received with regards to the substations and transmission lines have both been included in the Issues and Response Report in order to provide a holistic representation of the comments received. However, only comments pertaining to the substations have been addressed in this report. Comments related to the transmission lines will be addressed in the EIA Report for the transmission lines.

In addition, key stakeholders, which included local and provincial authorities, landowners, farmers associations, forestry organisations, NGOs and tourism and conservation related organisations were invited to attend key stakeholder meetings that were held from 10:00 to 12:00 on Tuesday, 24 July 2007 (Nelspruit), Wednesday, 25 July 2007 (Machadodorp) and Thursday, 26 July 2007 (Middelburg).

Additional key stakeholder meetings were held on Wednesday, 15 August 2007. The EIA, public participation team and the proponent's technical advisor personally met with the representatives of SAPPI Kraft and SAPPI Forests. SEF also held meetings with Eden Nature Reserve and the Wonderfontein Farmers' Association on Tuesday, 21 August 2007.

Several attempts to liaise with the Steve Tshwete Local Municipality and the Mbombela Local Municipality were made. However, during the initial registration stages of the public participation process, these invitations for liaison were unsuccessful. The correspondence in this respect forms part of Appendix 2(d). SEF, however, endeavoured to contact these bodies during the public review period of the Draft Scoping Report (please refer to Section 5.2.5 below for more information).

During the public review period of the Draft Scoping Report, SEF undertook further focus group meetings with key stakeholders identified during the initial public participation comment period, as indicated in Table 4.

Table 4: Focus group meetings during public review period of Draft Scoping Report

Address	Nelspruit	Nelspruit	Groblersdal
Sector	Mbombela Municipality	Lowveld Chamber of Business and Tourism	Mpumalanga Tourism and Parks Board
Attendees	Mr ND Malokela Mr GM Malimabe	Mr H Mars Ms J Pieterse Ms S Mhlophe	Mr H Botha
Date	2 October 2007	2 October 2007	2 October 2007
Time	09:30 – 10:30	11:00 – 12:00	16:45 – 17:45

5.2.3.1 Mbombela Local Municipality

SEF have made several attempts to consult with the Mbombela Local Municipality during the initial public participation registration period. After numerous meetings were rescheduled the Municipality indicated their availability to meet with SEF on Tuesday, 2 October 2007. Unfortunately, only two (2) people attended the meeting after eight (8) people confirmed their attendance for the meeting.

Mr. Ntsose Dolphin Malokela, the Executive Manager Technical Services for the Mbombela Local Municipality commissioned Mr Gareg Malimabe, representing the electrical department, to attend the meeting as the Executive Manager had to excuse himself.

Mr. Gareg Malimabe indicated that he will circulate the BIDs, and refer the relevant departments within the municipality to SEF's and Eskom's website for comment on the Draft Scoping Report. The Municipality will consolidate

all comments from the relevant departments and submit their comments to SEF before the end of the public review period of the Draft Scoping Report for transmission lines (31 October 2007).

5.2.3.2 Low veld Chamber of Business and Tourism

This organisation had indicated that they will disseminate the information provided in the BIDs and Scoping Reports to their members and suggested that the Nkangala District Municipality be consulted with, should SEF experience any further difficulty in contacting the Mbombela Local Municipality. Contact details of other Interested and Affected Parties were also provided to SEF.

5.2.3.3 Mpumalanga Tourism and Parks Board

Mr. Hannes Botha attended a meeting with SEF on behalf of Mr. Andre Hoffman and agreed to review and comment on the Draft Scoping Report after consultation with his colleagues.

5.2.3.4 Eden Nature Reserve

The Chairperson of Eden Nature Reserve, which is situated approximately 4km west of the Marathon Substation, requested an individual meeting with SEF, Eskom and the Eden Nature Reserve residents to discuss the proposed transmission line route alignments. Eden Nature Reserve is a privately owned nature residential estate, which has two existing 275kV transmission lines running over its property. A meeting with representatives of the Eden Nature Reserve was held on Tuesday, 21 August 2007. It was indicated at the meeting that visual impacts and the impact on game species (e.g. giraffes) are a concern and it was requested that SEF and Eskom should investigate alternative route alignments to by-pass the nature reserve in order to reduce the impact. A proposed alternative south of Eden Nature Reserve (subsequently named PM5) was identified. An existing transmission line runs along this proposed alternative. It was also requested that, should additional transmission lines over Eden Nature Reserve be unavoidable, Eskom should use suspended cross rope type pylons, as their visual impact is lower than that of the other types of pylons. In addition to investigating other alternative routes and substation positions, the main purpose of the additional site visits undertaken in November 2007 and February 2008 was to investigate the feasibility of the proposed alternative around Eden Nature Reserve.

5.2.4 **Detailed maps of alternative alignments**

In response to requests from I&APs at the initial series of public participation meetings held between 24 and 26 July 2007, SEF made available a total of

33 maps of the alternative alignments of the transmission lines. These maps indicate the locations of the proposed alternative alignments on a backdrop of the 1:50 000 topographic maps. In instances where I&APs indicated they wanted more detailed information on the location of specific alignments, they were requested to record this request on the comments sheet provided. These maps were made available directly to I&APs who requested them, and the maps were also placed on SEF and Eskom's websites. The maps are included in Appendix 5.

5.2.5 Draft Scoping Report for Transmission Lines

All the issues raised during the scoping phase were captured in the Draft Scoping Report which was made available in English. The Draft Scoping Report was made available for public comment for a period of 30 days. The availability of the Draft Scoping Report, from 26 September 2007 to 31 October 2007 was announced by personal letters to all the registered I&APs on the distribution list.

The Draft Scoping Report was made available for public review at the following venues:

- Nelspruit Public Library;
- Waterval Boven Public Library;
- Machadodorp Police Station;
- Middelburg Public Library; and
- Hendrina Public Library.

The Draft Scoping Report was also made available as follows:

- Mailed to I&APs who request electronic copies;
- Posted onto SEF's website at <http://www.sefsa.co.za> and Eskom's website at <http://www.eskom.co.za/eia>.

5.2.6 Draft EIA Report for Transmission Lines

All the issues raised to date are captured in this Draft EIA Report which is made available in English. The Draft EIA Report will be available for public comment for a period of 30 days. The availability of the Draft EIA Report, from Monday 19 February 2008 to 19 March 2008, was announced by personal letters to all the registered I&APs on the distribution list.

The Draft EIA Report will be available for public review at the following venues:

- Nelspruit Public Library;
- Waterval Boven Public Library;
- Machadodorp Police Station;
- Middelburg Public Library; and

- Hendrina Public Library.

The Draft EIA Report will also be available as follows:

- Mailed to I&APs who request electronic copies;
- Posted onto SEF's website at <http://www.sefsa.co.za> and Eskom's website at <http://www.eskom.co.za/eia>.

5.2.7 Meetings with I&APs during the draft EIA review phase

Meetings with I&APs have been arranged for the 4th and 5th of March 2008 in the project area. One meeting / open day will be held near Nelspruit, one will be held near Machadodorp and a third will be held near Middelburg at venues identified as suitable by I&APs. Should there be requests from individual I&APs for focus group meetings, these will be accommodated.

5.2.8 Conclusion

Public participation during the EIA process attempted to contact as many as possible interested and affected parties and to provide them with an opportunity to comment on the impacts of the proposed development. In order to facilitate an open and transparent process, I&APs were identified and notified of the proposed development, in accordance with the legislation. Comments / concerns received were incorporated and addressed in this EIA Report.

Assessing the comments / concerns received during the public participation process, it was evident that the following issues were of concern with regards to the transmission lines:

- Terrestrial ecology (flora, fauna and birds);
- Forestry;
- Agriculture;
- Mining land use in the area;
- Property value;
- Tourism; and
- Visual impacts.

6 ALTERNATIVE ANALYSIS

The EIA regulations require the EIA process to include the consideration of feasible alternatives for a proposed development. Therefore a number of possible proposals or alternatives for accomplishing the same objectives should be identified and investigated. It is noteworthy that DEAT considers the failure to consider alternatives adequately to be "... symptomatic of a biased process that is intent on defending a project proposal" (DEAT, 2004). The various alternatives will be assessed in terms of environmental, social and economic sustainability. The preferred option will be highlighted and presented to the authorities. The following alternatives have been assessed in the EIA report:

- Pylon alternatives;
- Route alignment alternatives;
- No-go alternatives;
- Power generation alternatives.

6.1 FEASIBLE ALTERNATIVES

6.1.1 Pylon alternatives

As indicated in Section 2.1.2, three alternative pylon designs could be used for the transmission lines. These are the cross rope suspension, guyed suspension and self-supporting pylons.

The choice of pylons is a function of the technical constraints and environmental considerations. In certain instances, e.g. where there is a bend point in the transmission line route, or where highly undulating or uneven terrain is being crossed, there is no option but to use self-supporting structures. However, on relatively even terrain and on straight portions of the route, cross rope suspension or guyed suspension towers could be used.

Cross rope suspension pylons are preferred in areas where visual quality is important, e.g. in the high-altitude grassland areas, where there are many tourism establishments and trout farms. The structure of these pylons uses much less structural steel and the pylons thus have less visual "bulk". Preference should be given to cross-rope suspension towers, where technically feasible. They also have an advantage to Eskom as they are cheaper than self-supporting pylons.

However, in spite of the advantage of reduced visual impact, cross rope suspension and guyed suspension pylons are unsuitable for areas where agriculture is practiced. This is due to the fact that these types of pylons are supported by four guys (anchor cables) that are anchored in the ground far from the foot of the pylon. In the case of the cross rope suspension towers,

the guys are situated 55m apart, on the boundary of the servitude. In the case of the guyed suspension pylons, the guys are anchored 26m apart. These guys complicate the movement of agricultural machinery and are a safety hazard.

Therefore, it is recommended that, for the sake of minimising the visual impact of the transmission lines, cross-rope suspension towers are used where technically possible. However, in farming areas, self-supporting suspension towers must be used where the transmission servitude will pass through cultivated lands. This is a general recommendation and Eskom should be allowed to deviate from this recommendation where landowners prefer different pylons to those recommended here.

6.1.2 Route Alternatives

Three alternative route alignments were initially proposed by Eskom for the Hendrina to Prairie transmission line as well as for the Prairie to Marathon transmission line. Additional alternatives were identified for the Prairie to Marathon portion of the route during the scoping process, as indicated in 6.1.3 below.

6.1.2.1 Hendrina to Prairie

There are three alternative routes proposed for the Transmission Line route from Hendrina to Prairie:

- **HP 1:** From near Hendrina Power Station to Prairie Substation following an existing power line route;
- **HP 2:** southernmost route compared to other alternative routes. Follows existing power line route only from near Nooitgedacht Dam to Prairie Substation; and
- **HP 3:** From Hendrina to Prairie Substation following the N4 highway.

6.1.2.2 Prairie to Marathon

There are three alternative routes proposed for the Transmission Line route from Prairie to Marathon:

- **PM 1:** From Prairie Substation to Marathon Substation following a route parallel to and north of the N4 Highway along an existing power line route;
- **PM 2:** From Prairie Substation to Marathon Substation following a route parallel to and south of the N4 Highway along an existing power line route; and
- **PM 3:** From Prairie Substation to Marathon Substation following the Schoemanskloof Valley along the R36.

Specialists were requested to indicate their preferences for alternative alignments at an integration meeting in January 2008. An indication of the outcomes of their opinions, as well as the technical factors, is provided in Table 5 and

Table 6.

Table 5: Summary of specialist opinions and technical considerations for alternative routes between Hendrina and Prairie

Specialist	Most favoured option	Intermediate	Least favoured option
Geotechnical suitability	No preference for any alternative route. All routes traverse the same geological substrates. There are no geo-technical constraints that cannot be overcome by appropriate design of the pylons.		
Impact on soil and agricultural resources	HP3: This route is along primarily along the N4 corridor, which is already impacted by various forms of development. It is therefore likely to have the least impact on agriculture.	No preference between HP1 and HP2. Both these routes pass through extensive areas of cultivated land.	
Impact on terrestrial ecology	HP3: This route is primarily along the N4 corridor, which is already impacted by various forms of development.	HP1: Compared to HP2, HP1 passes through fewer areas of medium ecological sensitivity (refer to Section 4.1.5 for an explanation of how this sensitivity was derived). HP1 passes through more areas of cultivated land, which has lower ecological sensitivity than untransformed vegetation. Shorter than HP2, therefore smaller ecological footprint.	HP2: Compared to HP1, HP2 passes through more areas of medium ecological sensitivity (refer to Section 4.1.5 for an explanation of how this sensitivity was derived). Longer than HP1, therefore larger ecological footprint.
Impacts on birds	HP1: This alternative passes close to a number of pans that are important habitats for water birds, but the length of the route that affects these habitats is less than HP2. It corresponds to an area of low red data species reporting rates.	HP3: This route is along primarily along the N4 corridor, which is already impacted, and far from the pans that occur along the eastern portion of the Hendrina to Prairie region	HP2: This option has the longest length in close proximity to the pans that are important habitats for water birds.
Impact on heritage resources	HP1 or HP2: Neither of these routes would directly affect any known heritage sites.		HP3: There is one known heritage site along HP3, namely the Bergendal Battle Monument (situated about 300m south of the N4 and 7km southeast of Belfast) that could potentially be affected.

Specialist	Most favoured option	Intermediate	Least favoured option
Visual impact	HP1 or HP2: The impact of these alternatives would be similar. Both these routes are preferred above the HP3 alternative, which would affect tourist views along the N4		HP3: This route is least preferred because the transmission lines would be visible from the N4, which is an important tourist route to the Mpumalanga lowveld.
Social impact	HP3: This route is primarily along the N4 corridor, which is already impacted by various forms of development.	HP1 or HP2: Both these routes pass through agricultural areas, where the disruption to social structures and traditions would be greater than along the already developed N4 corridor.	
Technical considerations	<p>HP1:</p> <ul style="list-style-type: none"> • Shortest route • Relatively straight route with few bend points, therefore cost of pylons would be lowest • Parallel to an existing transmission line servitude - simplifies negotiations with landowners. 	<p>HP2:</p> <ul style="list-style-type: none"> • Longer route than HP1 • Relatively straight route with few bend points, therefore cost of pylons would be lowest • Parallel to an existing transmission line servitude – simplifies negotiations with landowners. 	<p>HP3:</p> <ul style="list-style-type: none"> • Longest route • Route changes direction very frequently. Many bend points - cost would therefore be highest, as many self-supporting pylons would be required. • No existing transmission line servitude.

To synthesize these preferences, it is clear that HP3 is technically the most difficult route and from Eskom's point of view the least preferable alternative, as there is no existing transmission line servitude and because the cost associated with the frequent changes in direction would be prohibitive. However, HP3 is most preferred in terms of the impacts on ecological systems, agricultural resources and social impacts. HP1 is the most preferred alternative in terms of the impact on birds, heritage resources and visual impact. In an environment such as the Mpumalanga Highveld, where huge areas have already been impacted by opencast coal mining and agriculture, ecological factors assume relatively low importance. Therefore, the marginal ecological benefits that would be gained from HP3 can be justifiably dismissed as a decision factor. In this light, HP1 emerges as the recommended alternative, since the only decision factors in HP3's favour are agriculture and social impacts. In contrast, bird impacts, heritage impacts, visual impacts and technical considerations are in favour of HP1. **HP1 is therefore the route alternative recommended for environmental authorisation.**

Table 6: Summary of specialist opinions and technical considerations for alternative routes between Prairie and Marathon

Specialist	Most favoured option	Intermediate	Least favoured option
Geotechnical suitability	No preference for any alternative route. All routes traverse the same geological substrates. There are no geo-technical constraints that cannot be overcome by appropriate design of the pylons.		
Impact on soil and agricultural resources	PM1 & PM2: Both routes cross similar terrain and would have a similar level of impact on agriculture.	PM3: Extensive agricultural production in Schoemanskloof Valley would be affected. PM4: Would have most impact on plantation forestry.	PM5: Intense agricultural production occurs along the PM5 route.
Impact on terrestrial ecology	PM1 and PM5: This combination is favoured because PM1 is aligned parallel to an existing transmission servitude, which is already impacted. PM5 is already impacted by agricultural activity.	PM2: Similar to PM 5, but the easternmost portion of PM2 close to Marathon substations traverses relatively natural vegetation communities compared to PM1	PM3: Not favoured, due to impact on forest ecosystems in Schoemanskloof Valley. PM4: Not favoured, due to impacts on mistbelt grassland and forests
Impacts on birds	PM2: traverses fewer vegetation communities (and therefore bird habitats) than PM1. Compared to PM1, crosses fewer habitats such as non-perennial streams that are suitable breeding and roosting habitat for species of conservation concern. PM5: Traverses only one broad vegetation community	PM1: Similar to PM2, but traverses fewer wetlands than PM2. Traverses more habitats such as non-perennial streams that are suitable breeding and roosting habitat for species of conservation concern.	PM3: Not along an existing power line, would therefore create completely new impacts in an area previously relatively undisturbed.
Impact on heritage resources	No preference. There are known heritage sites along any of the three alternative routes that would be directly affected by the transmission lines. NB: This will be confirmed during the walkdown assessment.		

Specialist	Most favoured option	Intermediate	Least favoured option
Visual impact	PM1: This alternative is parallel to an existing power line servitude which already has three transmission lines. The additional of one line will not significantly change the visual character of the landscape.	PM2: Only has a single existing transmission line. The degree of change to the landscape for PM2 would therefore be greater than for PM1 if an additional power line would be placed next to the existing PM2 servitude. PM5: Closer to the scenically important Crocodile River than PM1. Visible from the N4.	PM3 and PM4: These alternatives would traverse areas that are currently devoid of high-voltage transmission lines. Schoemanskloof Valley is very scenic and currently unspoilt visually.
Social impact	PM1 or PM2: Preferred as it avoids the Ngodwana Village, where there is no space for servitude expansion. If PM1 can avoid Nogodwana Village, then PM1 is also favoured. PM5: Avoids Eden Nature Reserve.	PM1: Impacts are similar to PM2, but it has the potential to impact on Ngodwana Village. However, if a route can constructed around Ngodwana Village, it has the same rating as PM1.	PM3: Would introduce a new impact into an area that is currently relatively unspoilt.
Technical considerations	PM1: <ul style="list-style-type: none"> Equally long as PM2 Mountainous terrain is challenging Relatively straight route with few bend points compared to PM2, therefore cost of pylons would be lowest Parallel to an existing transmission line servitude - simplifies negotiations with landowners. 	PM2: <ul style="list-style-type: none"> Equally long as PM1, but has more bend points Mountainous terrain is challenging Could cause unacceptable safety risks close to Ngodwana, where the servitude is very close to an airfield. There is very little space on the northern side of the Elands River Valley where PM2 is situated to place a new servitude without negatively affecting existing land uses. Parallel to an existing transmission line servitude – simplifies negotiations with landowners. 	PM3: <ul style="list-style-type: none"> Route changes direction very frequently, many bend points - cost would therefore be highest, as many self-supporting pylons would be required. No existing transmission line servitude – this will complicate negotiations with landowners. Mountainous terrain is challenging

To synthesize the above preferences, it is clear that PM1 is favoured in terms of technical considerations, social impacts, visual impacts, impacts on terrestrial ecology and impacts on agriculture. PM3 is rejected because of the impacts that it would cause on an otherwise relatively undisturbed landscape, which has thus far experienced very few impacts in any of the impact categories. PM2 is not far behind PM1 in terms of preference. PM2 is slightly favoured over PM1 in terms of the impact on birds and from a social impact point of view. However, the impacts on birds can be easily mitigated, and there is no fatal flaw in the alignment of PM1 with respect to the impact on birds. Furthermore, the preference for PM2 from a social point of view is based on the premise that PM1 would result in unacceptably high impacts on Ngodwana Village, where the village is adjacent to the servitude and there is no space for expansion. However, it has been established that PM1 could be deviated around Ngodwana to eliminate these impacts. PM1 is, therefore, recommended for authorisation.

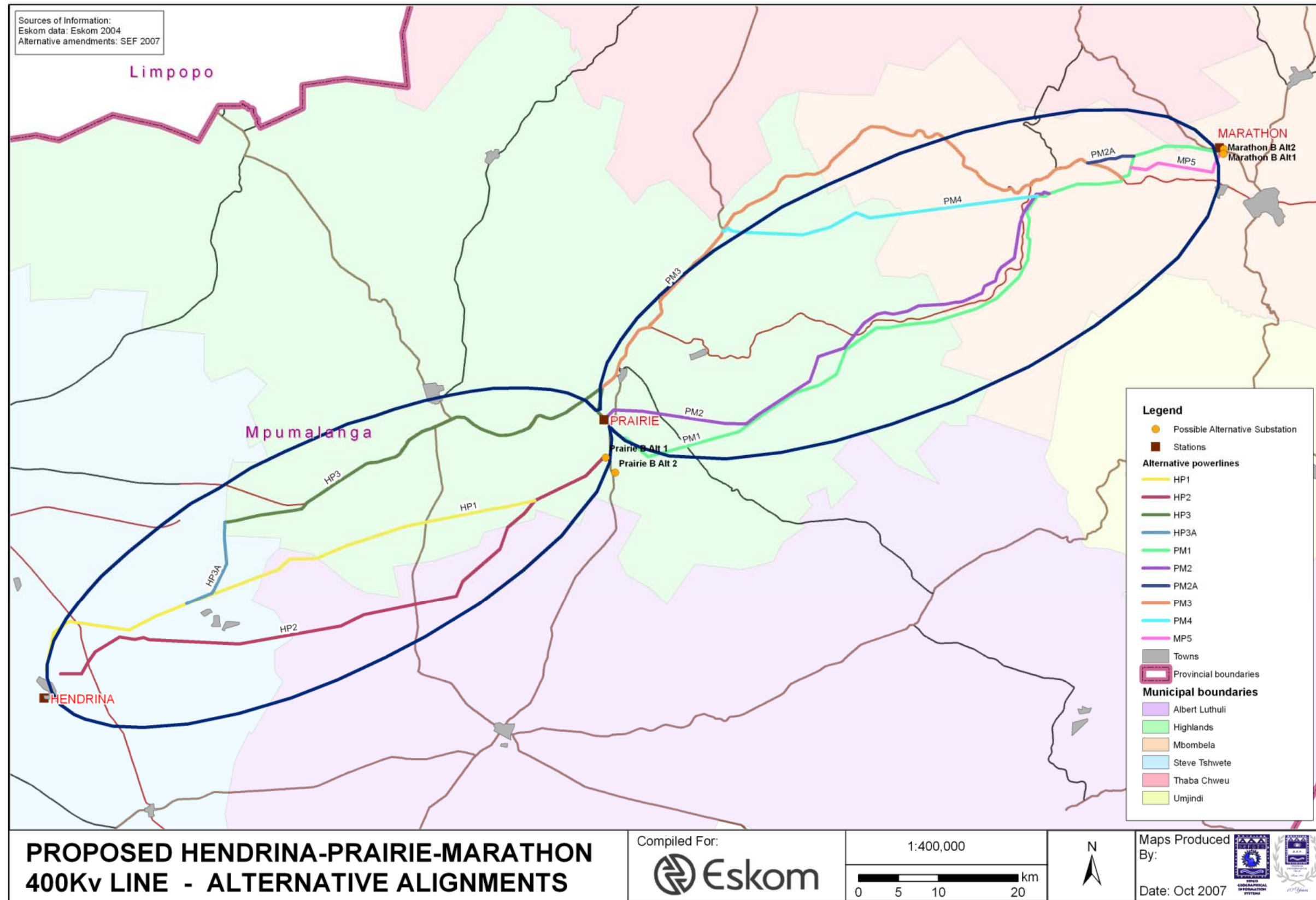


Figure 17: Alternative transmission line routes

6.1.2.3 Additional alternatives identified

Based on the comments received from I&APs and the scoping phase specialist integration meeting, two additional route alternatives were proposed for the Prairie to Marathon portion of the study area. These routes (shown in Figure 17) and their benefits and disadvantages are discussed below.

- **PM 4:** This alternative is located between the Schoemanskloof Valley alternative and the alternatives that follow the Elands River Valley. The prime motivation for identifying this alternative is that the predominant land use along the western portion of this alternative is forestry. The ecological impact on this alternative was, therefore, considered during the scoping phase to be potentially lower than the other alternatives.

The route was surveyed during the helicopter flyover of the study area on 6 February 2008. Although it was found that a portion of the route does pass through extensive forestry areas, which have already been significantly impacted by exotic plantations, the eastern half of this route passes through areas of pristine escarpment mist-belt forest and grassland (see Figure 18).



Figure 18: Aerial view of mistbelt forest and grassland habitat along the eastern portion of PM4

These areas are ecologically very sensitive, and are virtually devoid of any form of development. Apart from the technical challenge of constructing new transmission lines through such an area, where there is limited to no access, the ecological impacts would also be highly

significant. When comparing PM4 with the alternative of placing a transmission line along an existing servitude in an already impacted area, the latter is clearly preferable.

- **PM 5:** As indicated in Section 5.2.3, the management of Eden Nature suggested the investigation of an alternative alignment that would follow the Crocodile River Valley and thus avoid Eden Nature Reserve. The proposed alignment is along an existing Eskom Transmission servitude which currently has only a single transmission line, whilst the initially proposed route already has two transmission lines. From Marathon substation, the proposed route runs south, parallel to an existing transmission servitude for a distance of approximately 3km. The route then turns west, parallel to the Crocodile River, before joining with another north-south orientated transmission servitude close to Alkmaar.

This alternative was inspected during a site visit in November 2007 and was again surveyed during the helicopter flyover of the study area on 6 February 2008. The route passes over large farming areas which are characterised by orchards and sugar cane and there are several houses and other structures in very close proximity to the route (see Figure 19 and Figure 20). The area is intensively farmed, and this alternative may therefore have a significant impact of agricultural productivity. There is also little space for the placement of the pylons between houses, greenhouse structures and other structures, and it would be necessary to demolish or move certain structures if this alternative were to be adopted.



Figure 19: View of servitude through existing orchards along the PM 5 alternative



Figure 20: Proximity of existing structures to the existing servitude along the PM5 alternative



Figure 21: Satellite image of the Farm Sterkspruit 285 along the PM5 alternative

The initial proposal to take the transmission lines through Eden Nature Reserve, although undesirable from an aesthetic point of view, would therefore be preferable when compared to the controversial option of demolishing houses and other structures, and loss of productive agricultural land that would be associated with PM5. Although there is an undeniable visual impact on Eden Nature Reserve, this visual impact

already exists, since there are already two 275kV transmission lines that cross through Eden Nature Reserve. The existing houses on Eden Nature Reserve are much further from the existing transmission lines than the structures along PM5, and would therefore not be directly affected, apart from the visual impact.

It is therefore recommended that alternative PM5 should not be pursued and that agreement must be reached with the management of Eden Nature Reserve regarding mitigation of the visual impact of the transmission line. It will be essential to use cross rope suspension pylons through Eden Nature Reserve and the immediately adjacent areas.

6.2 UNFEASIBLE ALTERNATIVES

6.2.1 Generation of Power / Electricity

Interested and affected parties suggested the consideration of alternatives with regards to generation of electricity. It was suggested that Eskom should consider generating electricity through alternative means close to the points where power is required, as well as considering using more power domestically rather than exporting it to countries such as Mozambique. This alternative cannot, however, be considered within the ambit of an EIA process.

The listed activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) are project-based and strategic level decisions, such as alternative means of power generation, fall outside the scope of a project-specific EIA such as this one. Such considerations are more suited to a Strategic Environmental Assessment. In this case, the decision on the means to generate electricity is made not by the applicant (Eskom Transmission) but by Eskom Generation (refer to 1.2 for details of the applicant for this project).

6.2.2 Underground cabling

One of the outcomes of the key stakeholder meetings and public meetings during the scoping phase was a proposal for the use of underground cabling instead of above ground transmission lines. In this regard, SEF referred to Johnson (2006), a study that was undertaken by an electricity company that provides electricity in the United States of America (refer to Appendix 3). The relevant outcomes of the study for the proposed development are as follows:

Negative

- The costs involved with the implementation of underground cabling are more than 10 times greater than overhead cabling. The study estimates that it will cost approximately US\$1 million a mile.
- This cost will be transferred to the consumer throughout South Africa, with an expected increase of between 80 – 125 %. An example given was that a

consumer could end up paying up to US\$ 3 500.00 (approximately R23 000.00) for implementing underground cabling nationwide.

- Underground cabling is still affected by storms. Even though there is a reduced frequency of power outages, it takes longer to repair the outages than if they were overhead cabling, as the cables must first be opened up before being repaired.
- The study focuses on the provision of underground cabling for distribution lines, and not transmission lines. The placing of transmission lines underground will be at an even greater cost and difficulty than distribution lines. In a developing country such as South Africa, the costs associated with underground transmission lines cannot be justified, especially at this stage in South Africa's history where electricity is in short supply and the need for improving supply is urgent.
- Digging a trench for an underground cable would cause additional ecological impacts through the disturbance of vegetation and soil. In contrast, the footprints of pylons are limited to small areas where they are anchored.

Positive

- Minimised visual impact for landowners and communities.
- The mitigation of visual impacts is so significant that in some instances it can outweigh the financial costs.

Underground cabling can, therefore, not be considered for the entire route of approximately 185km between Hendrina and Prairie Substations. At most, it could be considered for short lengths of the route where there are critically important and pristine (previously unaffected) features that need to be protected from visual impacts. Should faults occur in underground cabling, the consequences for supply could be severe, especially on a high voltage 400kV transmission lines. Therefore, underground cabling has not been considered as a viable alternative to the above-ground transmission line system proposed.

6.2.3 Scheduling Alternatives

It is expected that construction for the proposed transmission lines will commence in June 2008 so that it can be complete in early 2009. However, it is anticipated that construction will start as soon as possible after all the necessary approvals are obtained, which is expected in May 2008. As discussed in Section 1.3, subsequent to the operational phase of the transmission lines coming into effect, construction will start on the transmission lines. However, as discussed in Section 1.3, the substations and the transmission lines have followed a single public participation process in order to avoid confusion, and to save time and other resources.

6.2.4 No-Go Alternative

DEAT (2001) states that, the 'no-go' alternative should be considered in cases where the proposed development will have a significant impact, which cannot be effectively or satisfactorily mitigated. The no-go alternative is explored in terms of the relative costs and benefits of not continuing with the proposed development.

If the Prairie and Marathon substations and the associated transmission lines are not constructed, Eskom will be unable to meet load demand requirements or maintain existing reliability and quality of supply. This is despite the fact that Eskom Transmission has taken all measures, to date, to ensure that the existing Transmission system is utilised to its full capacity. In addition, it will not be possible to meet the expected load demand if the predicted increase in electricity demand occurs on the Highveld North and Low veld regions.

The 'no-go' alternative will result in a zero additional environmental impact on the study area. However, the implications of not implementing the project appear to be significant with respect to economic and social components of sustainable development, as it would deprive the affected communities of access to electricity and associated economic opportunities.

By the lack of action, Eskom Transmission will not ensure firm supply into the Mpumalanga Province, which would result in the existing load shedding causing major disruptions of power supply to different areas at various times. This can have a major impact on the economy of the region, as no real economic growth can take place.

Furthermore, the no-go alternative is usually considered seriously in cases where there are fatal flaws associated with the proposed activity. In this instance, no fatal flaws were identified and all impacts can be mitigated, according to the opinion of the specialist team.

The no-go alternative is therefore ruled out, because it would neither supply the projected demand for electricity, nor optimise the existing infrastructure.

6.3 UNFEASIBLE ALTERNATIVES

6.3.1 Generation of Power / Electricity

Comments from consultation with I&APs had brought up the suggestion that alternatives with regards to generation of electricity needs to be investigated.

Whilst it is agreed that the investigation of alternative electricity generation options does have merit, these options cannot be effectively considered within a project-specific EIA process such as this. The listed activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of

1998) are project-based. Strategic-level decisions, such as alternative means of power generation, fall outside the scope of a project-specific EIA such as this. The consideration of alternative electricity generation options are more suited to a Strategic Environmental Assessment (SEA).

This particular EIA for transmission lines and substations was commissioned by Eskom Transmission, and it is therefore outside the capability of this applicant to consider generation options, since they are only concerned with the transport of electricity from the point of generation to substations. The decisions relating to methods of generating electricity comes from Eskom Generation (refer to Section 1.2 for details of the applicant for this project).

6.4 CONCLUSION

It is concluded that the following alternatives are not feasible and do not need to be considered:

- Alternative in terms of electricity generation;
- Underground cabling.

The PM4 alternative through the Schoemanskloof Valley is rejected on the ground that a new transmission line would cause a range of impacts (biophysical and social) that have not previously been experienced in this relatively unspoilt area. The PM4 alternative is rejected on the basis of the technical difficulty in constructing a line over the escarpment areas, where there is no current access, as well as the unacceptably high ecological impacts on relatively pristine mistbelt grassland and forest.

The alternative recommended for environmental authorisation is PM1, on condition that the transmission line deviates from the existing servitude at Ngodwana, so that it avoids Ngodwana Village.

The impact assessment section to follow will therefore be based on these recommended alternative routes.

7 ASSESSMENT OF IMPACTS

7.1 IDENTIFICATION OF KEY ENVIRONMENTAL ISSUES

The key environmental issues that are identified have been based on the experience of the EAP (on similar developments which entail environmental scoping and public participation processes) as well as information obtained from the site visit. The Integration Meeting of specialists as well as consultation with I&APs had also contributed to the identification of key environmental issues related to the proposed development.

The potential impacts and key issues identified include:

- Loss of soils with high agricultural potential;
- Suitability of geological and soil conditions for construction of the proposed infrastructure;
- Soil and water (surface and groundwater) contamination;
- Soil erosion and pollution;
- Catchment processes in terms of wetlands and watercourses;
- Destruction of flora and displacement of fauna;
- Impacts of the infrastructure / equipment on the bird life;
- Visual impacts;
- Impacts of features with historical and cultural value;
- Socio-economic and tourism impact;
- Noise impacts during construction phase; and
- Safety and security.

The manner in which these issues can affect the environment is briefly outlined as follows:

- Contamination of groundwater as a result of deposition of contaminants during the construction phase;
- Contamination of surface water as a result of siltation caused by increased erosion, during the construction phase. Increased erosion could be caused by the creation of preferred drainage lines;
- Increased erosion and surface water runoff from hydrological systems in close proximity to the construction sites as a result of vegetation clearing mainly during the construction phase;
- Visual intrusion as a result of the building and operation of the transmission lines;

- Noise impacts from construction vehicles and other heavy-duty equipment used during the construction and operational phases of the transmission lines;
- Floral destruction through vegetation clearing and earthworks during the construction phase, and maintenance activities during the operational phase;
- Loss of high potential arable land as a result of the construction of the proposed transmission lines on current farmlands and orchards;
- Habitat destruction as a result of vegetation clearing and other pre-construction activities;
- Faunal destruction and displacement as a result of migration and competition from introduced species, the most significant being the impacts on bird life;
- Impact on safety and security, as a result of construction and operational activities of the proposed transmission lines;
- Destruction of heritage / historical sites, through clearance work for the construction of the transmission lines; and
- Impacts related to the social environment and impact on tourism e.g. farm owners, game reserves and other I&APs.

The results of the specialist studies have been analysed and integrated into the EIA Report, in order to assess the potential impacts of the transmission lines, devise potential alternatives with respect to selected activities and develop the necessary mitigation measures in order to minimise negative impacts and optimise positive impacts. The specialist recommendations have been incorporated in an EMP. The activities as described in the project description have been assessed on both an individual as well as a cumulative level for the project. Table 7 provides a summary of the anticipated impacts and the investigations/specialist studies that have been conducted for the proposed development.

7.2 SUMMARY OF KEY IMPACTS

Table 7: Summary of anticipated impacts as identified during Scoping

Environmental Aspect	Relevant Area	Environmental Objective	Potential Impacts	Proposed Additional Investigations
PHYSICAL				
Geology, Hydrology and soils	Site	To ensure that the foundations for the transmission line pylons are suitable for development and / or the necessary measures are implemented in order to ensure its suitability.	Subsidence, cracking of built structures, unstable foundations.	Geotechnical and Soils Investigations
Agricultural Potential	Local	To ensure that soils of high agricultural potential are preserved.	Loss of soil of high agricultural potential.	Soil and Agricultural Potential Assessment
Terrestrial Ecology	Regional	To ensure that species of conservation importance are identified and preserved. To ensure that the ecological integrity and functionality of the system is maintained.	Fragmentation of habitat, loss of species of conservation importance, loss of biodiversity, disruption of natural processes and functionality.	Ecological Assessment
Impact on avifauna	Regional	To ensure that the birds are not negatively affected by bird-power line interactions.	Increased bird fatalities.	Avifaunal Study
SOCIAL				
Safety & Security	Site	To assure safety within the site, during the construction and operational phase.	Open gates.	Social Impact Assessment
			Fire hazard.	
			Access of strangers.	
			Threat to safety of residents and tourists.	
Visual aspects	Regional	To minimise visual pollution.	Alteration of Landscape Character.	Visual Impact Assessment
		To identify the elements of particular visual value and visual quality that could be affected by the proposed project.		
		To maintain an undisrupted skyline.	Other Visual impacts.	
Heritage and Culture	Site	To identify of all buildings, artefacts and symbols of culture and heritage significance.	Loss of significant symbols of heritage and culture.	Heritage Impact Assessment

Environmental Aspect	Relevant Area	Environmental Objective	Potential Impacts	Proposed Additional Investigations
Socio-economic impacts	Regional	To identify impacts related to the surrounding communities and tourism-related businesses that will be affected by the proposed development.	Loss of safety and security.	Social Impact Assessment
			Loss of land tenure.	
Tourism impacts	Regional	To minimise the impact of the proposed transmission lines routes on private game reserves and game farms, lodges and ecotourism attractions.	Loss of significant tourism potential in the area.	Social Impact Assessment
Air Quality impact	Regional	To minimise the impact of air pollution on the proposed transmission line.	Shut down of the transmission line.	Impact of Air Quality on Transmission Line Equipment

8 DETAILED IMPACT ASSESSMENT

8.1 SUITABILITY OF THE ENVIRONMENT FOR THE DEVELOPMENT

8.1.1 GEOTECHNICAL SUITABILITY

Source of the impact:

The construction of the transmission lines on the specified farm portions

Significance:

Should this impact occur, the extent will stretch to the surrounding properties, thereby receiving a regional extent rating. This will cause a permanent impact on the landscape which results in the functions and processes ceasing completely. The intensity is thus rated as high. The probability of the impact occurring is highly likely, should none of the mitigation measures be implemented. The implementation of the mitigation measures will reduce the impact to medium-high.

Mitigation Measures:

1. A detailed foundation investigation must be undertaken to determine the geotechnical suitability of the site for the construction of substations.
2. The recommendations and mitigation measures as proposed by the geotechnical specialist must be implemented.

Table 8: Geotechnical suitability

Impact Source(s)	Construction of the transmission lines	Status	-
Nature of the Impact	Unstable founding conditions could result in the destruction of the substation site during the operational phase		
Receiving Environment	Site 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)	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	

8.2 BIOPHYSICAL IMPACTS

8.2.1 SOIL AND AGRICULTURAL POTENTIAL

8.2.1.1 Loss of agricultural production potential

Sources of the impact:

- 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

Description of the impact:

Hendrina-Prairie

This area is dominated by maize farming. Maize farming will be able to continue underneath the power line servitude. However, small portions of cultivated land will be lost due to the footprint of the pylons and the guys (in the case of cross rope suspension pylons and guyed V pylons). Should rope suspension pylons and guyed V pylons be used, the impact on the usable area for cultivation will be greater than for self-supporting towers.

Prairie-Marathon

This portion of the route in the low veld is intensively cultivated. Especially where orchards are present, the impact could be severe, as the maximum allowable height of trees underneath transmission lines is 4m. If the transmission lines cross through pecan nut orchards, avocado orchards or orchards with similarly large trees, the impact could be severe, and could result in the trees having to be removed if they are too tall. This could result in a total loss of production over the 55m width of the servitude.

Significance:

The extent is rated as "site", since the impact would occur only within the servitude. The duration is permanent, as the disruption to agriculture would continue to occur throughout the operational life of the transmission line. The intensity is medium, since agriculture would be able to continue in the servitude, although in a disrupted manner. The probability is highly likely. Significance without mitigation is medium to high, and with mitigation it would be medium.

Prairie-Marathon

Mitigation Measures:

1. **Self-supporting towers must be used in areas where cultivated fields or orchards are crossed in order to minimise the footprint of the pylons.**