

**PROPOSED 2x400kV MATIMBA B-DINALEDI TRANSMISSION POWER LINES**

**SOCIAL IMPACT ASSESSMENT REPORT**

as part of the

**ENVIRONMENTAL IMPACT ASSESMENT**

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## EXECUTIVE SUMMARY

This report presents the results of the Social Impact Assessment as part of the Environmental Impact Assessment (EIA) for the construction and operation of two 400kV Transmission power lines along the proposed study corridors from Matimba B Power station to Dinaledi substation.

The overall objective of the EIA is to get the approval for the proposed servitude route with a flexibility buffer of 2km for the 2x400kV power lines between Matimba B Power station and Dinaledi substation.

**The overall objective of this SIA report is to assess the proposed 5 km final study corridor with alternatives from a social perspective, and recommend a final preferred route alignment.**

To meet the overall objective of this SIA, this report aimed to:

- ✓ Describe the project in, that is,
  - the proposed route corridors;
  - the negotiation process;
  - the process of constructing a 400kV Transmission power line.
  
- ✓ Understand and describe the social change processes that could be expected because of the implementation of the project in the proposed corridor. The change processes which were assessed included
  - demographic processes(changes in the number and composition of people);
  - economic processes(relating to the way in which people make a living and the economic activities in society);
  - geographical processes (changes in land use patterns);
  - institutional and legal processes (changes in the role, efficiency and operation of governments and other organizations);
  - empowerment processes (changes in the ability of people to get involved in and can influence decision making processes);
  - socio-cultural processes (changes that affect the culture of a society).

The descriptions of the expected change processes were informed by

- the description of the current and expected future social processes without the project intervention as per the Scoping Report;
- issues and concerns raised in the Scoping Report;
- issues and concerns raised by I&AP's and the specialist in the EIA Phase;
- results of the Post-hoc assessment study on the construction impacts of a high voltage Transmission power line;
- results of the socio-economic survey on land use changes and resultant socio-economic impacts of a high voltage Transmission power lines.

- Assess potential impacts that could occur as a result of these change processes. Impacts were identified by looking at how the change process could result in changes in the physical or cognitive experiences of people. An impact can be called an impact only when it is experienced cognitively and/or physically. For example, population growth, or influx of construction workers are not impacts, but change processes. They could, however, lead to experiences (impacts) such as fear, resettlement, or lack of income.
- ✓ Assess the impacts, considering extent, duration, probability, confidence, intensity, status and significance.
- ✓ Propose mitigation measures to attempt to reduce the significance of impacts.
- ✓ Identify specific areas of impact;
- ✓ Propose a final preferred route corridor;
- ✓ Develop guidelines for the Environmental Management Plan (EMP).

The study corridor for the EIA consisted of a number of options within the corridor. Finally, these alternatives had to be assessed in order to come up with a final preferred corridor from a social perspective. The assessment was based on information available to the social specialist to date. Based on these assessments as set out in 4.2.1-4.2.4, the proposed route corridor is as follows:

From Matimba B, follow the existing lines on the eastern side. Coming to the different options before entering Spitskop, cross over to the eastern option at point C on the map to enter Spitskop. Exiting from Spitskop, of the two options, follow the western option, and then turn east well south of Bojating. Cross the R511 after Thaba Tolo Game Reserve, and enter Dinaledi from the eastern option as opposed to the western option.

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## ACRONYMS

EIA	Environmental Impact Assessment
ECO	Environmental Control Officer
EMP	Environmental Management Plan
GIS	Geographical Information System
GPS	Global Positioning System
HIV	Human Immuno-deficiency Virus
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
LM	Local Municipality
LP	Limpopo Province
NWP	North West Province
PHA MQR	Post-hoc Assessment, MasterQ Research
RRA	Rapid Rural Appraisal
STI	Sexual Transmitted Infection
SIA	Social Impact Assessment

## 1. BACKGROUND AND INTRODUCTION

Eskom Distribution is proposing a project to support increased electricity demand in the Brits and Ga-Rankuwa areas. The proposed project entails the construction and operation of two 400 kV Transmission power lines from Matimba B Power station to the Dinaledi substation near Brits<sup>1</sup>.

To determine the route these proposed lines should follow from Matimba B to Dinaledi, an Environmental Impact Assessment had to be completed. A scoping assessment of the study area was completed as part of the Environmental Impact Assessment. For the Scoping Phase, 16 possible alternative corridors, D1-16, were identified to be considered for the 400kV lines - four from Matimba to Northam and 4 from Northam to Dinaledi. Combinations of these 8 corridors brought the final number of possible corridors to consider to 16.

Specialists considered these alternatives in the context of the study area. The assessments of the specialist studies were spatially represented to indicate sensitivity zones. Final corridors were proposed, taking into account these sensitivity zones. The final proposed study corridors, 5km in width, were plotted through areas with the least total sensitivity.

Following on the Scoping Phase, an Environmental Impact Assessment (EIA) had to be completed for these final study corridors. This entailed a more detailed assessment by specialists to determine the preferred final route corridor, narrowed down to 2km in width.

This report presents the results of the Social Impact Assessment as part of the Environmental Impact Assessment for the construction and operation of these two 400kV Transmission power lines along the proposed study corridors from Matimba B Power station to Dinaledi substation.

The first sub-section below provides an overview of the preliminary findings of the Social Impact Assessment (SIA) conducted during the Scoping Phase of the EIA. The second sub-section explains the objectives of the study reported in this document, and the final sub-section describes the methodologies that were employed to meet these objectives.

### 1.1. PRELIMINARY FINDINGS OF THE SIA

Prior to embarking on a full Environmental Impact Assessment of the study corridors, a social scoping study had to be completed to

- Identify undesirable, highly undesirable and somewhat undesirable areas for the proposed Transmission power lines to cross, taking into account the social, land use and tourism profile of the study area;
- Based on this information, determine the preferred routes from social, land use and tourism perspectives;
- Identify information gaps and how these should best be addressed in the EIA Phase.

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<sup>1</sup> Matimba B BID VER 4



The identification of undesirable, highly undesirable and somewhat undesirable areas for the proposed Transmission power lines were informed by the following criteria or principles:

UNDESIRABLE AREAS		
Impact category	Criteria	Comments
Social	Areas currently occupied by human settlements	These could necessitate the relocation of populations.
	Areas earmarked for future development (e.g. of residential units)	Transmission power lines would interfere with development plans.
Land use	Areas occupied by open cast mining activities or surface infrastructure of underground mines	Necessity of mining around power lines would have significant cost and safety implications.
Tourism	Conservation areas/ lodges/ tourism destinations (more so eco-tourism)	Transmission power lines would impact negatively on the visual experience, sense of place and attractiveness of tourism venue. Hunting activities are probably slightly less prone to such effects than ecotourism ("wilderness" experiences). Because hunting is closely related to tourism activities and its economic benefits, for the purposes of this study this sporting activity is assessed under the tourism umbrella.

HIGHLY UNDESIRABLE AREAS		
Impact category	Criteria	Comments
Social	Areas in close proximity of current human settlements	Transmission power lines could pose a safety risk in terms of fire, electrocution or pylons collapsing. Furthermore, future encroachment of settlements on servitude would be likely.
	Areas earmarked for future development (e.g. of residential units)	Transmission power lines would interfere with development plans.
Land use	Areas occupied by cultivated land	Transmission power lines would interfere with irrigation and ploughing, and would pose a potential fire risk. Furthermore, construction activities would lead to temporary loss of land.
	Areas in close proximity of underground mining	Ground slumps could cause pylons to collapse. Underground fires could occur.
Tourism	Buffer zones around conservation areas/ lodges/ tourist destinations	Tourists/ visitors tend to approach destinations through these buffer zones. The negative visual impact of Transmission power lines could detract from the experience of the destination.

SOMEWHAT UNDESIRABLE AREAS		
Impact category	Criteria	Comments
Social	Areas far removed from existing settlements	Reduces the probability that construction workers would provide a boost to the informal sector. Also increased the distance that would have to be traversed by services infrastructure for construction camps. This, in turn, would increase the burden on local authorities that are required to provide that infrastructure.
	“Greenfields” areas (areas not currently occupied by any infrastructure)	Situating a Transmission power lines close to existing infrastructure is preferable, as this would consolidate visual impacts and thereby reduce the line’s impact on sense of place.
Land use	Areas far removed from existing road infrastructure	Would necessitate the construction of lengthy access roads for construction and maintenance activities. These roads could impact on land use, daily movement patterns, safety, sense of place, etc.
	Areas occupied by livestock farming	Temporary loss of grazing land would occur during construction activities.
Tourism	Areas with potential for future development as tourist destinations/ recreational areas	Negative visual impact of power lines could reduce potential of area to be developed as tourist destination/ recreational area.

These principles were also applied in the EIA to propose a final preferred route, and informed the development of guidelines for mitigation measures. **Principles** give an indication of a course of action that ought to be taken. **Mitigation measures** are statements which provide advice or direction to ensure that whatever course of action is decided on, the likelihood of negative impacts occurring are reduced, and the potential positive impacts are enhanced.

The Scoping Phase was concluded with a list of the anticipated social impacts of the proposed Transmission power line. These had to be addressed in the EIA Phase, and focused on

- Impacts that were expected to commence *prior to* the beginning of construction;
- Impacts that were expected to arise *during* construction (it was anticipated that similar impacts can be expected in the *decommissioning phase*); and
- Impacts that were expected to occur during the *operational* phase of the project.

The list anticipated social impacts were expanded in the EIA Phase, taking into consideration the issues and concerns that were raised by Interested and Affected parties (I&AP’s), and the additional information that was sourced to properly assess these potential impacts. These potential impacts are illustrated and discussed in the main body of this report (section 3).

## 1.2. OBJECTIVES OF THE EIA

This document presents the results of the SIA that was conducted as part of the technical assessment phase of the EIA. The **overall objective of the EIA** is to get the approval for the proposed servitude route with a flexibility buffer of 2km for the 2x400kV power lines between Matimba B Power station and Dinaledi substation.

**The overall objective of this SIA report is to assess the proposed 5 km final study corridor with alternatives from a social perspective, and recommend a final preferred route alignment.**

A SIA is not limited to a narrow or restrictive understanding of the concept 'social' (Vanclay, F. Environmental Impact Assessment Review 22 (2002) 183-211). With input from participants at conferences of the International Association for Impact Assessment, Vanclay (2002, p. 388) defines SIA in the following manner:

Social impact assessment is the process of analysing (predicting, evaluating and reflecting) and managing the intended and unintended consequences on the human environment of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions so as to bring about a more sustainable and equitable biophysical and human environment.

SIA, therefore, is an umbrella or overarching framework that encompasses all human impacts including aesthetic (landscape analysis), archaeological and heritage, community, cultural, demographic, development, economic and fiscal, gender, health, indigenous rights, infrastructure, institutional, political (human rights, governance, democratisation etc.), poverty-related, psychological, resource issues (access and ownership of resources), the impacts of tourism and other impacts on societies (F. Vanclay / Environmental Impact Assessment Review 22 (2002) 183-211).

However, according to (Vanclay 2002:3-10) one of the pitfalls of SIAs is that social change processes are referred to as social impacts in these studies. He said that "social change processes are set in motion by project activities or policies" while social impacts "refer to the impacts actually experienced by humans in either a corporeal (physical) or cognitive (perceptual) sense."

To meet the overall objective of this SIA, this report aimed to (illustrated in Figure 1):

- ✓ Describe the project in, that is,
  - the proposed route corridors;
  - the negotiation process;
  - the process of constructing a 400kV Transmission power line.
  
- ✓ Understand and describe the social change processes that could be expected because of the implementation of the project in the proposed corridor. The change processes which were assessed included

- demographic processes(changes in the number and composition of people);
- economic processes(relating to the way in which people make a living and the economic activities in society);
- geographical processes (changes in land use patterns);
- institutional and legal processes (changes in the role, efficiency and operation of governments and other organizations);
- empowerment processes (changes in the ability of people to get involved in and can influence decision making processes);
- socio-cultural processes (changes that affect the culture of a society).

The descriptions of the expected change processes were informed by

- the description of the current and expected future social processes without the project intervention as per the Scoping Report;
- issues and concerns raised in the Scoping Report;
- issues and concerns raised by I&AP's and the specialist in the EIA Phase;
- results of the Post-hoc assessment study on the construction impacts of a high voltage Transmission power line;
- results of the socio-economic survey on land use changes and resultant socio-economic impacts of a high voltage Transmission power lines.

- ✓ Assess potential impacts that could occur as a result of these change processes. Impacts were identified by looking at how the change process could result in changes in the physical or cognitive experiences of people. An impact can be called an impact only when it is experienced cognitively and/or physically. For example, population growth, or influx of construction workers are not impacts, but change processes. They could, however, lead to experiences (impacts) such as fear, resettlement, or lack of income. Potential impacts were identified by acknowledging that the physical or cognitive experience of people could be effected in terms of (Vanclay 2002):

- people's way of life - that is, how they live, work, play and interact with one another on a day-to-day basis;
- their culture - that is, their shared beliefs, customs, values and language or dialect;
- their community - its cohesion, stability, character, services and facilities;
- their political systems - the extent to which people are able to participate in decisions that affect their lives, the level of democratisation that is taking place, and the resources provided for this purpose;
- their environment - the quality of the air and water people use; the availability and quality of the food they eat; the level of hazard or risk, dust and noise they are exposed to; the adequacy of sanitation, their physical safety, and their access to and control over resources;
- their health and wellbeing - health is a state of complete physical, mental, social and spiritual wellbeing and not merely the absence of disease or infirmity;

- their personal and property rights - particularly whether people are economically affected, or experience personal disadvantage which may include a violation of their civil liberties;
- their fears and aspirations - their perceptions about their safety, their fears about the future of their community, and their aspirations for their future and the future of their children.
- ✓ Assess the impacts, considering extent, duration, probability, confidence, intensity, status and significance.
- ✓ Propose mitigation measures to attempt to reduce the significance of impacts.
- ✓ Identify specific areas of impact;
- ✓ Propose a final preferred route corridor;
- ✓ Develop guidelines for the Environmental Management Plan (EMP).

### 1.3. APPROACH AND METHODOLOGY

This section focuses on the approach and methodologies that were applied in the SIA to ultimately fulfil the objective of this report. A summary of the approach followed by the social specialist is illustrated in Figure 1, which is further explained in this section and supported by section 1.2.

The SIA Scoping Report gave a baseline description of the study area and social change processes that could be expected without the intervention of the project. The SIA Scoping Report did not fully describe the social change processes that could be expected as a result of the project, but did a broad assessment. Further studies had to be conducted in the EIA Phase to fully understand these. These recommended studies for further clarification in the EIA Phase, as listed in the SIA Scoping Report, are quoted in the next sub sections.

#### 1.3.1. ***Studies recommended for the EIA Phase***

##### **Impacts to arise prior to construction**

The social change processes that were recommended to be assessed, and potential social impacts as a result of these, were:

1. *Social opposition to the project;*
2. *The possible necessity of relocating populations currently residing in areas in the proposed route corridor.*

##### **Recommended studies for EIA phase:**

1. In collaboration with public participation practitioner, consult with land owners along selected route and other affected parties to determine the nature and severity of opposition to project, as well as ways in which such opposition might be reduced.
2. Determine density of settlements in the vicinity of selected route. Also determine probability for future expansion of settlements.

### Impacts to occur during construction

The social change processes that were recommended to be assessed, and expected impacts as a result of these, were:

1. *Employment creation*
2. *Influx of job seekers*
3. *Social problems due to population influx*
4. *Increased demand for services*
5. *Impacts on safety and daily movement patterns*
6. *Impacts of construction activities on directly affected land owners*

#### Recommended studies for EIA phase:

1. More detailed information required on size of construction workforce in order to estimate likely social impacts in terms of indirect work in the informal sector (e.g. catering for construction workers).
2. Comparative *Post-hoc* evaluations of the influx that has occurred with the construction of other transmission lines.
3. Consultation with municipal officials to determine current extent of social problems and initiatives to combat them.
4. Assess capacity of municipalities along route to provide the necessary services. Consult with municipal officials to determine the ability of municipalities to meet additional demands for infrastructure and services.
5. Obtain information on plans (if any) to upgrade road infrastructure.
6. Conduct comparative analysis of Transmission power lines that have been completed in order to assess impacts there were created by construction activities (land use, tourism and developments).

### Impacts to occur during operation

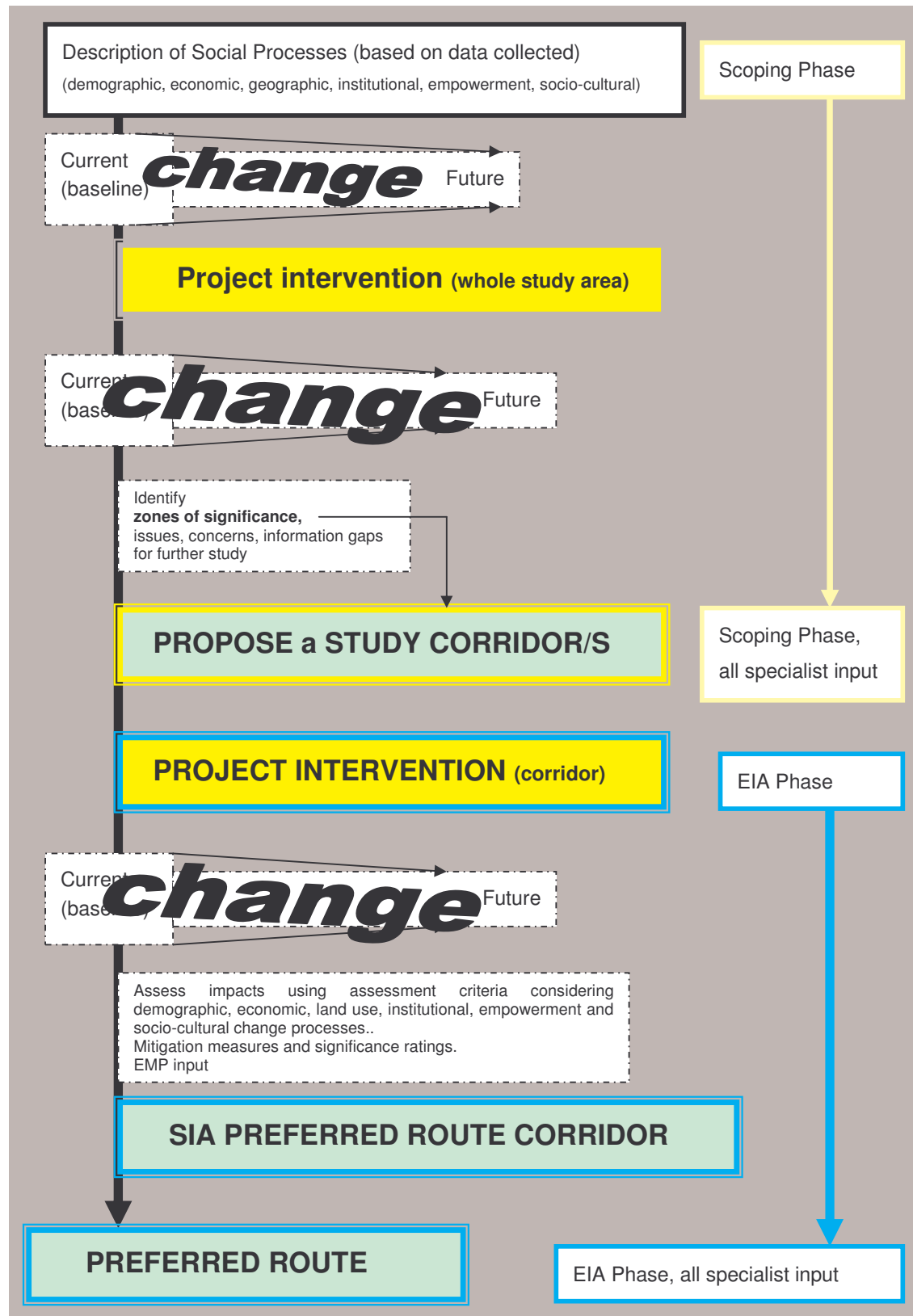
The social change processes that were recommended to be assessed, and expected impacts as a result of these, were:

1. *Maintenance activities on directly affected land owners*
2. *Hazards associated with power lines*
3. *Sense of place*
4. *Recreation and tourism*

#### Recommended studies for EIA phase:

1. Conduct a comparative analysis of existing transmission lines in order to assess current impacts of construction activities (mining and agriculture).
2. Determine the probability for expansion in settlements close to selected route.
3. Results of the Visual Impact Assessment to be interpreted from a social perspective to conduct a more rigorous evaluation of impacts on sense of place.
4. Assess tourism related activities in more detail to gain more insight into the possible effects of the project on tourism and recreational activities.

Figure 1. SIA Process



### 1.3.2. *Studies conducted in the EIA Phase*

Different methodologies were employed to execute the recommended studies. These are illustrated in Table 1.

Table 1. Data collection methodologies

RECOMMENDED STUDIES FOR THE EIA PHASE	Recommended study	Methodology	Output
	Fill information gaps listed in 1.3.1, 1.3.2, 1.3.3	Rapid Rural Appraisal Desktop research	Results incorporated throughout this report
	Asses the impacts of construction activities (on land use, tourism and developments) to better evaluate impacts for this project	Comparative Post-hoc Evaluation	Separate report and results incorporated throughout this report
	Assess tourism related activities to gain better insight into the possible effects of the project on tourism and recreational activities	Survey Research	Separate report and results incorporated throughout this report

These methodologies (Rapid Rural Appraisal, desk research, Post-hoc evaluation, and survey research) are discussed in more detail in the subsections that follow.

#### Rapid Rural Appraisal

**Rapid Rural Appraisal (RRA)** in particular employs consultation to incorporate local concerns and identify local expert knowledge quickly and efficiently. The RRA included

- Field trip by helicopter (30 November 2006);
- Fieldtrip by vehicle (25 and 26 January 2007, 21 February 2007);
- Interviews with Interested and Affected Parties (I&AP's);
- Interviews with officials;
- Issues, Comments and Responses Document.



The **objectives** of the RRA were to:

- Determine the land use along the corridor;
- Determine probability for expansion in settlements close to selected route;
- Assess tourism related activities in more detail to gain more insight into the possible effects of the project on tourism and recreational activities;
- Identify vulnerable parties and evaluate their situation;
- Assess cultural landscape;
- Determine density of settlements in the vicinity of the selected route. Also determine probability for future expansion of settlements;
- Determine current extent of social problems and initiatives to combat them;
- Assess capacity of municipalities along the route to provide the necessary services. Consult with municipal officials to determine the ability of municipalities to meet additional demands for infrastructure and services;
- Obtain information on plans (if any) to upgrade road infrastructure.

During the helicopter trip, the proposed route corridors were followed. The social specialist focussed on land use of the area, which in turn gave insight into potential social and tourism impacts. Geographical Information System (GIS) points of farm houses, lodges and settlements along the route were taken, using a Global Positioning System (GPS). Although these points were not accurate to the exact degree, it gave a good indication of activities along the line. The GIS results were mapped, which gave an indication of areas where impacts could be significant (example resettlement of people). The social specialist then did a RRA along these sections of the line to do a more depth assessment of areas which seemed problematic. Again, co-ordinates of areas/points of importance were identified with GPS. Appendix A contains the map with the results. The results are not mapped in detail, but broad land use areas were identified based on these results.

#### **Desk Research**

**Desk Research** includes the assessment of published information (including published oral history), including

- The national archives;
- Maps of the area;
- Relevant publications and reports.

The objective of the desk research was to guide, and support findings as well as fill information gaps.

#### **Comparative Post-hoc Evaluation**

A Post-hoc analysis of the social impacts of construction of high voltage Transmission power lines was conducted in response to the need for an evidence based approach in conducting SIAs. The analysis primarily investigated the social impacts recorded in one specific project. The case study

of the construction of the Matimba-Witkop Nr. 2 400kV Transmission line was selected for its location, the diversity of social environments surrounding the line and the fact that two different main contractors were used during construction. The study is called: Post-hoc Study, Social Impacts in Constructing High Voltage Transmission Power Lines, MasterQ Research, March 2007 (PHS MQR, 2007).

### Objectives of the study

The **main research objective** was to evaluate the social impacts anticipated for the construction of Matimba-Witkop Nr. 2 400kV Transmission power line SIA against the actual social impacts experienced, and supplement the findings with the actual social changes that occurred during the construction of the Beta-Delphi 400kV Transmission power line.

To this end, the **primary research objectives** of this study are:

- To describe land owners' experience of the negotiation process.
- To identify the actual social impacts experienced during construction.
- To describe the nature, extent and severity of the social impacts.
- To identify effective mitigation measures to be implemented.
- To identify ways to improve the SIA process.

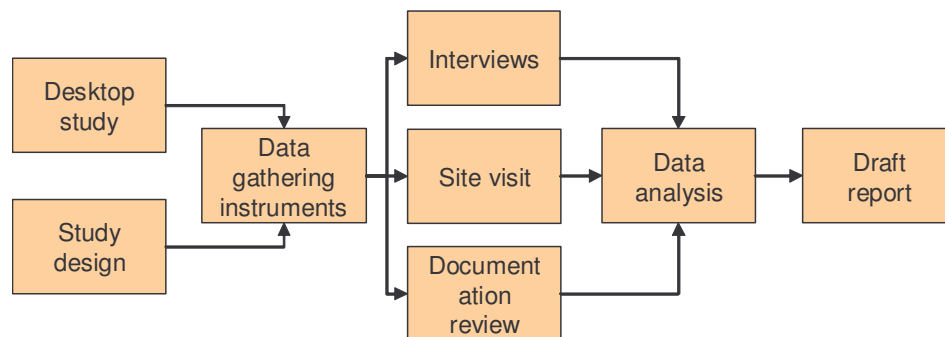
The **secondary research objectives**, which gave context to the primary objectives, are

- To understand the EIA process.
- To understand the SIA process in the context of the EIA process.
- To understand the negotiation process.
- To understand the construction process.
- To understand social change processes and social impacts.

The secondary objectives were answered by way of a desktop study.

### Methodology

The study was implemented according to the diagram below:



## Survey Research

### Objectives of the study

The main objective of this research was to assess the potential socio-economic impact of power lines as a result of a change in land use processes. The reason for the research was to assist with the assessment of potential change processes and associated impacts from a socio-economic perspective.

To answer the main objective, the primary objectives were to understand the

- Impacts of power lines in terms of
  - perceived lifestyle impact;
  - perceived financial impact;
  - perceived impact of the alignment of power lines.
- Tourism Impacts
  - visitor profile;
  - income profile;
  - growth potential.
- Financial impacts on cattle and crop farming.
- Potential economic impacts on investments and future plans.
- Impacts on employees.

### Methodology

The research was quantitative in nature. Structured telephonic interviews were conducted and took approximately 10 minutes to complete. The results were captured and assessed in SPSS, a statistical programme.

A list of approximately 103 land owners with farms (including game farms) who registered as Interested and Affected parties for the Matimba B-Dinaledi, Matimba B-Marang Projects, and Mmamabula-Delta made up the population. Of the 103, a total of 50 land owners partook in the study. Not all the land owners on the database partook in the study because of unavailability of land owners, timeframes available to attempt to reach land owners, and refusal by land owners to partake. The sample was not a representative sample as it excluded those who did not register as I&AP's and those who did not provide their telephone contact details. The results should therefore be seen as indicative of what is happening in the area.

### Impact Assessment

All of the methodologies discussed were used to describe social change processes. These social change processes assisted in identifying potential impacts. Impacts were then assessed in more detail, as illustrated in Table 2. A final significance rating for each impact before and after mitigation was then given. These ratings were given for the proposed corridor as a whole, and where applicable ratings were changed to acknowledge pockets of "problem" areas (refer to Appendix B for a full description of the assessment criteria). This information was used to select and defend a final proposed route corridor.

**Table 2. Assessment criteria**

Criteria	Measurement			
Extent of impact	Site	Local	Regional	National
Duration of impact	Short term (0-5yrs)	Medium term (5+-15yrs)	Long term (15+-30yrs)	Permanent
Intensity	Low	Medium	High	Very high
Probability of occurrence	Improbable	Possible	Highly probable	Definite
Status	Positive	Neutral	Negative	
Degree of confidence	Low	Medium	High	
<b>Significance</b>	<b>Low</b>	<b>Moderate</b>	<b>High</b>	<b>Very high</b>

The next section describes the route corridors, the servitude acquisition process, and the process that is followed to construct and maintain a power line. The change processes as a result of these activities are briefly described. The information is not described in detail or interpreted (the “so what” aspect) in this section. This is done in the context of section 3, which covers the impact assessment in more detail.

## 2. PROJECT DESCRIPTION

This section describes the alignment of the proposed route corridors, the project requirements in terms of the negotiation and construction processes, followed by a description of the receiving environment in the proposed corridors in terms of demographic, economic, geographical, institutional, empowerment and socio-cultural change processes.

### 2.1. ROUTE CORRIDOR

This section should be read in conjunction with the map in Appendix A. The study corridor traverses the Limpopo Province (LP) and the North West Province (NWP), starting at Matimba B Power station close to Lephalale in the north, going south to enter Spitskop substation on the border of the LP and the NWP, just north of Pilanesberg. It then goes on to follow the old Bophuthatswana border to enter Dinaledi substation close to Brits.

From Matimba B Power station to Spitskop substation, the proposed Marang Transmission power line shares the same study corridor. From Spitskop, the Marang study corridor diverts to go to the Marang substation. From Matimba B to Spitskop, an existing 400kV Transmission power line is followed for most of the way.

The study corridor is 5km wide, and the final option is in the middle of this corridor. The servitude for a 400kV Transmission power line is 55m wide, and the total servitude for three lines will therefore be 165 meters and for two lines 110 meters.

The section between Matimba B Power station and substation consists of mainly game farms. Before entering Spitskop substation, the study corridor splits in three options. The eastern and middle options' land use is mainly game farms, and the western option cultivated land and grazing. Centre

pivots are used, but not extensively. The planned Heritage Park from Magong to Madikwe Nature Reserve falls in the western study corridor. There are a number of settlements within the three alternative study corridors. The settlements in this area are: Mokgalwaneng, Disake, Kraalhoek, Mmantserre, Mmopyane, Swartklip hostels and mining town, Ga Ramotsidi, Setikile. There is a cluster of villages to the south of the options, including Ramotsibi Tswana, Kameelboom, and Welgeval.

From Spitskop there are two options, the one goes south passing through Varkfontein and Mankwe Madikwe, turning east to meet the other option at Bojating. The other option turns east just after Spitskop and then goes South to Bojating, passing to the west of Mmarogang, and Ramokokastad. From Bojating the study corridor mainly follows the old Bophutatswana border in the south easterly direction to Dinaledi. It passes south of a cluster of villages, of which Ga Tsogwe and Lethlabile are the closest. On the southern side of the old border are mainly game farms, and the route is on the border of these farm and traditional land to the north. The exception is where it passes right next to the R511. This area includes game farms as well as cultivated land, and the route crosses these game farms and cultivated land. Irrigation is intense in this area. Approaching Dinaledi, just after Lethlabile, the corridor splits in two options. The one option passes to the east of proposed town developments, and the western option passes through proposed town planning area. The section just north of Dinaledi has a canal system fed by water pipes from the Hartbeespoortdam. This area is agricultural land with high potential, and town development is prohibited in this area.

The affected tribal authorities are Bakgatla ba Mmakau with Kgosi Motsepe, and Bakgatla ba Kgafela with Kgosi Pilane.

The nature reserves in the study area are Pilanesberg Nature Reserve, Ben Alberts, the Thaba Tholo Eco Park, Rhino Bushveld Eco Park, Borakalalo Game Reserve and Madeleine Robinson. The privately owned game farms offer tourist facilities and hunting opportunities. There are bed and breakfasts in the villages and towns, because of the vicinity to nature reserves which do take day visitors.

The area surrounding Spitskop is mining property.

Provincial roads include the R511 from Brits to Thabazimbi, the R510 from Rustenburg to Thabazimbi and the R566 from Brits to Pilanesberg. The corridor crosses a number of local and farm roads.

Two railway servitudes cross the study area from north to south. The main line runs from the Matimba Power station roughly parallel to the R510 to Brits. The other line runs along the R511 from Brits northwards. The main east-west lines include the lines from Northam to Dwaalboom. There are a large conglomeration of railway servitudes between Pilanesberg and Marikana (this paragraph taken from the visual specialist report).

The route corridor crosses the Matlabas and Crocodile rivers in Limpopo Province.

Landing strips are close to the spot marked "4" in the LP, in close vicinity to Disake, and in the vicinity of Northam in NP.

## 2.2. NEGOTIATION PROCESS

The process of establishing a power line is as follows:

EIA Phase  
Negotiation  
Construction  
Maintenance  
Decommissioning

The Negotiation process is the focus of this section. The servitude negotiation and negotiation process for private land owners and traditional authorities are discussed.

The following process represents the steps that are followed in getting the servitude registered.

- The route is finalised before negotiation can start.
- Negotiators determine which properties are affected by the final route.
- The Survey-General is contacted to verify and confirm the properties to be affected.
- The Deeds Office provides the names of the legal owners of the properties.
- The services of an external property valuator are procured. Properties are valued by doing a strip valuation for which price ranges for the different properties are submitted.
- Maps are drafted for each property indicating the proposed route for the Transmission power line to be constructed on private or tribal land.
- Eskom draws up an option to secure the servitude. The option indicates that the owner will accept that the line will cross his property, subject to conditions to be finalised in the negotiation of the servitude agreement. An option is valid for one year. Eskom offers 100% of the value of the servitude for the first line to be constructed on one owner's property, 110% for the second and 120% for the third line. The value of the servitude to be negotiated is calculated by multiplying the area of the servitude required from the land owner with the valuator's unit price.
- Negotiators visit the land owners to start negotiations. The documentation, including the map of the affected area and the option are used to start negotiations. If land owners are not aware of the proposed line to be constructed on their property, the negotiator explains the procedures and conditions to them. *In the case of tribal land, a government representative has to attend a public meeting with the tribal leaders when negotiations start.*
- The land owner has to sign the option. Special conditions are negotiated and added to the standard option form. *In the case of tribal land before an option is signed, a tribal resolution has to be made regarding Eskom's intention to reach a servitude agreement on the proposed tribal land. If a tribal resolution is reached to grant Eskom the servitude, the Provincial Department of Land Affairs have to certify the decision. The National Department of Land Affairs register the servitude of tribal land.*
- Once the route is confirmed (i.e. options signed with the upstream and downstream land owners) the servitude agreement will be finalised with the land owners. This agreement will set out the compensation amount, and conditions for the establishment and operation of the servitude, and will be site specific (different land owners may have different requirements). Compensation payments are made when the servitude is registered at the Deeds office.

- Once the construction is complete and the land rehabilitated to the land owners' satisfaction, the land owner signs a 'Final Release' certificate. Until such time Eskom Transmission remains liable for the condition of the land.
- Once the clearance certificate is signed, the responsibility for the line and servitude is handed over to the regional Eskom Transmission office. Prior to this the Eskom national office is responsible for the process.
- If the land owner is not satisfied with the construction process, conditions cannot be renegotiated. However, the land owner can refuse to sign the 'Final Release' certificate should the rehabilitation of the land not be satisfactory, and the anti-climb around the pylons not have been done to a satisfactory level.
- If no agreement can be reached between Eskom and the land owner and all other avenues to resolve the issues has been investigated and failed, Eskom applies for expropriation of the land. A full EIA has to be completed before an application of expropriation can be logged. This is not a preferred option for Eskom. For expropriation NERSA (National Energy Regulator of South Africa) is called in. The land owner has a chance to state his case. NERSA makes an independent decision whether the land should be expropriated. Expropriation could be refused. A legally binding expropriation process was not in place at the time of writing of this report. The expropriation process was in the process of being gazetted.
- The right obtained by Eskom entails certain restrictions on land owners over whose land the servitude is secured as well as allowances. These would include restrictions and/or allowances on certain activities within the servitude area in terms of a contract reached between the applicable land owner and Eskom-TS. The following are **examples** of restrictions<sup>2</sup>:
  - No building of houses, sheds or similar constructions that could affect or be affected by the power line and pylons.
  - No blocking of access to the servitude area that would deny Eskom maintenance operators any possibility of entering and/or servicing the servitude area.
  - No utilisation of spill points within the servitude area.
  - No blasting or excavating within the servitude area without prior approval from Eskom.

The following are examples of allowances:

- Grazing and dry-land cultivation activities within the servitude area.
- Vegetation clearing and animal movement within the servitude area.
- Placing of topsoil berms not exceeding certain dimensions under the power lines or within the servitude area.

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<sup>2</sup> Matimba B-Dinaledi 400kV Transmission Integration EIA Study, Scoping Report v1 for Public review

### 2.3. CONSTRUCTION PROCESS

The construction process follows on negotiations with land owners in which the servitude is secured.

There are a number of variables determining the sequence of events in the construction process, the number of people involved in each activity and the time spent on an activity. These variables include the time frames for completion of the line, the natural environment and other local conditions. Some activities could happen simultaneously.

When the construction of the line starts, each activity will follow the previous one, so that a chain of events, with different teams involved will happen over time. On average, there are some 35 active days of construction at any point. However, this may take place over a period of up to two years.

At the EIA phase, prior to negotiations, the route of the line are approved by the DEAT. The following steps represent the process of construction:

1. The route is surveyed. This is done by air as well as by walking the route.
2. A profile of the line is designed based on soil conditions and other factors. At this stage decisions are made on conductor types, towers, insulators and foundations to be used.
3. A final design of the line is made and placement of towers determined.
4. Tenders are issued and awarded to one or more construction companies.
5. Negotiations with land owners regarding access to the servitude are started. Access plans are drafted and signed by Eskom, the contractor and the land owner. At these discussions, the parties agree on rehabilitation measures to be implemented after construction. Photographs of the applicable infrastructure or land is taken beforehand to ensure that rehabilitation is done to standard. Access roads are established through recurring use - blading or scraping of a new road should not be expected.
6. The centre line is pegged. At this stage requirements and locations of new gates are recorded.
7. Bush clearance is done along the line. The width of the line to be cleared differs from project to project depending on the vegetation and the landscape of the area as well as on land owners' requirements. At each tower position, four strips are cleared (size depends on the type of tower to be erected) for assembly and erection of the tower. The bush clearance team(s) move through the whole length of the line. However, the time needed to finish this activity depends on the vegetation of the area. During bush clearance protected species are identified and appropriately handled. Certain plants could be salvaged and relocated while alien species are treated. Cut material is cleared.
8. New gates are often installed when bush clearance is done.
9. Before the contractor starts with the foundations of the towers, the towers should have been pegged. A surveyor is appointed to do this. When pegging is being done, the footing of the pylons is set out. Any obstacles or potential problems with the tower positions and the consequent moving of tower positions are reported.
10. The first step in putting the foundations for the towers in place is in establishing foundation nominations. At this stage, soil types are checked to determine foundation requirements. Trial foundations are dug at the main foundation points. This is done through mechanical back-actor / auger methods. However, in certain circumstances manual labour is used.



11. Foundations are excavated mechanically with a drill where possible. At this stage it looks like a square pit of up to 4mx4m in area and 4m deep depending on soil conditions. The pit will be covered up of fenced off after it has been dug until the foundation is cast. This is done to prevent livestock from falling into these pits.
12. The foundation steelwork is fitted into the foundation pit not too long after it has been dug. This is done to reinforce the foundations. The steelwork is made up at base camp and brought to site by truck. However, all fitting and wiring is done on site.
13. The concrete for the foundations are poured after the steelwork has been fitted. Shuttering is done and a standard concrete truck used to cast the concrete. A 28 day period is required after concrete has been laid. Where access problems exist concrete will be mixed on site. Helicopters will be used in exceptional circumstances. During this stage access or service roads will be used extensively.
14. Tower steelwork is delivered in sections by long trucks and assembled on site. One truck transports one tower directly from the factory to site. Access roads are clearly marked to ensure that the correct tower is delivered to site.
15. Towers are assembled on site by an assembly team. The steelwork is fitted and assembled on the ground - thereby necessitating the area to be cleared of vegetation around the tower. Once the nuts are punched, non corrosive paint is placed in the nuts.
16. Towers are erected with cranes. The size of these cranes starts at 50 tons.
17. After towers have been erected, the stringing of the cables could start. Cable drums are placed next to each other and stringing takes place in both directions from the drum stations. Up to 4km can be strung from one station each way. The working area at each drum station can be as long as 130m but will be confined to the servitude width. Intensive vehicle movement may take place within this working area. A pilot tractor places the pilot cable on the ground, which is pulled up through the use of a pulley. Conductors are never to touch the ground. In mountainous areas, a helicopter can be used or the pilot rope can be shot across valleys.
18. The line is tensioned from each cable station to ensure minimum ground clearance heights are achieved.
19. Rehabilitation of the construction site (mainly the servitude) is a continuous process. However, final rehabilitation starts after about 100 towers have been strung. The contractor is required to give one year's guarantee on their work, in which time rehabilitation must be concluded. Each land owner has to sign a release form once their area has been rehabilitated, indicating that they are satisfied that everything has been left as it was before. Quotations are sourced and a proposal prepared to reimburse land owners for damages. The proposal goes through a tender committee at which the payment is approved. All damages, including damages to crops will be paid and also signed off by the land owner.
20. A final inspection is done.

Some of the initial activities only involve a limited number of specialised people that moves through the servitude. It is only when bush clearance starts that bigger numbers of construction workers come onto site. The following teams are active on site:

- Bush clearance team. Size 10 - 20 on local conditions. This team could also be involved in erecting gates. If a separate team put up gates, a team size of around 5 people could be expected. The potential for recruiting local labour for these teams are extensive.

- Foundations team. Size 35 - 45 per team. More than one team could be used to accelerate construction. Although there is an opportunity for local labour to be recruited in this team, it is limited. It seems possible to use at least 50% local labour.
- Assembly team. Size 10 - 25 people per team. More than one team could be used to accelerate construction. Limited potential for recruitment of local labour. It seems possible to use at least 25% local labour.
- Erection team. Size 15 - 20 people per team. There seems to be no potential for recruitment of local labour.
- Stringing team. Size 120 people. Limited potential for recruiting local labour. It seems possible to use at least 25% local labour.
- Rehabilitation team: Size 5 - 15 depending on site conditions. These teams could be involved in different activities. There is limited potential for recruiting local labour.

The assumption for this SIA is:

The 2x400kV Matimba B-Dinaledi and 1x400kV Matimba B-Marang Transmission power lines will be constructed at the same time from Matimba B Power station to Spitskop substation. Because of the tight timeframes, the assumption is that the team sizes will be tripled. Construction will start simultaneously from Dinaledi towards Spitskop substations, and from Matimba B Power station towards Spitskop substation.

As described in the Visual Specialist Report, the Spitskop substation will have to be upgraded to receive the 2 X 400kV Transmission power lines from Matimba B Power station as well as to allow for the 2 X 400kV Transmission power lines that will leave the substation to link up with the Dinaledi substation. Changes on some of the equipment and layouts relating to other services from the substation will also be required in order to be able to conduct the above upgrading.

The following are the project activity aspects for the Spitskop extension:

▪ Yard Stone:

New yard stone is required in newly extended 275kV and 400kV yards areas. Clear areas in existing yard for equipment foundations, stockpile yard stone and replace when complete.

▪ Structural Steel:

Provide support Steelwork for busbars, stringers, equipment, and as per Steelwork Marking Plan.

▪ Operational:

The Operational Lighting is to be extended and integrated for the new terraced areas.

▪ Drainage:

Storm-water drainage is to be extended and integrated for the new terraced areas.

▪ Roads:

Extend the 6m concrete access road between the 275kV and 400kV yards by 120m to the east and 90m to the west as per the Road Layout. The tar road requires some rerouting as per Road Layout.

▪ Fencing:

Sections of fencing will have to be removed and new fencing placed around the expanded areas.

- Foundations, plinths and trenches:

Provide support foundations for busbar stringers columns, equipment, and extend the cable trenches as per bay layouts.

- Buildings:

A new Control building with Battery room and offices is to be built. A new steel stores building & flammable store is required.

- Earthwork:

The existing 400kV yard terrace is to be extended to the east by 120m, to the west by 90m and to the south by a maximum of 90m. The eastern extension is to accommodate a bus section and 2 feeders and a bus coupler, the western extension is to accommodate a bus section, a 275kV line overpass, a feeder and a bus coupler. The terraced area to south is required for the line crossings that are to be realised using substation steelwork.

The Dinaledi substation will have to be upgraded to receive the additional 2 X 400kV transmission power lines. Complete details on the Dinaledi substation are not available at this stage. The project aspects of the Spitskop are however expected to be applicable for the Dinaledi Substation expansion.

## **2.4. CHANGE PROCESSES**

This section briefly the receiving environment in the proposed corridors in terms of demographic, economic, geographical, and socio-cultural change processes. Institutional-empowerment change processes fall under 2.2 where the negotiation process is described.

### ***2.4.1. Demographic Processes***

The corridor covers the rural area of Limpopo Province. The Limpopo Province (LP) covers 123 910km<sup>2</sup>, and has approximately 5.2million inhabitants, which brings the population density to approximately 40 people per km<sup>2</sup>. The province is therefore largely rural in nature, and approximately 89% of its population live in non-urban areas. Only 11% of the province's population reside in urban areas. The route corridor only covers rural area in the LP, and passes isolated houses, and scattered residential areas.

The route corridor also covers the rural area of the North West Province (NWP). This province covers 116 180km<sup>2</sup>, and has approximately 3.5million inhabitants, which brings the population density to approximately 30 people per km<sup>2</sup>. Although this province is also largely rural in nature, approximately 66% (as opposed to 89% for Limpopo) of its population live in non-urban areas. Only 34% of the province's population reside in urban areas. The route corridor covers rural land up to Lethlabile, which is a densely populated town.

Demographic change processes are assessed in more detail in 3.3.

### ***2.4.2. Economic Processes***

In the LP between point A and B, game farms are in the majority. The corridors before entering Spitskop, the eastern and middle corridors cover the mainly game farms, and the western corridor mostly grazing and cultivated land. Between Spitskop and Dinaledi, game farms are in the majority. For most of the way the study corridor follows the border of these game farms along traditional land, except where it follows the R511, where it crosses game area. This deduction is based on

fieldtrip results, during which observed game farms were marked with GPS. Again, these are not indicated on a map as some game farms might not have been observed and farmers might take exception should their farms not be indicated as game farms.

Most of the game farms already have a Transmission power line crossing the land. However, results of interviews with game farmers, as per the socio-economic survey, indicated that this was not the best situation. The presence of a power line detracts from the sense of place of a game farm, which has financial implications. One land owner mentioned that Eskom would have to buy out his property should more lines cross his property. This was confirmed by results from the PHA MQR (2007), where game farmers said that the power line spoiled the farm as an eco tourism destination. Game farmers said that game farmers lost income due to the visual impact of the power line on their property. Game farmers interviewed indicated that it was difficult to quantify the loss in income as a result of the line going through their property. However, they had comments from tourists regarding the negative visual impact of the line.

Ideally, a study needs to be done to determine the loss of livelihood as a result of a line. Such a study should involve a baseline measurement of the situation prior to the construction of the power line, which should be followed by an assessment post the construction of the power line. The assessment should be done over a period of years, and changes in other variables such as marketing etc. should be considered in the assessment. Ideally, a control group should also be part of the study to assess whether measured changes could be as a result of what was happening in the area - e.g. a decrease in tourism figures is happening in the whole area, and not only on those properties with a power line. The control group should consist of farms with and without a Transmission power line.

In light of research results discussed in this document, a game farm is economically vulnerable as far as power lines are concerned. A summary of a typical game farm in the area is given as per the results of the socio-economic survey conducted by MasterQ Research:

- Managed by the owner.
- Averages 1816 hectare.
- The perception is that power line will influence his or her life style critically.
- If there is no alternative, the power lines must be in a corridor on the border of the farm.
- There are sensitive areas on the farm.
- They are concerned about socio-cultural (sense of place), biophysical and economic impacts.
- They claim there will be a loss of income because of the visibility of the line.
- Compensation in the form of once-off payment is not preferred.
- Very few day visitors. Mainly overnight visitors.
- Mainly caters for hunting parties but other groups or individuals are welcome. No provision is made for parties and weddings.
- Booking is essential.
- On average 42% local, and 58% visitors come from other countries.
- On average visitors stay 4.8 days during the week and 3.9 days over weekends.
- There is not a significant difference between farms with a line, and farms without a line in terms of increase in visitor numbers over the past six months - 56% of the

- establishments experience an increase in visitor numbers and 44% not. Results will have to be confirmed against case study results, and results from interviews with tourists.
- Occupancy is 70+%.
  - Advertising varies from none to overseas agents and expos.
  - The cost to shoot an impala and the cost for accommodation depend on the target visitor. From affordable to very expensive if paid with Dollar or Euro. There is a direct positive relationship between cost for accommodation and for shooting an animal.
  - On average the businesses have been in operation for 11 years with a standard deviation of 8.6 years
  - A very short peak season is applicable. Mainly during the winter months, June July and August, bit also April and May.
  - Only three have some of the Big 5 species but small game is plentiful.
  - On average workers employed receive a pay of R1000-00 per month plus benefits such as housing, etc.
  - Mostly only in-house training for own workers is given.
  - The average tariff for catered accommodation is R916.88 per person per night and for self-catering accommodation it is R281.30 per person per night.
  - For most, catered accommodation, is R400.00+ per person per night.
  - A monthly income per hectare in high season is approximately R1000.00 per ha. The income per hectare according to gross income is much higher at R284.00. The implication is that it is cost intensive to run these establishments, and that low season is very quiet.
  - A game farm is more capital intensive compared to a traditional cattle farm. Many millions of Rand have been spent the last three years and many more is budgeted for.
  - The owner mostly finances developments on his farm.
  - There are plans for future improvements.
  - An average of 3.3 workers per tourist is employed, 0.3 people per hectare.

Based on results of the socio-economic survey, and a desktop study the indication is that the following change processes can be expected:

- International visitors will be lost. Although research amongst international visitors should be conducted to confirm this hypothesis, it is expected that international tourists come to a game farm in Africa to experience the wilderness. A visible power line will detract from the experience, and other farms will be seeked out. An email received from an international agent confirms this.
- Local people might still visit these farms, but it will depend on their expectations. Should they only want to visit the game farm with the sole purpose of shooting game, they might not mind coming to the area. This might be dependent on price - they might prefer to go to the cheaper farm without a power line.
- The game farm owner might have to change his target market, which might make the farm unviable. This will depend on the size of the farm.
- The visibility of the line will play an important role. The lines will be more visible in the LP, compared to the NWP where it is less flat, and trees are higher. The sense of place will probably be impacted on to a lesser degree.

- Not only game farms with a line will experience the possible loss of visitors, but also the neighbouring game farms. This might be more of a problem in the LP.

Economic change processes are discussed in more detail in section 3.1.

#### *2.4.3. Geographical Processes*

As indicated in the previous section, the land use in the corridor traversing the Limpopo Province is mainly for game, and the land use in the corridor traversing the North West province is mainly game and traditional land. The photos ahead depict some land uses in the area, Spitskop substation from the air, and Dinaledi substation on eye level. Changes in land use are described in more detail in section 3.2.





#### **2.4.4. Socio-cultural Processes**

Sense of place goes hand in hand with place attachment, which is the sense of connectedness a person/community feels towards certain places. Place attachment may be evident at different geographic levels, e.g. site specific (e.g. a house, burial site, tree where religious gatherings take place), area specific, and physiographic specific. The concept of sense of place attempts to integrate the character of a setting with the personal emotions, memories and cultural activities associated with it. Territorial behaviour is viewed as a set of behaviours and cognition a group exhibits based on perceived ownership.

Much of what is valuable in a culture is embedded in place, which cannot be measured in monetary terms. It is because of a sense of place and belonging that some people loath to be moved from their dwelling place, despite the fact that they will be compensated for the inconvenience and impact on their lives.<sup>3</sup>

There seems to be a strong cultural attachment to the study area. The majority of the land owners who were interviewed for the socio-economic survey claimed that a high voltage power line would have a serious to fatal effect on their lifestyles. To attempt to understand the type of lifestyle impact the power lines had on those who a high voltage power line(s) on their farm, they were asked how these line(s) affected them. For those who already had a line on their land, the impact was socio-cultural for three (3), for three (3) biophysical - which is linked to sense of place, and only for two (2) socio-economic. These direct biophysical and socio-cultural affects could also have second order impacts, for example impact on sense of place could have an impact on income. However, because these have not been overtly mentioned by participants, conclusions about second order impacts are not made.

To understand what areas should be avoided, and what land owners regarded as sensitive areas, as well as to gain an understanding of the cultural value associated with the land, land owners were asked whether they had any sensitive areas on their land which should be avoided. A majority of 90% claimed to have a sensitive area on the farm, which could be adversely affected by the Transmission power lines. For the majority of game farmers, animals/game and buildings were perceived as sensitive. Most probably because of the monetary value attached to the socio-cultural landscape (game farms should be pristine, power lines should not be visible from a lodge). An assessment of comments that were made by participants at the end of the interview confirmed this conclusion: 13 (26%) mentioned the reduction of esthetic value, and 10 (20%) mentioned that tourist numbers would decrease as a result of a power lines. Four (8%) wanted underground lines. The majority chose that all the lines should be placed in one corridor. This indicates a high level of attachment to the whole area, and not only to the piece of land of the land owner. There is a need to preserve the area in its current state.

The farmers have been in business for average eleven years, which could indicate a strong sense of place. Also the fact that the owners themselves run their businesses is indicative of an attachment to the area. There was a choice to live in the area, and not somewhere else.

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<sup>3</sup> Snyder, R., Williams, D., and Peterson, G. Culture Loss and Sense of Place in Resource Evaluation: Economics, Anthropology, and Indigenous Cultures (date unknown)

The surrounding communities in the study area in the NWP live on traditional land. The North West Province came to existence in 1994 with the merging of Bophuthatswana, one of the former Bantustans (or black homelands), and the western part of Transvaal, one of the four former South African provinces.

The affected tribal authorities are Bakgatla ba Mmakau with Kgosi Motsepe, and Bakgatla ba Kgafela with Kgosi Pilane. The recorded history of these tribes gives an indication that a strong sense of belonging and attachment to place are possibly present amongst these tribes. Ethnographic research and documents indicate that the Bakgatla ba ga Kgafela have been living in the vicinity of Pilanesberg since the latter half of the eighteenth century. Pilanesberg is named after a chief, Pilane, who ruled between 1825 and 1850. It is interesting to note that when they first arrived, another group, the baTlhako, were in the area and demanded tribute from the Bakgatla people. Today the Bakgatla people live in Saulspoort along the northern border of the Park<sup>4</sup>.

Socio-cultural processes are discussed in more detail in section 3.6, more specifically in the context of control and safety.

### 3. SOCIAL CHANGE PROCESS AND IMPACT ASSESSMENT

This section proceeds to discuss social change processes and related potential impacts that could be expected as a result of the project. The change processes are discussed in the context of the following systems:

- economic processes (relating to the way in which people make a living and the economic activities in society);
- demographic processes (changes in the number and composition of people);
- geographical processes (changes in land use patterns);
- institutional and legal processes (changes in the role, efficiency and operation of governments and other organizations) together with empowerment processes (changes in the ability of people to get involved in and can influence decision making processes);
- socio-cultural processes (changes that affect the culture of a society).

The change processes could happen on an individual, community, local and regional level, and are discussed on these levels where applicable. The potential impacts that could be expected as a result of these social changes are then discussed. The assessments are applicable to the construction of the line and the extension of the substations.

This section is structured as follows:

- Discussion of the circumstances that will lead to a change process;
- Description of the change process;
- Identification of the impacts that could be expected as a result of the change process;
- Identification of the individuals and/or communities most likely to be experience the impact;
- Identification of the vulnerable segments within these groups of individuals and/or communities;

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<sup>4</sup> [http://www.unisa.ac.za/Default.asp?Cmd=ViewContent&ContentID=1072&P\\_ForPrint=1#pilanesberg](http://www.unisa.ac.za/Default.asp?Cmd=ViewContent&ContentID=1072&P_ForPrint=1#pilanesberg), accessed March 2007

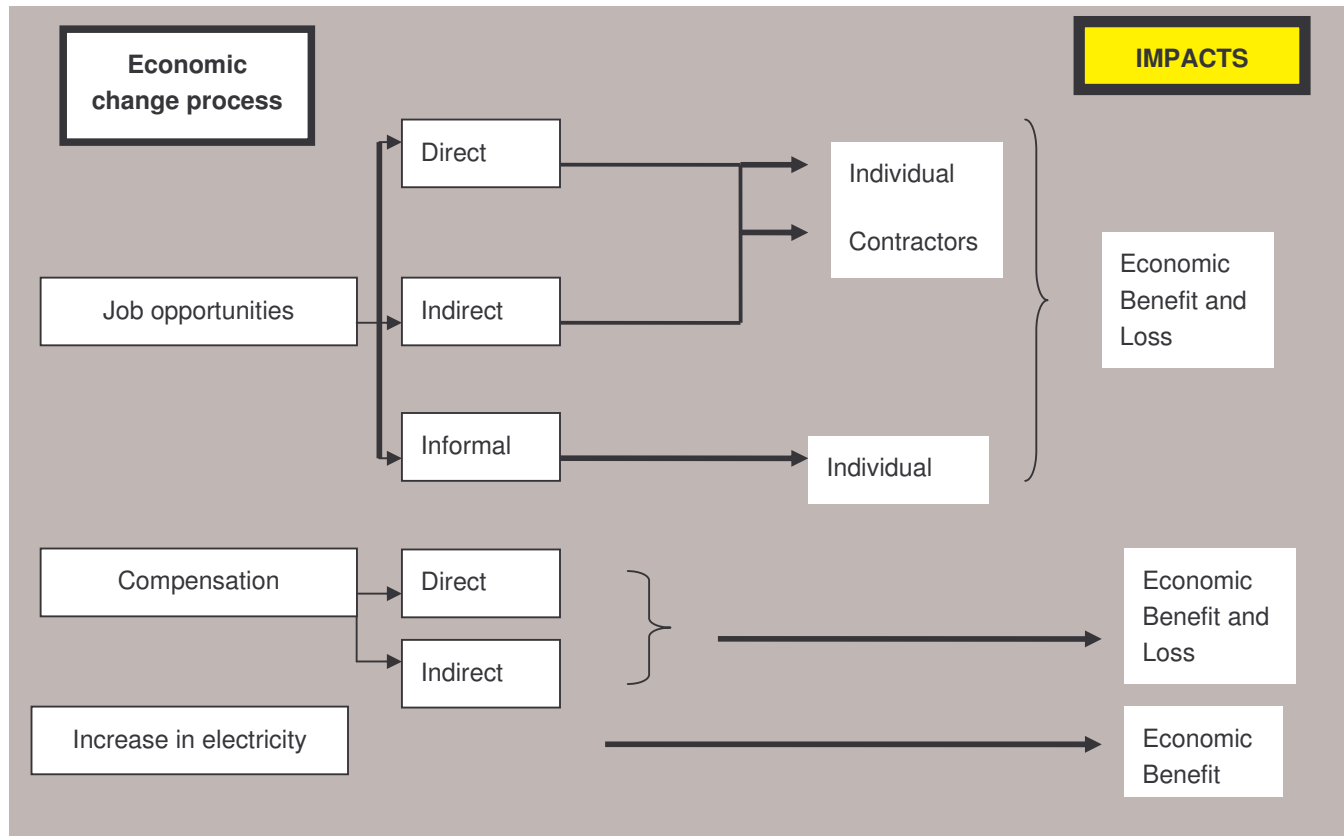


- From this information, identify specific areas where stringent mitigation measures need to be applied to ameliorate negative impacts or enhance positive impacts;
- Assess the impacts as per 1.3.4;
- Determine significance of the impact;
- Propose mitigation measures;
- Re-assess the mitigation measures, assuming successful implementation of the mitigation measures.

### **3.1. ECONOMIC CHANGE PROCESSES**

Economic change processes relate to the way in which people make a living and the economic activities in society. For this project, economic change processes from individual to regional level can be expected. These change processes will be different for different segments of society, and can result in positive or negative impacts. For example, the economic change process experienced by a white game farmer with his own piece of land will be different to the economic change process experienced by an unemployed black mother who lives in an informal settlement. The impacts that are experienced as a result of these economic changes will also be different. The white farmer might experience a loss of income because tourist numbers are on the decrease as a result of construction activities. The black mother might experience some financial gain because of the opportunities afforded to her as a result of construction activities. The change processes that are discussed in this section are illustrated in Diagram 1.

Diagram 1. Potential economic change processes and impacts



### ***3.1.1. Direct formal job opportunities for local individuals and/or contractors***

Job opportunities are created as a result of the pre-construction, construction, and maintenance of the line. It is likely that there are no local contractors in the study area able to construct a 400 kV power line. Very specific skill and knowledge are required to construct a line. Eskom appoints specialised contractors, and even international companies because local contractors do not have the capacity to handle the current workload. Only a limited number of local individuals within the study area could be employed during construction. Because of the skills levels required for the actual construction of the line, local labourers are usually engaged in work that does not require a substantial amount of skill. This includes bush clearance, erection of gates and acting as security guards.

In terms of legal requirements, legislation requires contractors to comply inter alia with the OHS Act, UIF and employment equity principles. Capacity building of local individuals to build required skills and ensuring compliance with labour legislation have time and cost implications for the contractor. For these reasons Eskom does not currently expect contractors to employ and/or train local individuals for skilled and semi-skilled labour during construction. In addition to the legal requirements, employment issues in a linear project also relates to political pressures from local communities. Logistical and other problems arise from having to employ local individuals across the project area. For example, criticism against the procurement process could come from local communities.

Local labour (as individuals or contractors) could represent anything between 10% and 50% of the labour force during construction (PHA MQR, 2007). Where local communities or land owners demand local labour to be used, a bigger proportion of the labour force could represent local labour. However, problems with the quality of work could develop should certain parts of the construction process be sub contracted to local labour. Also, the job opportunities are temporary. It could happen that those who delivered satisfactory work are offered permanent positions, but for the majority the opportunities will be short term.

Depending on the project plan for the Matimba B-Marang and the Matimba B-Dinaledi Transmission power lines, it could be that the same people are used for these projects, or that one procurement procedure is followed. If lines are built at different times, but the same people are used, the length of employment and related impacts will be prolonged. If different people are used, whether the lines are built simultaneously or separately, more people will benefit.

The assumptions for this assessment of potential job opportunities are as follows:

The 2x400kV Matimba B-Dinaledi and 1x400kV Matimba B-Marang Transmission power lines will be constructed at the same time from Matimba B to Spitskop. Because of the tight timeframes, the assumption is that the team sizes will be tripled. The number of employees will be as follows:

- Bush clearance team. Size 30 - 60. Gate erection: team of 5.
- Foundations team. Size 105 - 135.
- Assembly team. Size 30 - 95 people per team.

- Erection team. Size 45 - 60 people per team.
- Stringing team. Size 360 people.
- Rehabilitation team: Size 15 - 45

From Spitskop to Dinaledi the teams will be doubled:

- Bush clearance team. Size 20 - 40. Gate erection: team of 5.
- Foundations team. Size 70- 90.
- Assembly team. Size 20 - 50 people per team.
- Erection team. Size 30 - 40 people per team.
- Stringing team. Size 240 people.
- Rehabilitation team: Size 10 - 30.

The assumption is made that at least 50% of the labour force will be recruited from the local labour pool. From Matimba B to Spitskop an estimated maximum of 755 labourers will be needed. Assuming that 50% will be local labour, 388 labourers will be recruited locally. In light of the unemployment levels and the skills levels in the area, this should be possible. From Spitskop to Dinaledi, an estimated maximum of 490 labourers will be needed. Assuming that 50% will be local labour, 245 labourers will be recruited locally. Again, this should be possible in light of the unemployment and skills levels in the area.

The job opportunities are mainly during construction. For operation, the job opportunities could be a permanent job or a contract for bush clearance. Bush clearance will happen in intervals. Bush clearance opportunities might also be limited because the land owner or Eskom might want to do it. It is highly unlikely that a permanent maintenance position will be secured.

Direct formal job opportunities for local individuals and/or contractors in the study area				
Change process	Impact	Majority affected segment	Vulnerable segment	Specific areas of impact
Local individuals and/or contractors are employed or sustained for a period.	Income levels increase and quality of life is enhanced, more opportunities to progress are afforded, emotional and physical well-being is improved. Income levels decrease again once the contract is completed or the next section of the line is built. <i>It could be that for some the extra income encourage a-social behaviour (e.g. alcohol abuse)</i>	Black male, unskilled or semi-skilled, unemployed.	Those who do not comply with Eskom's procurement criteria or don't understand the process. Females, mostly black, are not equally considered for these positions. The unskilled/semi-skilled can be exploited.	The NWP, where the levels of unemployment are high, and household income low.

Stage	Pre construction (negotiation)	Construction	Operation
Extent of impact	<i>No opportunities</i>	<i>Local</i>	<i>Local</i>
Duration of impact		<i>Short term</i>	<i>Long term - but sporadic in the case of bush clearance.</i>
Intensity		<i>Medium+</i>	<i>Low+</i>
Probability of occurrence		<i>Most probable</i>	<i>Improbable</i>
Status of the impact		<i>Positive for the environment and development</i>	<i>Positive for the environment and development</i>
Accumulative Impact	The local economy will be boosted on a temporary basis, and family members might experience some relief to an extent, including women related to the employees.		
Confidence		<i>High</i>	<i>High</i>
Level of significance		<i>Medium+</i>	<i>Low+</i>

Mitigation measures	<ul style="list-style-type: none"> <li>Local steering committees can be used to identify local people for employment. A local person can be identified in the local community - this could happen through the Department of Labour - and this person establishes a steering committee. The contractors communicate their needs to the steering committee that compile a list of people that are available for employment. Alternatively, the Unions can be asked for assistance, or the Local Economic Development Forum.</li> <li>Local leaders should be made aware that only <b>limited</b> job opportunities will be created.</li> <li>The local leaders should also be informed about the nature of a linear project, and that labourers will probably move along the route as construction progresses. Labourers may choose to terminate employment if they moved away from home too far, and transport becomes too expensive or a problem. This will then afford opportunities to other communities.</li> <li>The potential employee should undergo induction training about the site rules and regulations. Should the applicant agree to these rules, a contract is signed with him.</li> <li>Equal opportunities for employment should be created to ensure that the local female population also have access to these opportunities. Females should be encouraged to apply for positions.</li> <li>Individuals with the potential to develop their skills should be afforded training opportunities. Eskom should be involved in this process.</li> <li>Mechanisms should be developed to provide alternative solutions for creating job security upon completion of the project. This could include formal and/or informal training on how to look for alternative employment, information on career progression, etc. to ensure that people are equipped to seek other jobs with the skills that they have gained.</li> </ul>
Level of significance after mitigation	<div> <div></div> <div> <p><i>High+ because up to 50% local jobs can be created should mitigation measures be implemented.</i></p> </div> <div> <p><i>Medium+ because bush clearance could be done by local contractors.</i></p> </div> </div>

**3.1.2. Indirect formal and/or informal economic opportunities for local individuals and/or contractors**

Other economic opportunities seem to be focused around construction camps. This is done through construction workers' use of local enterprises (shops and shebeens) and in formal and informal work opportunities created at the construction camp. The mere fact that economic activity increases through increased expenditure within the area is an indirect benefit to the community.

However, increased economic activity seems to focus almost exclusively around construction camps. Indirect formal work opportunities around construction camps seem to be mostly for cleaners and security guards - seemingly mostly male. Women provide services in or next to the construction camp which could include washing, cooking, sex, and supplying alcohol and food (Post-hoc Study, Social Impacts in Constructing High Voltage Transmission Power Lines, MasterQ Research, 2007 = PHS MQR, 2007).

When a construction camp is put up money is also paid towards the land owner. This is seen to hugely benefit the community. On tribal or municipal land negotiations are done with community leaders who consult with the community regarding the issue. Another opportunity for financial gain is the rental of land for the accommodation of the construction workers and storage of equipment. This will have a positive impact on the community that benefits from it.

The accommodation of construction workers in the communities should be considered as it increases the economic benefits of the project to the affected communities. The economic opportunity for the local community is positive, and potential impacts such as pregnancies because of sexual relationships could be prevented to some extent by implementing mitigation measures. The payment to households will vary according to the nature of the accommodation.

For the construction of one line about 60-130 workers need accommodation at one time, for the construction of three lines simultaneously, a maximum of about 400 workers will need accommodation at a time. Towns in the area are Lephalale, Thabazimbi, Northam, Lethlabile, and a number of villages in NWP. It should be possible to accommodate workers in these towns. In NWP transport should not be a problem. It could be a problem in LP, because the route is in deeper rural areas.

Sanitation is sometimes required in the maintenance phase when extensive maintenance needs to be done. However, the size, nature and location of the camp will determine the extent of services needed. In general, informal job opportunities are limited.



Indirect formal and/or informal job opportunities for local individuals and/or contractors				
Change process	Impact	Majority affected segment	Vulnerable segment	Specific areas of impact
Local informal and formal businesses are supported and sustained for the duration of the construction.	Income levels increase and quality of life is enhanced, more opportunities to progress are afforded, emotional and physical well-being is improved. Income levels decrease again once the contract is completed or the next section of the line is built. <i>It could be that for some the extra income encourages a-social behaviour (e.g. alcohol abuse). Also, transactional sex could have health impacts.</i>	Local businesses and their employees/potential employees. Black males and females who are unemployed or have a low income, with or without dependents.	Black males and females, unemployed or low income, can be exploited. Service providers (businesses and individuals) might under value their own services, and negotiation for a better costing will not be possible at a later stage.	Around construction camps.

Stage	Pre construction	Construction	Operation
Extent of impact	<i>No potential</i>	<i>Local for indirect informal Regional for indirect formal</i>	<i>Local for indirect informal Regional for indirect formal</i>
Duration of impact		<i>Short term</i>	<i>Sporadic long term</i>
Intensity		<i>Low+ if not accommodated in the community High+ if accommodated in local communities</i>	<i>Low+</i>
Probability of occurrence		<i>Most probable</i>	<i>Probable</i>
Status of the impact		<i>Positive for the environment and development</i>	<i>Positive for the environment and development</i>

Accumulative Impact	The local and regional economy will be boosted. Subcontractors will benefit. Family members will experience relief.		
Confidence		High	High
Level of significance		Medium+	Low+
Mitigation measures	<ul style="list-style-type: none"> <li>Develop a procurement policy that is easy to understand and ensure that local subcontractors also comply with the procurement policy and any other applicable policies.</li> <li>Ensure that local subcontractors receive the necessary support in terms of resources.</li> <li>Agree on specific performance criteria prior to appointment.</li> <li>Identify the segment that might benefit from informal indirect opportunities, and assist them with skills development and subsidise initiatives that are sustainable.</li> <li>Encourage construction workers to use local services.</li> <li>To mitigate the potential impact (HIV/Aids, STDs) provide HIV/Aids prevention programmes to the contract workers and communities, provide family planning and contraceptive services to community surrounding construction camp. Educate women regarding gender issues and negotiating safe sexual behaviour.</li> <li>House construction workers in local communities.</li> <li>Encourage maintenance workers to make use of local services if and where such services exist.</li> </ul>		
Level of significance after mitigation		High + if construction workers are accommodated in the local communities. Medium+ if not.	Medium+

### 3.1.3. Compensation for servitude – direct effect

Eskom pays for right of way in the servitude of 55m per 400kV line from the land owners and pay a once-off amount for. For 3x400kV Transmission power lines the servitude is 165m and for two the servitude is 110m. Compensation is given for loss of livelihood as a result of the servitude. Normally compensation is calculated based on current market related values. Eskom offers 100% of the value of the servitude for the first line to be constructed on one owner's property, 110% for the second and 120% for the third line. The value of the servitude to be negotiated is calculated by multiplying the area of the servitude required from the land owner with the valuator's unit price. The impact of financial gain should be long term, because although a once-off amount is paid, this amount is measured taking into consideration the lifelong economic effect. Land owners are increasingly insisting on an annual access fee, which should be revised annually.

The financial gain is seen as a positive impact, but the negative side is that the servitude is negotiated within a corridor approved by DEAT. Some modification of the proposed line is possible, but significant modification in the project design will have to be appealed. Effective mitigation measures could result in a servitude which satisfies both parties.

For tribal land users, the farmers / users of the land on tribal land are not necessarily involved in the negotiation process. They might not even be informed about the construction of the line. Land users do seem to receive the compensation for damage to the crops / land, but not part of the compensation for the servitude. A positive economic change process relates to compensation paid out by Eskom for crop damages. Land users on tribal land seem to largely experience the construction of the line as having a positive economic impact due to the compensation paid out for crops that are destroyed.

This section does not discuss the negotiation process, only the economic change processes and impacts that could be expected as a result of the servitude.

Economic Individual level				
Change process	Impact	Majority affected segment	Vulnerable segment	Specific areas of impact
Financial gain.	Better financial position, loss of income is compensated for, quality of life can even improve, and emotional and physical well-being is enhanced, more opportunities to progress could be afforded. <i>For some, more so the higher income, the compensation might be considered inadequate.</i> Inadequate compensation for loss of <b>livelihood</b> is possible.	All segments, e.g.: Traditional land dwellers Commercial farmers - agriculture and tourism Home owners Informal settlements Subsistence farmers	Those who have not gone through the process before and do not fully understand the implications of construction activities etc.  Those living in informal settlements and the poor have less bargaining power, if any.  Those who live on traditional land might not receive the compensation themselves.  Game farmers who might experience a loss of income because of the line, but cannot proof it and are therefore not compensated for it.	All areas.

Stage	Pre-construction
Extent of impact	<i>Regional (along the route corridor)</i>
Duration of impact	<i>Long term</i>
Intensity	<i>Very high+</i>
Probability of occurrence	<i>Definite</i>
Status of the impact	<i>Positive</i>
Accumulative Impact	<p>The family and relatives of the land owner can experience relief because of the financial benefit. However, the land loses value, and it is said that the re-sell value of the land decreases.</p> <p>For tourist attractions, loss of livelihood is not considered. The compensation is calculated in terms of the loss of income in the servitude, and not as a result of other potential losses because of the servitude. Tourist numbers might drop because of the power line crossing the land, and this can result in job losses.</p> <p>In all the cases monetary compensation should include loss of livelihood - only compensating for a house is not enough, compensation for the loss of livelihood because of relocation must also be considered. For example, a subsistence farmer might have to move to new area, and will have to start anew with agricultural activities. It takes time to have yielded a crop, and he will have to be compensated for that waiting period.</p> <p>The manner in which construction and maintenance activities are executed could increase or decrease levels of dissatisfaction.</p>
Confidence	<i>High</i>
Level of significance	<i>Low+ - meaning that compensation is part of a standard process. The land owner is compensated at market value.</i>

Mitigation measures	<ul style="list-style-type: none"> <li>▪ Loss of livelihood should be assessed in its totality, including the potential loss of income as a result of loss of tourists as a result of the line. This includes compensation for loss of tourists during the construction process - the land owner may decide not to take any bookings during the construction period, and Eskom should compensate for it.</li> <li>▪ Negotiators should only be allowed to negotiate construction of the line within the approved route corridor.</li> <li>▪ The valuator should be experienced in valuating the land in question, e.g. game farms.</li> <li>▪ Land owners should be allowed to get in an independent valuator.</li> <li>▪ The negotiation should be done for the whole servitude and not part of the servitude.</li> <li>▪ Land owners should be made aware that a pre- and post evaluation of their land value is possible.</li> <li>▪ Payment to crop owners on traditional land: these farmers might not have a bank account and ways of payment should be negotiated up front.</li> <li>▪ Should a power line negatively impact on the economic activities of property owners (e.g. game farming and eco-tourism), Eskom should take the issue of the total depreciation of the farm into account when compensation amounts are calculated.</li> <li>▪ Discussions on conditions set for construction or maintenance between land owners and Eskom should involve the relevant parties from Transmission and the Regions when the need arises as “we know what happens on site and what could be implemented.”</li> <li>▪ Consultation between Land &amp; Rights and the Regions is important when conditions are set that impact on maintenance of the line.</li> </ul>
Level of significance after mitigation	<i>High+ - remediation of impacts during construction and operation were considered.</i>

#### *3.1.4. Visibility of line – indirect economic change*

In terms of the potential impact on tourist activities, the concept of sense of place has to be considered. People go on holiday for various and different reasons, e.g. to escape, to be entertained, to enjoy nature, to socialise, etc. In choosing a destination the image of the place is being considered, e.g. its authenticity, its offering, its status. If expectations are not met, clientele will be lost.

Research on the psychological experience of sense of place suggests that people rapidly discount a landscape as soon as the first scar occurs, rather like a stain ruining a favourite garment<sup>5</sup>. Thereafter, any additional impacts on the landscape have a correspondingly smaller effect. Hence, the aesthetic impact of placing a transmission line in a landscape that already bears the marks of development would be less than that of placing it in a relatively unspoilt environment. In discussing the diverse research showing that people overwhelmingly prefer “nature scenes” to urban and built environments, Zadik (1985) explains “people seem to respond to environments as natural if the areas are predominantly vegetation and do not contain human artefacts such as roads or buildings<sup>6</sup>.”

The above is strengthened by the results of a study to determine the value of interior plants to the hotel/tourism industry, in which Evans and Malone (1992) conducted a study at Opryland. The 12 acres of indoor space has approximately 18,000 plants valued at over \$1 million. The annual, horticultural budget is approximately \$1.2 million. The study attributes several positive impacts to the “greatscapes” -- the unusually high occupancy rate of 85%, numerous awards and continued expansion. Most importantly, the higher rate (\$30/night) for those rooms overlooking the gardens and the high occupancy rate of those rooms translate into \$7 million in additional room revenue annually.

For land owners, the economic impact of construction of the line on their land could be both positive and negative. For example, game farmers or tourist establishments claim that they lose income from hunters or tourists as a result of the visual impact of the line as well as during construction of the power line. However, at least land owners are compensated for the servitude.

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<sup>5</sup> Petrich, C.H. (1993). Science and the inherently subjective: The evolution of aesthetic assessment since NEPA. In Hildebrand, S.G. & Cannon, J.B. (Eds.). Environmental Analysis: The NEPA Experience (pp. 249-273)

<sup>6</sup> HortTechnology April/June 1992 2(2) Diane Relf, Professor, Horticulture, Virginia Polytechnic Institute and State University

Economic Individual to Regional level				
Change process	Impact	Majority affected segment	Vulnerable segment	Specific areas of impact
Pre-construction activities: clearing of land.	Loss of livelihood and income for owner, more so if activities take place during high season.	Owners of game farms or neighbouring game farms.	Smaller game farms. Those who already have lines on their property.	Game farms and neighbouring farms visually impacted on.
Construction activities: camp and village visibly change the landscape. Operation: Transmission power line visibly changes the landscape.	Job loss should farms be bought out or decrease in tourist numbers happen. Loss of income, negative physical and mental health, and quality of life.	Farm workers.	Farm workers and their families - should the farm be depreciated, the farm workers will lose their jobs.	Game farms and neighbouring farms - more so the section between Matimba B and Spitskop.

Stage	Pre-construction		Construction		Operation	
	Game farms (also neighbouring)	Small Farms	Game farm	Small farm	Game farm	Small farm
Extent of impact	None		Local	Local	Local	Local
Duration of impact			Short term	Short term	Long term	Long term
Intensity			High	High	High-very high	High-very high
Probability of occurrence			Highly probable			
Status of the impact			Negative for environment, positive for the project			
Accumulative Impact	Families are affected - not only economically but also from a mental health perspective. Sense of place is affected. A decrease in tourist numbers van lead to job losses and impact on families, businesses as well as the local economy as a whole.					

Confidence		<i>Medium-high</i>			
Level of significance		<i>High-</i>	<i>High-</i>	<i>High-</i>	<i>High-</i>
Mitigation measures	<ul style="list-style-type: none"> <li>As far as possible, construction activities should be limited to the summer months to ensure that hunting activities are not adversely affected.</li> <li>As far as possible, the Transmission power line should follow existing infrastructure, such as roads and existing Transmission power lines as this type of environment is already regarded as “stained.”</li> <li>A pre- and post valuation should be conducted.</li> <li>Farm workers should be compensated for loss of livelihood should they loose their jobs.</li> </ul>				
Level of significance after mitigation		<i>Medium-</i>	<i>Medium-</i>	<i>Medium-</i>	<i>Medium-</i>

### 3.1.5. **Increase in electricity**

The project will support increased electricity demand in the Brits and Ga-Rankuwa areas, and also ensure a more reliable electricity supply.

Change process	Impact	Majority affected segment	Vulnerable segment	Specific areas of impact
Increased power provision to Brits-Ga-Rankuwa	Increase in economic activity, which will impact on rest of the country (ito businesses).	Those in Brits and Ga Rankuwa. Industries and businesses.	The poor will not directly benefit.	Ga-Rankuwa and Brits.

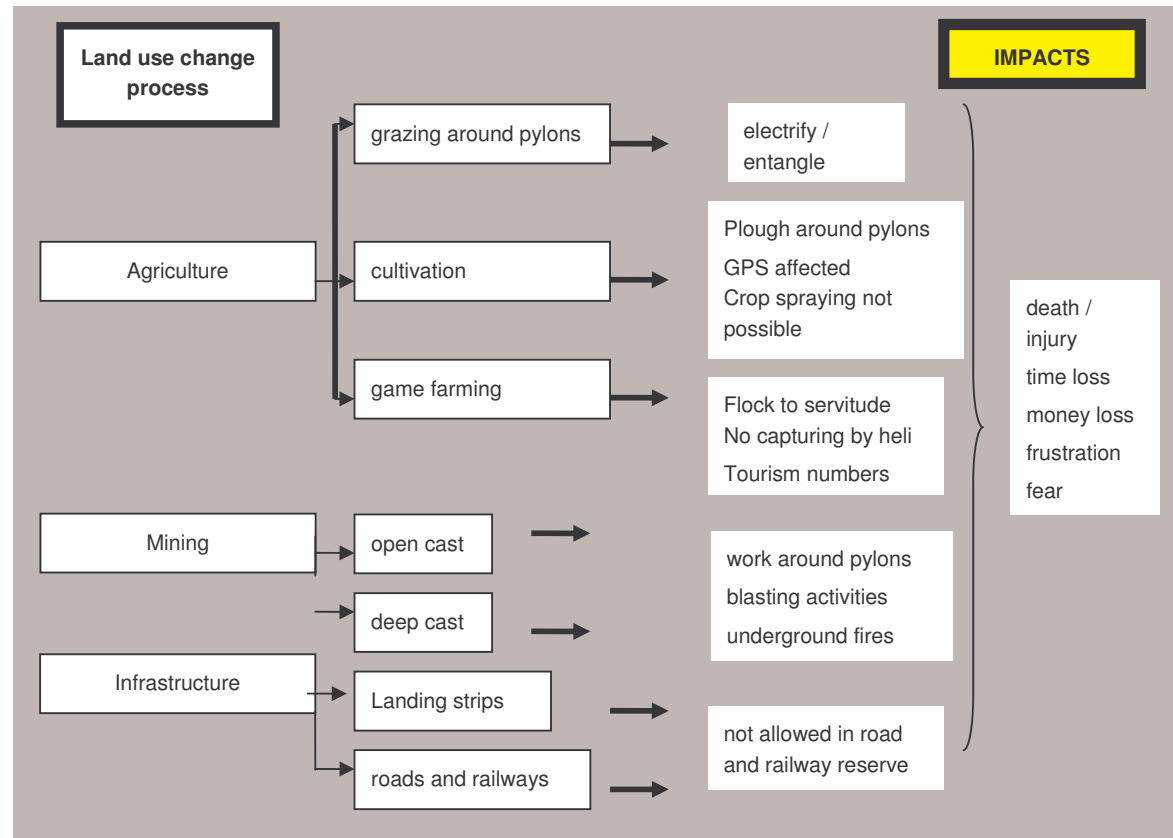


Stage	Operation
Extent of impact	<i>Regional</i>
Duration of impact	<i>Long term</i>
Intensity	<i>High+</i>
Probability of occurrence	<i>Highly probable</i>
Status of the impact	<i>Positive</i>
Accumulative Impact	Increase in economic activity could lead to education opportunities, better living standards, more development, which will create more jobs.
Confidence	<i>High</i>
Level of significance	<i>High</i>
Mitigation measures	
Level of significance after mitigation	<i>High</i>

### 3.2. LAND USE CHANGE PROCESSES

Geographical changes will lead to change in land use patterns. Land use change processes will be different for different segments of society, and can be positive or negative. For example, the change process will not be similar for a subsistence farmer and a commercial farmer with dry land cultivation. Expected land use changes are discussed in more detail, considering agriculture, tourism, landing strips, railways and mining.

Diagram 2. Potential land use change processes and impacts



### *3.2.1. Land use activities*

#### **Cultivated land**

##### **Change process and potential impacts:**

A temporary loss of cultivated land can be expected during the construction of the proposed Transmission power line due to the physical space needed for the construction activities. This would mean that a farmer would not have access to a part of his/her land for the planting of crops for the duration of the construction activities, which in turn would result in a temporary loss of income for that portion of the land. Loss of income because of loss of land will impact on the affected families - more so if timeframes are not adhered to.

Upon completion of the construction activities, the portion of the land is handed back to the land owner. The land owner is allowed to cultivate the land as before, but has to re-plan the layout of the crop fields due to the presence of a pylon(s) on the land. The land owner is allowed to plan crops within the servitude and in close proximity to the pylon(s), depending on whether he/she would be able to reach the crops for ploughing purposes. Some loss of land and economic loss will be experienced. Frustration with ploughing around pylons could increase stress levels.

It is preferable that 400kV Transmission power lines do not cross centre pivots, because of the proximity of the water to the line.

The pylons might interfere with the space needed for the centre pivot, and sub surface irrigation pipes.

##### **Mitigation Measures:**

- The temporary loss of cultivated land should be included in the negotiation process with the land owner.
- Land owners should be compensated for the permanent loss of cultivated land.
- Consultation should take place between the land owner and Eskom to determine the extent of permanent loss of land for cultivation due to the presence of the pylon(s).
- Upon agreement between the land owner and Eskom, land owners should be compensated for the permanent loss of portions of the land that is unreachable due to the presence of the pylon(s).
- The area should be rehabilitated upon completion of the construction activities to ensure that the land is returned in the same condition as prior to the construction activities.
- Where possible, pylons should be located on the border of the farmland to lessen the loss of cultivated land.
- Construction activities should be communicated and finalised with the affected property owners, and adhered to. Should this not be possible, the land owner should be informed and consulted about alternative arrangements.

##### **Specific areas of impact:**

Cultivated land, the area north of Spitskop, areas along rivers, the section next to the R511.

### **Grazing land**

#### **Change process and potential impacts:**

A temporary loss of grazing land can be expected during the construction of the proposed Transmission power line due to the physical space needed for the construction activities. This would mean that a farmer would not have access to a part of his/her grazing land for the duration of the construction activities, and might have implications for planning and economic implications. The portion of land that was used for construction activities is handed back to the land owner upon completion of these activities. Cattle can move freely under Transmission power lines and around pylons to graze. The permanent loss of grazing land is therefore not regarded as significant. It has happened, though, that cattle become entangled in the pylons, which led to injury and even death.

#### **Areas of impact:**

Grazing land, the area north of Spitskop.

### **Game farms/tourism areas**

#### **Change process and potential impacts;**

The impact on game farms can be two-fold. The effect can be on the activities of the farmer and the activities of the visitor. Activities of the farmer are relevant to this section.

Game farmers use helicopters to capture their game, and it is not possible to execute these activities in the vicinity of a power line. The helicopters fly low, and could crash into the line when herding game. Should the helicopter fly above the line, the game will not be effectively herded, and game could crash into fences.

Should the capturing net be away from the line, game still needs to be herded from all corners of the farm. Game seems to know when capturing is done, and 'hide' underneath lines.

Also, land is lost for grazing, and some game (like kudu) need a lot of food. The game farmer could suffer a significant loss when trees and/or grass are lost because of pylons.

Fortunately, game tends to 'naturally' move away from construction activities when it starts.

#### **Specific areas of impact:**

Game farms and neighbouring farms, all along the study corridor.

**Mitigation Measures (cattle and game):**

- If necessary, mitigation measures should be implemented to avoid any negative impact on animals (e.g. fencing off the construction area).
- Eskom or its appointed contractor(s) should assist with the temporary relocation of livestock.
- Where possible, pylons should be located on the border of the farmland to lessen the loss of grazing land.
- It is suggested that construction not take place during animal breeding months or during the main hunting seasons.
- Construction activities should be communicated and finalised with the affected property owners, and adhered to. Should this not be possible, the land owner should be informed and consulted about alternative arrangements.
- Where possible, pylons should be located on the border of the game farms and away from capturing nets to lessen the potential impacts.

**Cumulative Impacts:** It has happened that construction/maintenance teams leave gates open, don't follow access roads, and cut through fences, which affected the movement of livestock and lead to cross breeding and loss of cattle/game

**Landing strips**

**Change process and potential impacts:**

Transmission power lines in close proximity to landing strips and helicopter pads interfere with the safety of take off and landing. Also, it would appear that EMF interferes with GPS systems that are on board light aircrafts and helicopters, which in turn has a negative impact on the accurate navigation of aircrafts and helicopters. Interference with the GPS system could lead to fear and uncertainty regarding the effective navigation of and safe landing of aircrafts in the area.

**Mitigation Measures:**

Avoid Transmission power lines in close proximity to landing strips and helicopter pads.

**Specific areas of impact:**

Three landing strips, as marked on the map.

## Mining

### Change process and potential impacts:

Slumping and underground fires could occur in the vicinity of mines, and this has a safety impact for underground miners, as well as a financial impact on the mining operations in terms of a loss of production and/or rescue operations.

Open cast and strip mining of coal are the typical methods of mining coal reserves shallower than 60m below ground level<sup>7</sup>:

- Blasting in open cast mines presents an environmental hazard to power lines, threatening their operation and supply reliability. A minimum 500m buffer is normally required around blast sites, though a greater buffer area is likely to be required for lines that have the strategic importance of these between Mmamabula PS and Delta Substation.
- Dragline methods of excavation used in strip mining cannot be carried out in near proximity to overhead power lines for reasons of operational safety.
- The need for foundation stability means that an area much wider than the footprint of the towers needs to be preserved. This will vary according to the depth of the coal.
- The span between pylons may be 350m or more and it is theoretically possible to mine the coal between the pylons. However, this presents technical complications in mine operation and, for power line operation and maintenance reasons, the entire servitude will need to be preserved for access to the pylons, thereby sterilising coal reserves within along the entire servitude.
- Furthermore, the linear nature of power lines may eventually separate parts of the coal reserves from the main body if insufficient borehole exploration has been done by the time construction starts on the power lines. This could isolate an even greater area of coal reserves.

In most cases mines request Eskom to move power lines if coal reserves are discovered after the lines have been constructed and open cast methods are planned. Furthermore, from experience with lines in these areas Eskom seeks to try to provide a buffer between open cast operations and power lines.

Shallow underground mining presents a different impact on power lines. Depending on the depth of the coal seam, even mining 150 to 250m below ground results in some surface settlement after mining has been complete. Settlement may only be 300mm or so, but may also be a meter or more where the coal seams are 5m or more (conditions vary depending on depth of the coal and type of overlying material). This presents a risk of collapse of the tower structures.

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<sup>7</sup> 294-01 SR Addendum Mmamabula-Delta 11-03-07v3pdf

It is understood that pylons may be designed to accommodate limited settlement - possibly 200mm depending on foundation conditions. However, settlement is difficult to predict with any accuracy and it is more common to either move the overhead lines or to leave 'pillars' of coal under the pylons. The pillars will again be greater than the pylon footprint and, as with open cast methods, the process of coal extraction around the pillars is complex and more expensive.

Hence, planning a route for new power lines within areas of likely coal extraction needs to take these issues into account. An understanding of the location of coal reserves is important, especially for large power lines such as 400kV lines.

**Mitigation Measures:**

- The location of the Transmission power line should be determined in consultation with mining companies.
- It is preferable to avoid the mining operations altogether, but if it is unavoidable, the line should be located away from blasting areas and shafts.

**Specific areas of impact:**

Swartkop mine area at Spitskop.

**Roads and railways**

**Change process and potential impacts:**

Lines in close proximity of electric railway lines should be avoided to ensure that there is no electrical interference. Lines can cross 90 degrees over railway lines, but not run parallel to a railway line. Railways and roads have servitudes, and as a rule, Transmission power lines are not allowed in these servitudes.

**Specific areas of impact:**

Railways and roads as indicated on the map.

Stage	Construction				Operation			
	<i>Cultivated</i>	<i>Cattle</i>	<i>Game</i>	<i>Mining</i>	<i>Cultivated</i>	<i>Cattle</i>	<i>Game</i>	<i>Mining</i>
Extent of impact	<i>Site</i>							
Duration of impact	<i>Short term</i>				<i>Permanent</i>			
Intensity	<i>High around Spitskop</i>	<i>High NWP</i>	<i>High LP and NWP</i>	<i>High NWP</i>	<i>High around Spitskop</i>	<i>High NWP</i>	<i>High LP and NWP</i>	<i>High NWP</i>
Probability of occurrence	<i>Definite</i>			<i>Highly probable</i>	<i>Definite</i>			<i>Highly probable</i>
Status of the impact	<i>Negative for environment, positive for project</i>							
Accumulative Impact	Economic impact if not mitigated satisfactory							
Confidence	<i>High</i>							
Level of significance	<i>Medium-</i>	<i>Medium-</i>	<i>High-</i>	<i>High-</i>	<i>Medium-</i>	<i>Medium-</i>	<i>High-</i>	<i>High-</i>
Level of significance after mitigation	<i>Low-</i>	<i>Low -</i>	<i>Medium-</i>	<i>Low-</i>	<i>Low-</i>	<i>Low-</i>	<i>Medium-</i>	<i>Medium-</i>



### 3.2.2. **Spatial development**

Every municipality has a Spatial Development Framework and Integrated Development Plan according to which the developments are rolled out. The servitude might interfere with these development plans, as no structures are allowed in servitudes. Also, there is always a likelihood that formal or informal settlement could develop towards and into the servitude. Because of the fact that buildings are not allowed in the servitude for health and safety reasons, this should be avoided. Where development into servitudes in the study area was observed, it did not seem as if either Eskom or the Local municipalities took responsibility for moving these structures out of the servitude. Areas where this is a possibility should therefore be avoided.

Economic Individual level				
Change process	Impact	Majority affected segment	Vulnerable segment	Specific areas of impact
The presence of pylons and Transmission power lines could restrict the development plans of local municipalities, as no structures are allowed within the servitude.	This would impact on the planning process as development plans would have to be revised to accommodate the presence of a Transmission power line, which would have an impact on the economic impact status of the municipality. The revision of development plans would also delay developments plans. Informal settlements move into the servitude: health and safety impacts.	Villages / towns	Close vicinity to villages. Lethlabile - informal settlements could move into the servitude.	See discussion ahead.

Although increased urbanisation can be expected for both these provinces, especially in the Brits/Rustenburg and Lephalale areas, it does not seem as if developments are planned towards the proposed servitudes except in the Lethlabile and the area between the two alternatives entering Dinaledi. The western option might impact on planned town development. This area has been earmarked for town development (see map). With regards to the three options before entering Spitskop, it seems as if the likelihood of potential development into the western servitude will be least likely. With regards to the two options exiting Spitskop, it seems as if the likelihood of potential development into the eastern servitude will be least likely.

The likelihood for development into the servitude is higher for NWP. Under the low impact scenario the population of North West is expected to increase with 46% over a 20-year period (2001 to 2021) or 1.91% per annum. Under a high impact scenario, the North West population is expected to increase with 12.6% over the 20-year period or 0.60% per annum<sup>8</sup>. The population growth rate for Lephalale Municipality will decrease from

<sup>8</sup> Ventersdorp LM, IDP review report, 2004/2005

approximately 1.345% in the year 2004 to 1.024% in the year 2010. The number of informal dwellings will increase. In Limpopo, there was an increase of approximately 30 000 households living in informal dwellings in from 1996 to 2001, bringing the total to 78 000 households living in informal dwellings<sup>9</sup>. For Northwest, there was an increase of approximately 48 000 households living in informal dwellings from 1996 to 2001, bringing the total to 207 000 people living in informal dwellings<sup>10</sup>. It could therefore well be that informal dwellings could occur in the corridor in NWP.

The results of the socio-economic survey indicate that private game farm owners have invested a lot of money in the development of their establishments, and plans for expansion and improvement in the next years are in place. Some game farms in the NWP are part of the Land Reform process. No developments are currently planned for these game farms. However, one cannot conclude that these farms will not operate as game farms in future. In fact, the intention of the Land Reform process is that transferral of skills take place between the current owner and the future owner(s). The farms will therefore probably carry on operating as game farms under the new owners. Although the majority of the farms in NWP border the proposed corridor, and the corridor does not go through these farms, they will probably be impacted on because of the visual effect of the lines and the resultant impact on the sense of place experienced by visitors.

Also, a Heritage Park (HP) development is planned which will link Pilanesberg National Park with Madikwe Game Reserve. The objective of this Heritage Park Expansion Plan is to “pro-actively facilitate the natural expansion of Madikwe Game Reserve and Pilanesberg National Park to the benefit of all stakeholders with the ultimate aim of becoming a meaningful Nature-based Tourism Anchor in a bigger wildlife area, eventually incorporating Madikwe Game Reserve and Pilanesberg National Park with each other to form the HP (Heritage Park) of some 250000 ha (Executive Summary Heritage Park Big Five Safaris Pilanesberg to Madikwe South Africa North West Province). The western and middle option north of Spitskop substation goes through the eastern boundary of this planned HP. This part of the HP is planned to be a community owned Big 5 reserve, the Lebathlane Game Reserve of about 31 000 hectares. The Tshweneng Hills heritage site will be between the middle and western option.

Stage	Operation
Extent of impact	<i>Regional</i>
Duration of impact	<i>Permanent</i>
Intensity	<i>Medium</i>

9 StatsSA, Primary Tables, North West, Census '96 and 2001 compared

10 StatsSA, Primary Tables, North West, Census '96 and 2001 compared

Probability of occurrence	<i>Improbable for formal development plans. Possible for informal settlements at Lethlabile. Could impact on plans of private land owners.</i>
Status of the impact	<i>Negative</i>
Accumulative Impact	
Confidence	<i>High</i>
Level of significance	<i>Medium-</i>
Mitigation measures	<ul style="list-style-type: none"> <li>▪ Avoid settlements</li> <li>▪ Do not interfere with development plans</li> <li>▪ A management plan for informal settlers should be drawn up between the municipalities and Eskom</li> </ul>
Level of significance after mitigation	<i>Low-</i>

### ***3.2.3. Physical splintering***

Construction activities at the site as well as the construction village take up physical space that could temporarily splinter communities and affect free flow movement patterns from one side of the community to the other side. Although movement patterns will not cease to exist, it would be altered on the short term to move around the construction activities.

It is unlikely that the presence of a Transmission power line would splinter communities, seeing as people can still move freely underneath a Transmission power line. However, the perception that a Transmission power line is dangerous might prohibited people to move around or underneath the line, but it is foreseen that this would mostly be on an individual basis based on personal perception and would therefore not affect the collective community.

Mostly traffic - community level				
Change process	Impact	Majority affected segment	Vulnerable segment	Specific areas of impact
Presence of lines.	Construction activities at the site as well as the construction village take up physical space that could temporarily splinter communities and affect free flow movement patterns from one side of the community to the other side. Although movement patterns will not cease to exist, it would be altered on the short term to move around the construction activities.	Lethlabile and Spitskop area Game farms.	Pedestrians.	Lethlabile and Spitskop area Matimba B.  Game farms.
The number of trucks on the site of the construction of a 400kV Transmission power line could increase to around 20. In addition, two (2) bull dozers, two (2) excavators, two (2) big cranes and two (2) drill rigs could be expected on site. In addition to the heavy vehicles, workers move around in light trucks (bakkies). It is estimated that a maximum of around 25 bakkies will be on site during the busiest periods of construction. Stringing activities require the most vehicles. Speeding of construction vehicles could be an issue to land owners and affected communities surrounding the construction site.	Movement patterns have to change.  Also (but discussed in the environmental change section):  Damage to infrastructure  Unauthorised entry  Accidents as a result of speeding  Dust pollution			

Stage	Construction			Operation		
	<i>Traffic</i>	<i>Pedestrians</i>	<i>Villages/ towns</i>	<i>Traffic</i>	<i>Pedestrians</i>	<i>Villages/ towns</i>

Extent of impact	Site			
Duration of impact	Short term		Long term	
Intensity	Medium		Low	
Probability of occurrence	Highly probable		Improbable	Possible
Status of the impact	Negative		Negative	
Accumulative Impact	Other similar activities.			
Confidence	High		High	
Level of significance	Medium-		Low-	
Mitigation measures	<ul style="list-style-type: none"><li>▪ Provide a safe passage way for community members to minimise the impact on movement patterns.</li><li>▪ Fence off the construction site to prohibited unauthorised access by community members, thereby placing themselves in potential unnecessary danger.</li><li>▪ Community awareness on the safety mechanisms of a Transmission power line and potential dangers.</li><li>▪ Such an awareness campaign should be based on and addressed Frequently Asked Questions (FAQs) regarding a Transmission power line, e.g. is it safe to walk underneath a Transmission power line if the surrounding area is wet or it is raining?</li><li>▪ The awareness campaign should also focus on standard operating procedures when there is a breakdown in the line, e.g. people should steer clear of the area, who to contact, etc.</li><li>▪ Traffic: keep to speed limits, keep to authorised roads, use signage to warn people about traffic movements.</li></ul>			
Level of significance after mitigation	Low-		Low/	

### 3.3. DEMOGRAPHIC CHANGE PROCESSES

The construction and maintenance of a Transmission power line could lead to a change in the number and composition of people within any given community, which in turn could lead to economic and socio-cultural impacts. Demographic changes and related impacts during construction are mainly related to the influx of construction workers and job seekers and the outflow of local labourers recruited during construction. Relocation of houses in the servitude could also result in changes in the demography of smaller areas.

#### 3.3.1. **Relocation**

Eskom regulations state that residence under a Transmission power line is not allowed. If it so happens that people live in an area where a new proposed servitude is planned or servitude has to be extended, these people would have to be resettled in order to comply with Eskom regulations. Relocated households would also have to be compensated accordingly. With relocation Eskom offers to reimburse the homeowner for the construction of a similar house or ensure that a similar house is constructed. Homeowners was said to prefer being reimbursed for their homes. Because of the financial benefit received from being relocated from the servitude problems could arise from people putting up houses under the servitude during construction.

The table ahead gives an estimate of the number of affected households (inclusive of lodges, households and workers houses) in the 5km corridor based on the 1:225 000 maps. This was done by counting the number of black squares in the study corridor, which represent buildings. All the buildings (as per the black squares) in the existing 400kV servitude were not counted in because buildings are not allowed in a servitude, and no buildings were observed in the servitude during the field trip and helicopter. The table also lists the estimated number of houses to be relocated, based on a helicopter fly-over of the area. Although the lodges, houses and worker's houses have been plotted separately during the helicopter fly-over, the data is not reflected as such on the map, because the information might not be 100% accurate and land owners might take exception to this.

Point A-B in LP (see map): It is estimated that five buildings will have to be relocated should the proposed lines go east of the existing line (red dots on the map). Note that this is only estimation, as it was difficult to estimate the distance of a servitude of 160 meters from the air. Relocation could possibly be avoided by diverting the line. The area east of the line seems less densely populated, and this is the preferred side from a demographic point of view. Relocation in the other areas does not seem to be necessary, except for the Lethlabile area, where informal settlements are already developing towards the proposed servitude (point L on the map). Some houses and lodges will be located in close proximity to the power lines. Although relocation will not be necessary for these owners, the option for relocation should be given to the owners of these properties as the impact of three and four Transmission power lines close to the place called "home" could be highly significant.

The impact of relocation depends on the level of attachment to a place, which in turn is informed by variables such as age and number of years spent in that particular area. The relocation of populations should be avoided as far as possible.

Even if the proposed Transmission power line is aligned in such a manner that it does not traverse any currently inhabited areas, the possibility cannot be ruled out that some areas will not be inhabited by the time construction commences. In the past, there have been incidences where households have deliberately settled in an area that is known to be earmarked as a servitude for a planned Transmission power line. Such households then claim to have been living in that area for an extended period of time. Such claims are motivated by the fact that they might be able to claim compensation from Eskom for having to be resettled.

Description - Limpopo Province up to Spitskop	Number of houses in corridor			Estimated nr to be relocated
Point A-B				
Estimated number of individual houses	50			5
Estimated number of people per house	Average 3.4x50=170			Average 3.4x5=17
Estimated number of scattered residential (6+houses)	5 (V1, V2, V3, V4, V5) (6, 19, 20, 8, 53 houses)			
Estimated number of people per village	Average 3.4 people per house = 360			
Alternatives before entering Spitskop	West	Middle	East	
Estimated number of individual houses	55	10	15	
Estimated number of people	187	34	51	
Estimated number of villages	7	5	3	
Description - Spitskop to Dinaledi	Number of houses in corridor			
Estimated number of individual houses	21			
Estimated number of people per house	71			
Estimated number of villages	4			
				Some informal houses might have to be relocated in the Lethlabile area.



Stage	Pre-construction
Extent of impact	<i>Site</i>
Duration of impact	<i>Permanent</i>
Intensity	<i>Depends on the individual</i>
Probability of occurrence	<i>Definite</i>
Status of the impact	<i>Negative</i>
Accumulative Impact	
Confidence	<i>High</i>
Level of significance	<i>High -</i>
Mitigation measures	<ul style="list-style-type: none"> <li>▪ Avoid the resettlement and/or displacement of populations as far as possible.</li> <li>▪ If resettlement is unavoidable, residents should be sufficiently compensated for loss of livelihood and assisted with the relocation process.</li> <li>▪ A form of compensation should also be granted to individuals who are residing in informal settlements within the servitude. However, this issue should be approached with caution as this might set a precedent for future projects (it has already been stated during the ESS that people might deliberately move onto a servitude for the purpose of receiving compensation).</li> </ul>
Level of significance after mitigation	<i>Depends on the individual</i>

### **3.3.2. Influx of construction workers**

One contractor's workforce in constructing a 400kV line normally amounts to about 250 people. When construction is accelerated more workers could be expected on site. This is done by dividing the line into more than one section and appointing a contractor per section or by incorporating additional teams in the construction process. An estimated maximum of 250 workers will be engaged at any one time in the construction activities on the route for one line. However, construction activities are spread out across large areas of the route and continuously move along the route. The construction activity that requires the most labourers is stringing with up to 120 people engaged in the activity. As such, the influx of people has limited impact on and around the construction site.

The impact of the influx of construction workers is mostly applicable to the areas surrounding the construction camps where workers spend evenings and weekends. Although the average number of construction workers per camp is around 100, up to 250 workers could stay at the camp. In a rural area, this could represent a significant growth in population for the period of construction. Contact between the local community and the workers can be expected and conflict could be expected. However, conflict usually seems to be alcohol induced.

Community to Regional level				
Change process	Impact	Majority affected segment	Vulnerable segment	Specific areas of impact
More people	Depending on the flexibility of the receiving environment, the impact should not be viewed as purely negative. If the community has the capacity to accommodate additional people, the presence of construction workers could lead to a temporary boost in the local economy if construction workers make use of local services. However, a community that is unable to meet its own needs would be unable to sustain additional demands on the local services, which would lead to conflict if services are depleted (e.g. the local grocery store running out of supplies due to the extra demand). Potential conflict, stress on infrastructure, safety and health.	Men at public social gatherings where alcohol is consumed.	Poorer communities. Families left behind.	Around shebeens - NWP.

Stage	Construction
Extent of impact	<i>Site</i>
Duration of impact	<i>Short term</i>
Intensity	<i>Low-</i>
Probability of occurrence	<i>Definite</i>
Status of the impact	<i>Potentially positive</i>

Accumulative Impact	The simultaneous influx of appointed construction workers together with the influx of job seekers would further increase the demand on services to the detriment of the receiving environment.
Confidence	<i>High</i>
Level of significance	<i>Medium-</i>
Mitigation measures	<ul style="list-style-type: none"> <li>▪ Raise awareness amongst construction workers about local traditions and practices.</li> <li>▪ Elude local businesses to the fact that construction workers will move into the area to enable local businesses to plan for the extra demand.</li> <li>▪ Ensure that the local community communicate their expectations of construction workers' behaviour with them.</li> </ul>
Level of significance after mitigation	<i>Medium+</i>

### *3.3.3 Influx of job seekers*

Job seekers from surrounding communities focus their efforts in securing a job for construction on the site office and construction camp.

At the start of the construction period, surrounding communities become aware of job opportunities that might arise from construction of the line. In response to the possibility of getting a job on site, job seekers approach the construction camp, where the site office is located. Although a small number of job seekers could be employed in this way, job seekers mostly hang around the camp for a few days in the hope of securing a job on site. Local individuals could jeopardise their current employment in leaving their workplace in the hope of earning a better income in construction.

If the construction camp is located within an established community, employment procedures are discussed with the local leaders and followed to ensure that the community reaps the benefits from employment opportunities.

Community to Regional Level				
Change process	Impact	Majority affected segment	Vulnerable segment	Specific areas of impact
Perceived or real cultural differences	The influx of job seekers into the environment will lead to an increased demand on local services and will not necessarily lead to a boost in the local economy, seeing as these job seekers are unemployed. The influx of job seekers might further lead to conflict with local residents in respect of competition over limited job opportunities. The impact will also be on families they leave behind.	Men at public social gatherings where alcohol is consumed.	Poorer communities. Families left behind.	Around shebeens - NWP.

Stage	Construction
Extent of impact	<i>Site</i>
Duration of impact	<i>Short term</i>
Intensity	<i>Low-</i>
Probability of occurrence	<i>Possible</i>
Status of the impact	<i>Negative</i>
Accumulative Impact	The simultaneous influx of appointed construction workers together with the influx of job seekers would further increase the demand on services to the detriment of the receiving environment.
Confidence	<i>High</i>
Level of significance	<i>Medium-</i>
Mitigation measures	<ul style="list-style-type: none"> <li>Ensure that employment procedures / policy are communicated to local stakeholders.</li> <li>Have clear rules and regulations for access to the camp / site office.</li> </ul>
Level of significance after mitigation	<i>Low-</i>

### 3.3.4. Outflow of labourers

Local labourers employed during construction of the line could be offered permanent employment by the construction company. As 50%+ of local labour could be used during construction, the number of local labourers to be potentially offered permanent employment would be substantially less.

Economic Individual level				
Change process	Impact	Majority affected segment	Vulnerable segment	Specific areas of impact
Some local labourers are recruited during construction to join the contractor's permanent workforce. Once someone has joined the contractor's permanent workforce, he would then become a migrant labourer that moves with the contractor to other projects. The number of workers that move with the contractor differs.	The impact of this will be positive ito financial gain to families. But might be negative in terms of the local community's loss of men to become part of the migrant community with all its social impacts.	Employed men.	Families left behind.	NWP.

Stage	Construction
Extent of impact	<i>Site</i>
Duration of impact	<i>Long term</i>
Intensity	<i>High- and +</i>
Probability of occurrence	<i>Possible</i>
Status of the impact	<i>Positive</i>
Accumulative Impact	<i>Families are left behind, but benefit financially</i>
Confidence	<i>Medium</i>
Level of significance	<i>Medium- and medium +</i>
Mitigation measures	<ul style="list-style-type: none"> <li>▪ Frequent weekends home.</li> <li>▪ HIV/Aids awareness.</li> </ul>
Level of significance after mitigation	<i>Medium+</i>

### 3.4. EMPOWERMENT, INSTITUTIONAL AND POLITICAL CHANGE PROCESSES

#### 3.4.1. Negotiation

Eskom pays for right of way in the servitude of 55m per 400kV line from the land owners and pay a once-off amount, and negotiates this payment with the land owner, which can either empower or disempower the land owner. A transparent negotiation process that leads to a positive outcome (i.e. both parties are satisfied with the agreement) will have a positive impact. A breakdown in negotiations would lead to a negative impact in terms of a lengthy legal process that can either lead to an alternative route for the Transmission power line or the expropriation of land for the servitude. In this instance the project will be severely delayed. If there is a breakdown in the negotiation process, the potential impact would be high levels of frustration as a result of the litigation process and the resultant delay in construction, as well as the potential for a perceived economic loss for both parties.

The negotiation process would not have happened were the lines not to be constructed. This takes extra time, effort, and can be a stressful situation for the land owners. It is expected that the affected land owners in this area might be more resilient, as the majority had to go through a negotiation process for existing lines. This is mainly in the LP. In the NWP, where the line crosses traditional land, the owners might be less resilient. The servitude borders the game farms but crosses traditional land for most of the way in the NWP.

Change process	Impact	Vulnerable segment	Specific areas of impact
Negotiation process	Anger, fear, frustration, discomfort, sense of place change. Attitudes are formed by means of people's perception. In this case attitude formation refers to the perception that people in the local community might form on the proposed project, which in turn would influence their attitude towards the project. If the local community is unsupportive of the project, it could lead to social mobilisation. The probability of social mobilisation against the project is rated as highly probable, i.e. the likelihood of the impact materialising is likely. The risk for social mobilisation greatly increases if Eskom is perceived as distrustful, i.e. if they do not deliver on their undertakings with the community in terms of employment creation, etc. To ensure support of the project and reduce the risk of social mobilisation, Eskom should at all times be seen to care about the local community. The community need to feel that they receive some tangible benefits from the project, e.g. direct and indirect employment. The undertakings in the EMP should also be implemented effectively and with due diligence.	Those who have not gone through the process before and do not fully understand the implications of construction activities etc.  Those living in informal settlements and the poor have less bargaining power, if any.  Those who live on traditional land might not be in charge of the negotiation process.  Game farmers who might experience a loss of income because of the line, but cannot proof it.	Informal settlements in the servitude - in the Lethlabile area.  Traditional land with dwellings in the servitude, which makes resettlement necessary.  Game farms.

Stage	Pre-construction					
	Traditional land	Agriculture	Tourism	Homes	Informal	Subsistence
Extent of impact	<i>Local</i>	<i>Local</i>	<i>Local - indirect impact could be regional and even international</i>	<i>Local</i>	<i>Local</i>	<i>Local</i>
Duration of impact	<i>Long term</i>					
Intensity - measured according to the number of land owners in the category affected.	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>	<i>Low</i>	<i>Low</i>	<i>Low</i>
Probability of occurrence	<i>Highly probable</i>	<i>Highly probable</i>	<i>Highly probable</i>	<i>Highly probable</i>	<i>Low</i>	<i>Medium</i>
Status of the impact	<i>Positive for the receiver and the development</i>					
Accumulative Impact	<p>The family and relatives of the land owner can experience relief because of the financial benefit. However, the land loses value, and it is said that the re-sell value of the land decreases.</p> <p>For tourist attractions, loss of livelihood is not considered. The compensation is calculated in terms of the loss of income in the servitude, and not as a result of other potential losses because of the servitude. Tourist numbers might drop because of the power line crossing the land, and this can result in job losses.</p> <p>In all the cases monetary compensation should include loss of livelihood - only compensating for a house is not enough, compensation for the loss of livelihood because of relocation must also be considered. For example, a subsistence farmer might have to move to a completely new area, and will have to start anew with agricultural activities. It takes time to have a yield, and he will have to be compensated for that waiting period.</p> <p>The manner in which construction and maintenance activities are executed could increase or decrease levels of dissatisfaction.</p>					
Confidence	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>
Level of significance	<i>Depends on role of traditional authority and perceptions</i>	<i>Low-high</i>	<i>Low-high</i>	<i>Low-high</i>	<i>Low-high</i>	<i>Low-high</i>
Mitigation measures						

	<ul style="list-style-type: none"> <li>Discussions on conditions set for construction or maintenance between land owners and Eskom should involve the relevant parties from Transmission and the Regions when the need arises as “we know what happens on site and what could be implemented.”</li> <li>Consultation between Land &amp; Rights and the Regions is important when conditions are set that impact on maintenance of the line.</li> <li>The process should be conducted with the necessary respect, and the negotiator should be transparent about the process and expectations (do not engage in “empty promises”).</li> <li>Contracts should be reviewed by an independent body.</li> <li>Negotiations should preferably be done through an organised group or formal structures to ensure that land owners are protected.</li> <li>Land owners should be made aware that a pre- and post evaluation of their land value is possible.</li> <li>Negotiators should record everything that is discussed with land owners.</li> <li>Negotiation skills will be necessary throughout the process, even in the maintenance stage, and good preparation about rights will be of great assistance.</li> </ul>
Level of significance after mitigation	<i>Low+-High+</i>

### 3.4.2. Control

One of the most prominent issues amongst land owners is how they have lost control over who enters and move on their property due to the construction of the Transmission power line. Land owners feel that their privacy is invaded with construction and maintenance of the line. A common emotion amongst land owners is: “You’re on my land; I don’t have any control over what happens here.” This was confirmed by a number of land owners that were interviewed. For a land owner that values and cares for his property, the invasion of strangers is difficult. One of the comments made on how this invasion feels like was related as follows: “Maande lank is daar vreemdelinge wat in jou huis is” (for months there are strangers in your house).



Individual level				
Change process	Impact	Majority affected segment	Vulnerable segment	Specific areas of impact
Construction workers on property.	<u>Safety &amp; security fears</u> The presence of 'strangers' on their property sparks safety and security fears amongst land owners. This is said within the context of increased violent crimes conducted against farmers in South Africa. Land owners said they want to know when Eskom will be on their property. One of the interviewees said that with access to his property during construction, there is a possibility that unwanted people could enter to observe the property making him vulnerable to safety and security risks.	Farmers.	Uninformed.	All along the route.

Stage	Pre-construction, construction and maintenance
Extent of impact	<i>Site</i>
Duration of impact	<i>Short-Long term</i>
Intensity	<i>Medium-</i>
Probability of occurrence	<i>Highly probable</i>
Status of the impact	<i>Negative for the environment and the project</i>
Accumulative Impact	Negativity towards any Eskom project.
Confidence	<i>Medium</i>
Level of significance	<i>Medium- and medium +</i>

Mitigation measures	<ul style="list-style-type: none"> <li>▪ Transparent information should be supplied to the community from the outset of the project.</li> <li>▪ The local community should play an active participatory role in the planning process to strengthen their current support of the proposed project. This could be achieved by means of establishing a community forum that meet quarterly or once a month to discuss issues and progress surrounding the project.</li> <li>▪ Employment opportunities should first be offered to the local community if the skills are available within the community.</li> <li>▪ Eskom should deliver on their undertakings with the community in terms of employment creation, etc. (tangible benefits to the community).</li> <li>▪ The undertakings in the EMP should also be implemented effectively and with due diligence.</li> <li>▪ No firearms should be allowed on the construction site.</li> <li>▪ Security guards should be appointed.</li> <li>▪ Maintenance workers should be clearly identifiable, either by wearing overalls and/or identification cards.</li> <li>▪ Consult with local land owners prior to maintenance work taking place on the Transmission power line, to inform them of when the maintenance team will be on site, for how long, and approximately how many persons the team will consist of.</li> </ul>
Level of significance after mitigation	<i>Low+ to Medium+</i>

### 3.5. ENVIRONMENTAL CHANGE PROCESSES

#### 3.5.1. ***Presence of construction and maintenance workers***

The construction workers might be housed in a construction village. Their presence in the village and on site will impact on the environment, which in turn will impact on the surrounding communities.

The following change processes and impacts could develop due to the biophysical changes and changes in the physical environment as a result of construction and maintenance:

Gates. One of the most prominent problems experienced during construction is the issue of gates that are left open by contractors. Although land owners did not know of any livestock losses, game farmers specifically could not be sure that they didn't lose game.

Other issues that are often reported according to interviewees are: broken locks, locked gates that are not supposed to be locked, unlocked gates that are supposed to be locked, damage to gates and gate theft. Inappropriate use of gates and locks could have an impact on the safety and security of land owners, livestock theft and poaching of livestock.

**Mitigation measures:**

- Fines could be implemented for leaving gates open.

Firewood could get stolen. During bush clearance firewood is left in the servitude.

At the construction of the Matimba-Witkop Nr. 2 400kV Transmission power line one of the land owners interviewed had a problem that some of this firewood was stolen from his property during construction. The ECO confirmed reports in this regard from other land owners.

The provision of firewood due to bush clearance prior to construction of the line could also be positively evaluated by land owners according to one of the interviewees.

**Mitigation measures:**

- Fines could be implemented for taking wood
- Firewood should be available, and the use of fire monitored.
- To mitigate fires, all vehicles should carry flappers and the contractor should be required to have a trained fire fighter on site.
- Educate local communities and workers on the risk of fire and how to minimize the risk or contain fires.
- Construction workers should only be allowed to make fire in designated areas. Construction workers who do not keep within designated areas should be fined.
- Contractors are liable for the costs involved with connecting to the electricity network and the water services network.

Damage to infrastructure. Damage to roads is often cited by land owners as a problem that develops due to construction. Construction implementers indicated that roads are often damaged due to construction but are repaired to its original state after contractors have finished with construction. More damage is done during the wet season. Other infrastructure damage could include damage to gates and fences or damage to irrigation pumps.

**Mitigation measures:**

- The claim process for damage done by contractors should be simple.
- Land owners should be aware that they can refuse to sign the release form until they are satisfied with the level of rehabilitation.

Vegetation is destroyed during construction.

Trees could be cut unnecessarily.

In some areas, no trees can be cut as required by the land owner. Stringing is done by hand at this place.

**Mitigation measures:**

- The claim process for damage done by contractors should be simple.
- Land owners should be aware that they can refuse to sign the release form until they are satisfied with the level of rehabilitation.
- Land owners can request trees not to be cut. If this does not jeopardise safety, this can be adhered to and stringing can be done by hand.

Sanitation. Construction workers' excretion could be infected with worms, and as a consequence spread infection amongst livestock.

**Mitigation measures:**

- Construction workers are required to be treated for worms.
- Contractors are also required to carry portable chemical toilets with them on site.
- Adequate water facilities should be provided.
- Sufficient portable chemical toilets on site and at the construction village;
- Refuse on site should be discarded in sealed bins and/or covered skips. Refuse should be removed from the site on regular intervals (at least once a week) and disposed of at an approved waste disposal site; and

Littering.

**Mitigation measures:**

- The CEO should check for littering.
- Bins should be provided on site and at the camp.
- Fines could be implemented for littering.

Dust on roads due to vehicular movement.

**Mitigation measures:**

- Keep to speed limits.
- Water roads.

Damage to cultural, historical or archaeological resources.

**Mitigation**

A representative from the area should move with the team to check damages as construction workers might not be aware of any.

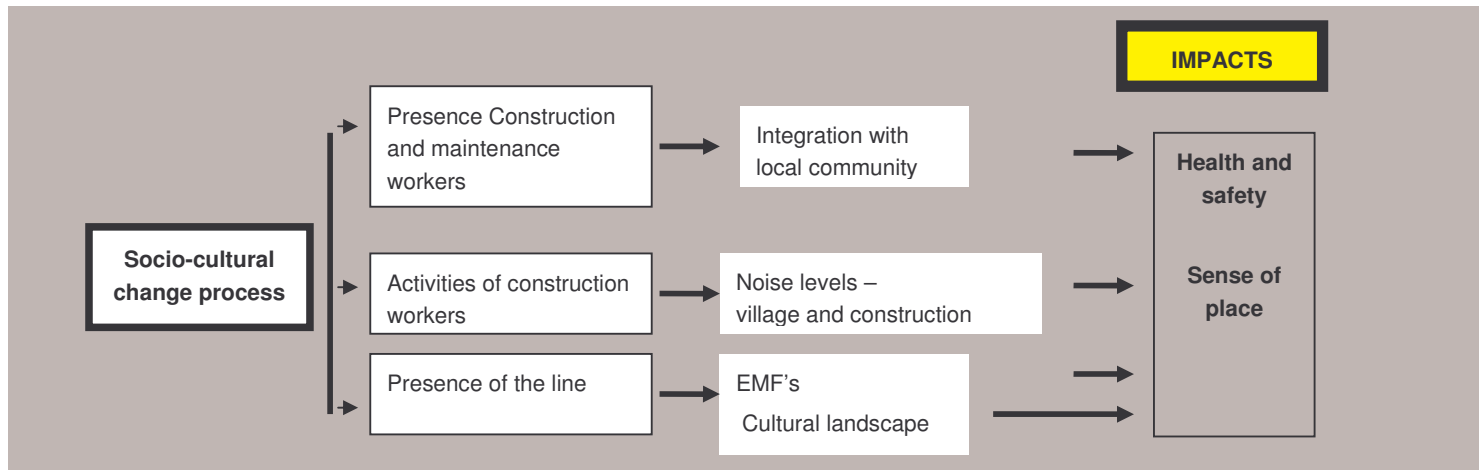
Individual and community level				
Change process	Impact	Majority affected segment	Vulnerable segment	Specific areas of impact
Litter, dust, water pollution.	Health and safety.	Close vicinity of the line/camp/roads that are used.	Communities with low service levels (water & sanitation, refuse removal).	Gravel roads. Communities with limited service.

Stage	Construction		
	Gates left open	Fire	Litter, dust, water pollution, fire wood, sanitation
Extent of impact	<i>Local</i>	<i>Can be regional</i>	<i>Local</i>
Duration of impact	<i>Short term</i>	<i>Long term</i>	<i>Short term-long term</i>
Intensity	<i>Medium</i>	<i>Can be very high</i>	<i>Medium</i>
Probability of occurrence	<i>Highly probable</i>	<i>Probable</i>	<i>Highly probable</i>
Status of the impact	<i>Negative for project and environment</i>		
Accumulative Impact	The number of construction workers - between Matimba B and Witkop the probability of occurrence will be higher should three teams work simultaneously.		

Confidence	<i>High</i>	<i>Medium</i>	<i>Medium-high</i>
Level of significance	<i>Medium-</i>	<i>Medium-high-</i>	<i>Medium-high-</i>
Mitigation measures	Apart from the above: Construction workers should adhere to a contract with the contractor. These rules of conduct should be stipulated in construction management plans. These should include the use of sanitation, water and waste as well as informal trading, running shebeens, and interfering in community affairs. The construction management plan should indicate how its water sanitation and waste facilities are in line with legislation. Emergency health facilities should be available at the camp. An ECO should control camps for adherence to these requirements.		
Level of significance after mitigation	<i>Low-</i>	<i>Low-</i>	<i>Low-</i>

### 3.6. SOCIO-CULTURAL CHANGE PROCESSES

This section assesses the cultural changes in a society than can be expected as a result of the project. Cultural changes can manifest on an individual or societal level and can either be perceived and/or experienced. The change processes and related impacts are discussed as follows:



### *3.6.1. Absorb construction and maintenance workers into the community*

#### Sexual relationships / children

According to literature and interviews with representatives from contractors and Eskom, sexual relations between construction workers and local individuals are mainly driven by the possibility of financial gain by local women from the more affluent construction workers. In the PHA MQR 2007 study, it became clear that these sexual relations might be different from traditional sex work where sexual services are exchanged for money. Women from poor communities seem to engage in transactional sex with construction workers where an exchange of other commodities could take place.

Women seem to visit men at the construction camp or in the local communities in which workers stay. Representatives from the contractor indicated that some women stay in the construction camps even though they are strictly speaking not allowed to. This was said to be allowed as “construction workers work long hours and should be allowed these freedoms.”

In both camps visited women were found inside, washing clothes or hanging around barracks. In a discussion with one of the construction workers on site, he said that the girls with whom they have a ‘jol’ also wash and cook for them. This was confirmed by one of the women found in the camp who said that she wasn’t paid for washing and cooking as she had a relationship with the man she washed and cooked for. In interviews with community members sexual relations between the workers and local women were seen as a natural occurrence and no one mentioned that these relationships were based on the exchange of money or other benefits.

The impact of sexual relationships between construction workers and women from the community could manifest in children being born after construction has finished. Even though no evidence could be found in this regard, the possibility was confirmed by a number of people. The councillor interviewed in Sebole, where construction workers stayed during the reparation of the line said that the community has seen an increase in teenage pregnancies since they have started to welcome construction workers from different projects to stay in their community. He proposed that campaigns on moral regeneration and HIV/AIDS awareness should be implemented during construction.

#### Alcohol abuse

Alcohol abuse among construction workers seems to be a problem during construction, especially after workers have received payment. The issues relate to alcohol’s effect on behaviour - sometimes causing irresponsible behaviour that could escalate to violence or conflict between individuals or groups - mentioned by stakeholders of both the Matimba-Witkop Nr. 2 400kV and the Beta-Delphi 400kV Transmission power lines. Noise around the shebeen, next to the construction camp in Uitspan due to alcohol abuse was also mentioned by one of the community members. It was however not seen as a problem.

According to one of the contractor representatives that were interviewed, alcohol abuse decreased in the last few years. He said that as workers are required to work harder while on site, there is not much time left for workers in which they could allow themselves to drink heavily.

Relationships between construction workers and local communities in the construction of the Matimba-Witkop Nr. 2 400kV Transmission power line were good according to all parties interviewed.

Where conflict was experienced between construction workers from outside and the local communities it seemed to be largely sparked by the use of alcohol. The difference in income between these groups was also cited as an additional source of conflict.

Representatives from the contractor as well as the local communities that housed construction workers during the Matimba-Witkop Nr. 2 400kV Transmission power line construction indicated that construction workers were briefed on what was expected from them in terms of their behaviour. Only a few incidents were reported. These were either at the shebeen in the local community or at the camp when workers or community members were intoxicated. The following rules were laid down for construction workers:

- No movement in the village at night.
- To be aware of alcohol abuse in the village.
- Construction workers are to be introduced to the community.
- Local shops or shebeens are warned that they should not allow workers to buy on\_credit as they will be moving away after a time.

Individual and community level				
Change process	Impact	Majority affected segment	Vulnerable segment	Specific areas of impact
<p>The relationships and behaviour patterns in a community change to absorb the newcomers.</p> <p>Construction workers are separated from their families for a prolonged period of time. It is therefore not uncommon for construction workers to engage in temporary sexual relationships with members of the local community and/or for sex workers to visit/loiter at the construction village.</p>	<p>Transmission of HIV/AIDS and STD's. These relations could also negatively impact on mental health.</p>	<p>Black females. Construction workers on site.</p>	<p>Females who live in poverty. Those who have easy access to the construction village. Also disempowered females (gender relations).</p>	<p>Around towns, and informal settlements. Lethlabile, Ramokoka, and other villages in close vicinity of the route. The level of significance is high in these areas, because of the potential fatal effect.</p>



Stage	Construction	Operation
Extent of impact	<i>Regional</i>	<i>Regional</i>
Duration of impact	<i>Short term-permanent</i>	<i>Short term-permanent</i>
Intensity (should the impact occur, it can be benign)	<i>High</i>	<i>High</i>
	<i>Highly probable</i>	<i>Low likelihood</i>
Status of the impact	<i>Negative for the communities and project</i>	<i>Negative for the communities and project</i>
Accumulative Impact	Construction workers go back to their families and transmit these diseases. Women are in a partnership with other man/men. Workers might become ill and lose their jobs, impacting on their well-being of their families.	
Confidence	<i>High</i>	<i>High</i>
Level of significance	<i>Very high-</i>	<i>High-</i>
Mitigation measures	<ul style="list-style-type: none"> <li>▪ An aggressive STI and HIV/AIDS awareness campaign should be launched, which is not only directed at construction workers but also at the community as a whole.</li> <li>▪ Condoms should be distributed by placing them at centrally located points and by ensuring that construction workers and community members are aware of the availability and location of condoms. The distribution of condoms should be approached with the necessary cultural sensitivity.</li> <li>▪ Access at the construction site should be controlled to prevent sex workers from either visiting and/or loiter at the construction village.</li> <li>▪ Construction workers should be clearly identifiable. Overalls should have the logo of the construction company on it and/or construction workers should wear identification cards.</li> <li>▪ Local women should be empowered. This could be achieved by employing them to work on the project, which in turn would decrease their (financial) vulnerability.</li> <li>▪ Regular leave should be given to contractors.</li> <li>▪ Clinic on site/close to a site.</li> <li>▪ Also focus training on local community. Include training with women focus on family planning, gender relations</li> </ul>	

	<ul style="list-style-type: none"> <li>Improve conditions at construction camp by providing entertainment.</li> </ul>	
Level of significance after mitigation	High-	Medium-

### 3.6.2. Construction worker activities - noise

Not enough information about the possible mental health impact is available to rate the impact of noise, and this impact is therefore not assessed in detail.

Individual and community level				
Change process	Impact	Majority affected segment	Vulnerable segment	Specific areas of impact
Noise originates from chainsaws, drill machines and bull dozers on site. Helicopters along the line could also bother land owners.	A constant high level of noise has a prolonged detrimental effect on a person's general well-being and functioning. People living in close proximity to a construction site will be exposed to such a constant level of noise generated by the construction activities taking place. The area is rural in nature and therefore very quiet at the moment. Any activity that takes place in the area will increase the noise levels.	People living close to the line.	Tourist destinations	Isolated houses and lodges, schools, offices along the line. It doesn't seem to bother rural settlements even though asked specifically.

Stage	Construction
Extent of impact	Local
Duration of impact	Short term
Intensity	Low-medium
Probability of occurrence	Low likelihood-highly probable
Status of the impact	Negative

Accumulative Impact	Should the transmission lines be constructed simultaneously, as well as the Matimba B-Marang Transmission power line, and the proposed 6x765kV Transmission power lines, noise levels might increase.
Confidence	<i>Medium</i>
Level of significance	<i>Medium-</i>
Mitigation measures	<ul style="list-style-type: none"> <li>▪ Adjacent property owners should also be consulted if any night time construction activities were to take place.</li> <li>▪ Construction activities should not take place after hours</li> <li>▪ Affected parties should be informed about the construction schedule.</li> <li>▪ Construction should not be done on Sundays.</li> <li>▪ The hunting season (winter) should be taken into account, and game farms where hunting takes place be avoided.</li> <li>▪ Ensure that the owner / residents are informed about imminent noise before it starts.</li> <li>▪ The construction village should be located away from the local community to ensure that noise levels at the village do not affect the local community during the night time.</li> </ul>
Level of significance after mitigation	<i>Low-</i>

### 3.6.3 *The presence of the line*

Physical and mental health in the context of a power line is related to Electro Magnetic Fields (EMF's), electrocution, fire and collapse. The reason why mental health is mentioned in relation to physical health is because the physical effect or knowledge of the potential physical effect of power lines on people could have an effect on the mental state of members of the community. For example, although utilities in South Africa that are involved in the generation and distribution of electrical energy are bound by the Occupational Health and Safety (OHS) Act [63] to provide such services in a safe manner, and the International Commission for Non-Ionising Radiation Protection (ICNIRP) guidelines are used for assessing human exposure to EMF's, some people still fear that these guidelines are not sufficient. The public perceptions of risks sometimes differ significantly from objective risk assessments conducted by technical experts. Whereas technical assessments of risk takes into account only the probability and magnitude of events, subjective assessment of risk by the general public depends on a number of additional factors, and these factors include the

degree of choice in the matter, benefits gained from the intervention, as well as whether the risks are immediate and detectable (e.g. the effect of EMF's might prove to be serious in future). These perceptions should be addressed as part of an impact assessment.

Risks, other than EMF's, are that a line could cause fatal/traumatic accidents (e.g. electrocution). This could be caused by the collapse of a pylon and/or lines due to mechanical failure, disasters and fire. Fire can be caused by electrical malfunction or human error. Fatal accidents could also be caused by electrocution, which could be caused by induced charges, which can build up on fence wires mounted on wood posts near power lines. This phenomenon is generally restricted to higher voltage lines (200 kV or greater).

Individual and community level				
Change process	Impact	Majority affected segment	Vulnerable segment	Specific areas of impact
EMF's are introduced/increased (more lines).	Health and safety - either because of perceptions or because of proximity to the line.	Those living in close proximity to the line.	Those who move into the servitude. Uninformed / uneducated parts of the community Populations closest to the line, especially those populations that don't have a choice (usually related to poverty or tribal land given to them) etc. Where they stay or whether they could move. Also have limited access to health facilities.	Densely populated areas. Residential areas close to the line.

The impact of health and safety is discussed, assuming that potentially affected parties agree that EMF's have no impact on health and safety outside the servitude. The perceptions are assessed separately.

Stage	Operation	
	<i>On border of servitude</i>	<i>In servitude</i>
Extent of impact	<i>Local</i>	<i>Local</i>
Duration of impact	<i>For the lifetime of the power line</i>	
Intensity	<i>Low</i>	<i>Medium-high</i>
Probability of occurrence	<i>Improbable</i>	<i>Highly probable</i>
Status of the impact	<i>Neutral</i>	<i>Negative for the communities and project</i>
Accumulative Impact	More than one power line.	

Confidence	<i>High</i>	<i>High</i>
Level of significance (in light of probability)	<i>Low-</i>	<i>Moderate-high-</i>
Mitigation measures	<ul style="list-style-type: none"> <li>▪ Educate surrounding communities about the dangers of living in the servitude.</li> <li>▪ A form of signage on the pylons should also indicate that it is dangerous.</li> <li>▪ In some way a barrier (psychological and/or physical) should indicate that no structures should be built in the servitude.</li> <li>▪ Eskom should take responsibility to move people out of the servitude. Educate surrounding communities about the dangers of living in the servitude.</li> <li>▪ Signage on the pylons should also indicate that it is dangerous.</li> <li>▪ In some way a barrier (psychological and/or physical should indicate that no structures should be built in the servitude.</li> <li>▪ Eskom together with municipalities should make decisions about whose responsibility it is to move people out of the servitude.</li> <li>▪ The 400kV lines should be higher to decrease impacts of fire.</li> </ul>	
Level of significance after mitigation	<i>Low-</i>	<i>Low-</i>

Health impacts include mental health impacts. Perceptions of risk are as powerful as the reality of risk.

Individual and community level				
Change process	Impact	Majority affected segment	Vulnerable segment	Specific areas of impact
EMF's are introduced/increased (more lines).	Mental health. Sense of place.	Those who perceive EMF's to be dangerous. Tourists.	Tourist destinations.	Tourist destinations.

Stage	Operation
Extent of impact	<i>Local</i>
Duration of impact	<i>For the lifetime of the power line</i>
Intensity	<i>Medium-high</i>
Probability of occurrence	<i>Highly probable for game farms with tourists</i>
Status of the impact	<i>Negative</i>
Accumulative Impact	
Confidence	<i>High</i>
Level of significance	<i>High--</i>
Mitigation measures	<ul style="list-style-type: none"> <li>Steer clear of game farms; stay on the border or in an industrial corridor.</li> </ul>
Level of significance after mitigation	<i>Medium-</i>