

<p>cards.</p> <ul style="list-style-type: none"> » 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. » Regular leave should be given to workers and workers' families should be given opportunity to visit. » A clinic should be on site/close to the village and anti retro virals available. » Improve conditions at the construction village by providing entertainment. » Mobilise local municipalities/authorities to do a skills audit and communicate skills levels and experience required to be employed by the project. » Housing construction workers in communities could have more positive economic impacts (e.g. rental of room), but the potential health impacts as a result of more regular and consistent interaction with local inhabitants could be more significant. It therefore seems better to house construction workers in a village or separate housing area.
<p>Cumulative Impacts</p> <p>As a result of other projects and proposed projects in the study area it is likely that more workers from outside the study area will arrive and contribute to the impact.</p>
<p>Residual impacts</p> <p>N/A.</p>

Nature: Physical health impacts as a result of the presence of maintenance workers - Category 1 Impact		
	Before Mitigation	After Mitigation
Extent (Scale)	Site-International (1-5)	Site-International (1-5)
Duration	Short-Permanent (1-5)	Short-Permanent (1-5)
Magnitude	Moderate-Very high (3-5)	Moderate-Very high (3-5)
Reversibility	Reversible (3)	Reversible (3)
Probability	Medium (3)	Low (2)
Significance	Medium (24-54)	Low-Medium (16-36)
Status	Negative	
Mitigation		
<ul style="list-style-type: none"> » Aim for 30% local employment (PHS MQR 2007). » Maintenance workers should be clearly identifiable. Overalls should have the logo of the construction company on it and/or construction workers should wear identification cards. 		
Cumulative Impacts		
None.		
Residual impacts		
N/A.		

Nature: Physical health impacts as a result of the influx of job seekers		
The influx of job seekers into the environment will lead to pressure on local services and will not necessarily lead to a boost in the local economy, since 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 presence of job seekers might contribute to the spread of HIV/Aids.		
This is considered to be a Category 1 Impact		
	Before Mitigation	After Mitigation
Extent (Scale)	Site-International (1-5)	Site-International (1-5)
Duration	Short-Permanent (1-5)	Medium-Permanent (3-5)
Magnitude	Moderate-Very high (3-5)	Low (2)
Reversibility	Reversible (3)	Reversible (3)
Probability	Medium (3)	Medium (3)
Significance	Medium (24-54)	Low-Medium (27-46)
Status	Negative	
Mitigation		
<ul style="list-style-type: none"> » 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. » An Influx Management Plan should be developed and executed. » Have a recruitment desk away from the construction camp and construction areas. » Do not informally employ job seekers on site and at the construction village. » Mobilise local municipalities/authorities to do a skills audit and communicate skills levels and experience required to be employed by the project. » Aim for 30% local employment (PHS MQR 2007). 		
Cumulative Impacts		
<ul style="list-style-type: none"> » As a result of other projects and proposed projects in the study area it is likely that more workers from outside the study area will arrive and contribute to the impact. 		
Residual impacts		
N/A.		

Nature: Psychosocial impact on community level and on individuals as a result of different culture of construction workers, and the presence construction workers (construction) and maintenance workers (operation)
Alcohol abuse among construction workers might be a problem during construction, especially after workers had 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.
Villages in the area lack the capacity to accommodate additional people. Although the presence of construction workers and job seekers could lead to positive impacts such as a temporary boost in the local economy, a village/town that is unable to meet its own needs might be unable to sustain additional demands on the local services, which might lead to negative impacts such as conflict if services were depleted.

The presence of construction workers who enter and move about on private property due to the construction of the transmission power line and substation could lead to conflict because of a perceived lack of control. Landowners felt that their privacy was invaded with the construction and maintenance of the Matimba-Witkop No. 2 transmission power line.

The presence of these “strangers” on their property also sparked some safety and security concerns amongst landowners. This was said within the context of increased violent crimes conducted against farmers in South Africa. Construction workers could be blamed for crime and violence in the area. It is anticipated that the presence of construction workers and Eskom representatives could lead to conflict between Eskom/construction team and impacted people, and amongst impacted people, which could result in mental and physical health impacts, and may result in community cohesion breakdown.

CONSTRUCTION		
<i>Category 2 Impact</i>	Before mitigation	After mitigation
Extent (Scale)	Site (1)	Site (1)
Duration	Very short (1)	Very short (1)
Magnitude	Moderate (3)	Moderate (3)
Reversibility	Reversible (3)	Reversible (3)
Probability	High (4)	Medium (3)
Significance	Medium (32)	Low (24)
Status	Negative	Negative
OPERATION AND MAINTENANCE		
Extent (Scale)	Site (1)	Site (1)
Duration	Very short (1)	Very short (1)
Magnitude	Moderate (3)	Low (3)
Reversibility	Reversible (3)	Reversible (3)
Probability	Medium (3)	Low (2)
Significance	Low (24)	Low (14)
Status	Negative	Negative
Mitigation		
<ul style="list-style-type: none"> » 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 members 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. » Construction workers are to be introduced to the local leaders and landowners. » Local leaders should be made aware that only limited job opportunities will be created. » 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. » Educate women regarding gender issues and negotiating safe sexual behaviour. » No firearms should be allowed on the construction site. » Security guards should be appointed. » Construction and maintenance workers should be clearly identifiable by wearing overalls and/or identification cards. » Consult with local landowners 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. 		

Cumulative Impacts

- » Other Eskom projects in the study area. 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.

Residual impacts

N/A.

Nature: Change in sense of place as a result of nuisance impacts

Nuisance impacts will mainly occur during construction. During operation nuisance impacts will occur during maintenance activities. It is not likely that noise as a result of the project will contribute considerably to noise levels in already noisy areas such as busy roads, mines, and towns.

Noise originates from chainsaws, drill machines and bull dozers on site. Helicopters along the line during maintenance could also impact on landowners. The number of trucks on the site could increase to around 20 for one line. In addition, two bull dozers, two excavators, two big cranes and two 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.

However, noise levels are expected to be low and only people living in close proximity to a construction site will be exposed to noise generated by the construction activities taking place.

Speeding of construction vehicles and dust could be an issue to landowners and affected communities surrounding the construction site.

The construction camp could be noisy, and may contribute to nuisance impacts should it be away from villages – villages in general are noisy.

This is considered to be a **Category 1 Impact**.

CONSTRUCTION		
	Before mitigation	After mitigation
Extent (Scale)	Site (1)	Site (1)
Duration	Very short (1)	Very short (1)
Magnitude	Low (2)	Low (2)
Reversibility	Reversible (3)	Reversible (3)
Probability	Medium (3)	Medium (3)
Significance	Low (21)	Low (21)
Status	Negative	Negative
OPERATION AND MAINTENANCE		
Extent (Scale)	Site (1)	Site (1)
Duration	Very short (1)	Very short (1)
Magnitude	Low (2)	Low (2)
Reversibility	Reversible (3)	Reversible (3)
Probability	Low (2)	Low (2)

Significance	Low (14)	Low (14)
Status	Negative	Negative
<p>Mitigation</p> <p><i>Construction Mitigation</i></p> <ul style="list-style-type: none"> » Affected parties should be informed about the construction schedule. » Adjacent property owners should also be consulted regarding construction activities. » Construction activities should not take place between 18:00 and 06:00. » Construction should not be done on Sundays or public holidays and contractors should get permission from landowners to carry on with construction activities on these days. » The hunting season (winter) should be taken into account. » Ensure that the owners/residents are informed about imminent noise before it starts. » The negotiation process should include agreements on construction activities. <p><i>Dust</i></p> <ul style="list-style-type: none"> » Keep to speed limits. » Water roads. <p><i>Corona</i></p> <ul style="list-style-type: none"> » Avoid dwellings / lodges. <p><i>Operation Mitigation</i></p> <ul style="list-style-type: none"> » Affected parties should be informed about the maintenance schedule. » Maintenance should not be done on Sundays or public holidays. It is important to have some mechanism in place that Eskom can undertake maintenance at these times if necessary. » The hunting season (April to August) should be taken into account, and game farms where hunting takes place be avoided. 		
<p>Cumulative Impacts</p> <p>Could be cumulative impacts due to construction activities from other projects in the area.</p>		
<p>Residual impacts</p> <p>N/A.</p>		

Nature: Change in sense of place as a result of the presence of the line

A sense of connectedness a person/community feels towards a place or places 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. Dissatisfaction with their surroundings (sense of place) could lead to a reduction in visitor numbers which could have an economic and mental health impact on owners and workers. Landowners might want to sell their land and/or might have to adapt activities to accommodate the lines.

Sense of place is directly linked to the natural environment and apart from the visual impact, the impact on nature will also impact on sense of place. In addition, the servitude fragments the landscape, which impacts on sense of place.

A survey completed by MasterQ Research concluded the following about the potential impact of lines on tourists' experience of the areas east and south of Lephalale:

- » There might be a decrease in international and local visitors with very specific expectations, should Transmission power lines cross game farms. It seemed as if the

hunting experience included a natural setting and an appreciation for a pristine natural environment for most hunters. Although research amongst visitors should be conducted to confirm this hypothesis, it is expected that some international tourists come to a game farm in Africa to experience the wilderness. A visible Transmission power line would detract from the experience, and other farms without lines might be preferred.

- » Not all potential tourists would be lost. Game farms with power lines crossing their property are still in business. In fact, some of these owners reported a 100% occupation in the hunting season. Visitors included international hunters. However, results of depth interviews with game farmers indicated the presence of a power line detracted from the sense of place of a game farm, which had financial implications. Game farmers said that they lost some of their income potential due to the visual impact of the power line on their property, and that it was not easy to mitigate the presence of the line. 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.
- » The decision whether to hunt on a farm with a power line depends on the hunters' expectations. Hunters might want a wilderness experience, but also a good trophy and value for money. A game farm with a power line might be given preference should it better fulfil the expectations of the visitor. This does not mean that the strategic placement of the power lines is not important. The bigger the farm, the easier it would be to manage the farm and hunting safari around the transmission power line. It will also be more difficult to strategically place lines in flat areas.
- » The international definition of eco-tourism is not only experiencing nature, it includes diverse community activities and cultures of a country's inhabitants as well as its sensitive natural resources. The key here is that local communities are included in the activities of the reserve/park, and many jobs are afforded – for example Pilanesberg National Park. Most of the game farms are therefore not eco-tourism destinations in the strict sense of the word, as exposure to diverse community activities and cultures are not offered. The main focus is hunting.
- » The placement of the line will be crucial to reduce potential socio-economic and socio-cultural impacts. The final recommendations in the Social Impact Assessment will have to be informed by the Visual Impact Assessment.
- » Should hunters not book as a result of the line, the money already spent on marketing might prove to have been a waste of money. The game farm owner might have to change his target market once a power line is on his farm. This might involve a new marketing strategy. It will take years to build up a strong customer base in a new segment of the hunter population.
- » Not only game farms with power lines might experience the possible loss of visitors, but also the neighbouring game farms. Game farmers might have to divert game routes and roads on their farms to steer hunters clear of the lines. This will have an economic impact.
- » It might be difficult to find a similar property elsewhere in South Africa. Purchasing at replacement value should be considered, and depreciation of the property as a result of the power line(s). Eskom does a before and after valuation exercise.
- » Loss of jobs as a result of the presence of the lines should be considered in the final assessment.

» Ideally, a study in tourism areas 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, 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 was 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.

The acceptance of power lines in nature/game areas are strengthened by the fact that people still visit the Ben Alberts Nature Reserve and the Waterberg Biosphere, for example, despite the presence of power lines.

It is important to note that higher and lower sensitivity will apply to different farms depending on the size of the land, the topography, the flora and the number of existing lines on the land, the landowners' history with the land, use of the land, and attachment to the land, and the significance of impacts after mitigation will therefore be very farm specific.

This is considered to be a **Category 1 Impact**.

CONSTRUCTION		
	Before mitigation	After mitigation
Impact		
Extent (Scale)	Site (1)	Site (1)
Duration	Very short term(1)	Very short term(1)
Magnitude	Low (2)	Low (2)
Reversibility	Reversible (3)	Reversible (3)
Probability	High (4)	High (4)
Significance	Low (28)	Low (28)
Status	Negative	Negative
OPERATION CORRIDOR 1		
Category 2 Impact	Change in sense of place as a result of the presence of the line.	
Extent (Scale)	Site (1)	Site (1)
Duration	Long (4)	Long (4)
Magnitude	High (4)	Moderate (3)
Reversibility	Reversible (3)	Reversible (3)
Probability	High (4)	High (4)
Significance	Medium (48)	Medium (44)
Status	Negative	Negative
OPERATION CORRIDOR 2		
Category 2 Impact	Change in sense of place as a result of the presence of the line.	
Extent (Scale)	Site (1)	Site (1)
Duration	Long (4)	Long (4)
Magnitude	Moderate (3)	Low (2)
Reversibility	Reversible (3)	Reversible (3)

Probability	High (4)	High (4)
Significance	Medium (44)	Medium (40)
Status	Negative	Negative
OPERATION CORRIDOR 8		
Category 2 Impact	Change in sense of place as a result of the presence of the line.	
Extent (Scale)	Site (1)	Site (1)
Duration	Long (4)	Long (4)
Magnitude	Low (2)	Low (2)
Reversibility	Reversible (3)	Reversible (3)
Probability	High (4)	High (4)
Significance	Medium (40)	Medium (40)
Status	Negative	Negative
OPERATION CORRIDOR 4		
Category 2 Impact	Change in sense of place as a result of the presence of the line.	
Extent (Scale)	Site (1)	Site (1)
Duration	Long (4)	Long (4)
Magnitude	High (4)	Moderate (3)
Reversibility	Reversible (3)	Reversible (3)
Probability	Medium (3)	Medium (3)
Significance	Medium (36)	Medium (33)
Status	Negative	Negative
OPERATION CORRIDOR 5, 6, 7		
Category 2 Impact	Change in sense of place as a result of the presence of the line.	
Extent (Scale)	Site (1)	Site (1)
Duration	Long (4)	Long (4)
Reversibility	Reversible (3)	Reversible (3)
Magnitude	Moderate (3)	Moderate (3)
Probability	Medium (3)	Medium (3)
Significance	Medium (33)	Medium (33)
Status	Negative	Negative
Mitigation		
<ul style="list-style-type: none"> » Mitigation measures detailed in the Visual Impact Assessment and Ecological Assessment must be implemented. » Eskom considers buying the farm should power lines take up more than 50% of the land. This guideline should be revised, as farmers might lose their livelihood where Eskom lines take up less than 50% of their land. The impact on livelihoods should be monitored and evaluated before and after the construction of the line. » As far as possible, construction activities should be limited to the summer months to ensure that hunting activities are not adversely affected. » As far as possible, maintenance activities should be limited to the summer months to ensure that hunting activities are not adversely affected. » 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." » A pre- and post valuation should be conducted for properties during the negotiation process. 		

- » Farm workers should be compensated for loss of livelihood should they lose their jobs.
- » It is difficult to follow borders of farms, because the Corridors mostly cross them and do not follow them. This might mean that some farms might have to be bought out. The mitigation measure to ensure that these landowners are the same or better of than before should include:
 - * Consideration of cost of and availability of similar farms;
 - * Ensuring that those who lose jobs as a result, find other jobs;
- » Not only land value, but expenses incurred to market and run the game farm should be considered.

Cumulative Impacts

The existing lines in the area have already scarred the landscape and the cumulative impact of more lines along existing lines might not be as negative compared to putting lines through areas with no power lines. For tourists the impact on sense of place might be more pronounced where lines are constructed along existing lines.

Residual impacts

N/A.

Nature: Impact on health as a result of pollution of the natural environment by construction/maintenance workers and construction/maintenance activities.

The construction workers could be housed in a construction village or the surrounding communities. Their presence will impact on the environment, which in turn will impact on the surrounding communities. Littering, water pollution, air and dust pollution could be experienced during the construction phase of the project. Ground water and surface water could be polluted, for example, as a result of inadequate sanitation for construction workers. Construction workers' excretion could be infected with worms, and as a consequence spread infection amongst livestock. Overall, it is not expected that the status quo will change significantly because of the project in areas where there is a lack of services (impacts already occur) and areas where there are services (it will be easier to provide services to workers).

The construction vehicles will contribute to air and dust pollution, but it is not likely to change the status quo significantly.

This is considered to be a **Category 1 Impact**.

	Before mitigation	After mitigation
Extent (Scale)	Site (1)	Site (1)
Duration	Very short-Medium (1-3)	Very short-Medium (1-3)
Magnitude	Low (3)	Minor (2)
Reversibility	Reversible (3)	Reversible (3)
Probability	Medium (3)	Medium (3)
Significance	Low-Medium (24-30)	Low (21-27)
Status	Negative	Negative

Mitigation

- » Construction workers are required to be treated for worms.
- » Adequate water facilities should be provided.
- » Sufficient portable chemical toilets must be provided on site and at the construction

village.		
<ul style="list-style-type: none"> » Refuse on site should be discarded in sealed bins and/or in 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. » Littering » Bins should be provided on site and at the camp. » Some form of punishment should be implemented for littering. » Construction workers should adhere to a contract with the contractor. These rules of conduct should be stipulated in construction management plans and contracts with workers. These should include the use of sanitation, water and waste as well as informal trading, running of 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. 		
OPERATION AND MAINTENANCE		
Extent (Scale)	Site (1)	Site (1)
Duration	Very short (1)	Very short (1)
Magnitude	Minor (2)	Minor (2)
Reversibility	Reversible (3)	Reversible (3)
Probability	Low (2)	Low (2)
Significance	Low (14)	Low (14)
Status	Negative	Negative
Mitigation		
<ul style="list-style-type: none"> » Maintenance workers are required to be treated for worms. » Sufficient portable chemical toilets during servitude maintenance. 		
Cumulative Impacts		
The situation will be exacerbated in areas where influx of job seekers occur and as a result of the activities of teams on other power line projects which take place simultaneously in the same area.		
Residual impacts		
N/A.		

Nature: Reduction in industry output and earnings due to the construction of the power transmission line during construction and operation

A study conducted by MasterQ Research (2007) amongst 50 landowners who registered as Interested and Affected parties for the Medupi-Dinaledi, Medupi-Marang, and Mmamabula-Delta Projects as per December 2006 revealed the following:

- » The average tariff for catered accommodation was R916.88 per person per night and for self-catering accommodation R281.30 per person per night.
- » Landowners were investing money to develop their farms. The capital investment in the past three years (prior to 2007) was estimated at R184.58 million with an average of R5.13 million per landowner and a standard deviation of R32.83 million.
- » To hunt an impala cost between R600 and R3 000 with an average of R1 088.89 and a standard deviation of R760.00.
- » There were more game farms and international visitors in the 1000ha+ category and

higher occupation rates occurred in the 1000ha- category. The occupation in the 1000ha+ category was on the increase. The bigger farms generated higher incomes.

- » It seemed cost intensive to run these establishments, as 0.3 jobs per hectare were created, or three jobs per visitor.
- » The average years that an establishment was in operation was estimated at 11 years, with a standard deviation of 8.6 years. These results indicate that the number of game farms in the LP have increased since 1997.
- » Interviews conducted in the Marken area for this study indicated a similar importance of the area in terms of game farming/hunting and eco-tourism, four respondents in the area indicated that they derive 100% of their income from tourist and hunting activities and employ between three and 32 individuals per farm in doing so. The interviews also indicated a high percentage of outsider owned farms with two respondents estimating that the level of outsider ownership exceeding 40% in that area.

Research conducted previously by MasterQ Research (2007 and 2009) specifically around the impacts of power transmission lines indicates that property that derives its primary value from having a pristine or natural character may suffer some reduction in value when developments of an industrial nature (specifically transmission power lines) occur. This would most often mean that a transmission power line is constructed on or near a property, within relatively close visual range. However, this is dependent on a multitude of factors such as typography and size of the property, and does not include all types of agricultural properties. If the assumption is made that the majority of properties along all routes are in fact prized for their pristine character it is likely that placing the Transmission power lines along existing lines would have the least impact across all routes.

This is considered to be a **Category 1 Impact**.

	Before Mitigation	After Mitigation
Extent	Local (2)	Site (1)
Duration	Long (4)	Long (4)
Magnitude	Minor (1)	Minor (1)
Reversibility	Reversible (3)	Reversible (3)
Probability	High (4)	High (4)
Significance	Medium (44)	Medium (36)
Status	Negative	Negative

Mitigation

- » Determine route with minimum visual impact.
- » Avoid passing close to residences and lodges, especially if the lines would be visible at the main frontage.
- » Maintenance of the servitude should be done regularly and efficiently.
- » Construction should occur outside the winter months (main hunting season).
- » Implement Visual and Ecological Impact Assessment mitigation measures diligently.
- » Corridor 8: existing lines should be followed as diversion from the existing lines will affect the magnitude and significance of the impact.

<p>Cumulative Impacts</p> <p>The impact might be less where existing lines occur as landowners have already adapted their activities to accommodate the existing lines.</p>
<p>Residual impacts</p> <p>N/A.</p>

<p>Nature: Reduction in industry employment during construction and operation phases</p>		
<p>Category 1 Impact.</p>		
	Before Mitigation	After Mitigation
Impact		
Extent	Local (2)	Local (2)
Duration	Medium (3)	Medium (3)
Reversibility	Reversible (3)	Reversible (3)
Magnitude	Low (2)	Low (2)
Probability	Low (2)	Improbable (1)
Significance	Low (20)	Low (10)
Status	Negative	Negative
<p>Mitigation</p> <ul style="list-style-type: none"> » The local people have the skills to do unskilled/semiskilled work during construction, decommissioning and maintenance. Local people should be given equal opportunity to apply for jobs, where possible. Local steering committees/the municipality and Traditional Authorities could be used to identify local people for employment. A local person could be identified in the local community – this could happen through the Department of Labour – and this person could assist in the establishment of a steering committee. The contractors could then communicate their labour needs to the steering committee that would compile a list of people that are available for employment. Alternatively, the Unions or the Local Economic Development Forum could be asked for assistance. » 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. » Individuals with the potential to develop their skills should be afforded training opportunities. Eskom should be involved in this process. » 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. » 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. » Ensure that local subcontractors receive the necessary support in terms of resources. » Agree on specific performance criteria prior to appointment. » Identify the segment that might benefit from informal indirect opportunities, and 		

<p>assist them with skills development and subsidise initiatives that are sustainable.</p> <ul style="list-style-type: none"> » Encourage maintenance workers to make use of local services if and where such services exist. » Employment opportunities should first be offered to the local community if the skills are available within the community. <p>A significant visual impact could lead to a reduction in tourism numbers and impact on jobs. Therefore</p> <ul style="list-style-type: none"> » Determine route with minimum visual impact. » Avoid passing close to residences and lodges, especially if the lines would be visible at the main frontage.
<p>Cumulative Impacts</p> <p>The impact might be less where existing lines occur as landowners have already adapted their activities to accommodate the existing lines.</p>
<p>Residual impacts</p> <p>N/A.</p>

<p>Nature: Increase in employment opportunities due to the construction of the power transmission line.</p> <p>Construction detail sheets regarding the construction of power transmission line indicate that is a moderate creator of employment, with approximately 30 to 80 unskilled workers and 5 to 10 semiskilled workers that can be sourced other than skilled teams utilised by the contractor. The moving nature of transmission power line construction means that this employment will probably be temporary in nature for any person residing in a specific area. During operation employment creation will be minimal and maintenance will utilise existing manpower.</p> <p>Economic benefits to a worker will benefit dependents and might have a mental and physical health impact on the worker and dependents.</p> <p>This is considered to be a Category 1 Impact.</p>		
	Before Enhancement	After Enhancement
Extent	Local (2)	Local (2)
Duration	Very short (1)	Very short (1)
Magnitude	Minor (1)	Low (2)
Reversibility	Reversible (3)	Reversible (3)
Probability	High (4)	Definite (5)
Significance	Low (36)	Medium (50)
Status	Positive	Positive
<p>Enhancement</p> <ul style="list-style-type: none"> » Require contractors to employ contractor staff and temporary labourers are sourced from areas that the power transmission line crosses or from the region whenever possible. 		

Nature: Reduction in property values due to the construction and operation of the power transmission line: Corridors 1, 2, 4 (Construction and Operation)

Research conducted previously by MasterQ Research specifically around the impacts of power transmission lines indicates that property that derives its primary value from having a pristine or natural character may suffer some reduction in value when developments of an industrial nature (specifically transmission power lines) occur. This would most often mean that a transmission power line is constructed on or near a property. However, this is dependent on a multitude of factors such as typography and size of the property, and does not include all agricultural properties. If the assumption is made that the majority of properties along all routes are in fact prized for their pristine character it is likely that placing the power transmission lines along existing lines would have the least impact on property values across all routes. However, the property value loss along Corridor 8 may be exacerbated due to the presence of additional lines.

This is considered to be a **Category 2 Impact**.

	Before Mitigation	After Mitigation
Extent	Site (1)	Site (1)
Duration	Long (4)	Long (4)
Magnitude	Low (2)	Minor (1)
Reversibility	Reversible (3)	Reversible (3)
Probability	Definite (5)	High (4)
Significance	Medium (50)	Medium (36)
Status	Negative	Negative

Mitigation

- » Determine route with minimum visual impact.
- » Avoid passing close to residences and lodges, especially if the lines would be visible at the main frontage if Corridors 1 and 2 are chosen.

Cumulative Impacts

The impact might be exacerbated where more than two lines are in one Corridor.

Residual impacts

N/A.

Nature: Reduction in property values due to the construction and operation of the power transmission line: Corridor 8, 5, 6, 7 (Construction and Operation)

Category 2 Impact

	Before Mitigation	After Mitigation
Extent	Site (1)	Site (1)
Duration	Long (4)	Long (4)
Magnitude	Minor (1)	Minor (1)
Reversibility	Reversible (3)	Reversible (3)
Probability	Medium (3)	Medium (3)
Significance	Low (27)	Low (27)
Status	Negative	Negative

Mitigation » Should Corridor 8 be selected the proposed transmission power lines must follow existing lines.
Cumulative Impacts None.
Residual impacts N/A.

7.6.1. Comparison of Transmission Power Line Alternatives

From the Social Impact Assessment undertaken, the following conclusions have been made:

- » To avoid potential negative impacts on health and safety and of displacement of people, the preferred Corridors are **Corridors 2 and 8**:
 - * Corridor 1 will potentially impact the highest number of households (relocation), followed by Corridors 8 and then 2.
 - * Corridor 8 already has access roads to existing lines and is therefore preferred – involuntary resettlement as a result of access roads can be avoided.
 - * In terms of the current and future development of Lephalale, the town will develop between Lephalale and Onverwacht. A nodal linkage between Maropong and Onverwacht is planned. A Transmission line going between Maropong and Onverwacht should therefore follow existing lines and stay on Eskom land where possible.
 - * The P138-1 road to the south of these towns is planned. Corridor 1 should preferably follow the planned 138-1 road. However, this will mean the involuntary resettlement of a number of people – the exact number cannot be determined at this stage.
- » The avoidance of game farms should be given preference to the avoidance of cattle farms and cultivated land. However, there is hardly a difference between the alternative corridors in terms of approximate number of game farm portions irrespective of the size of these portions.
- » In terms of impacts on sense of place the preferred corridors are **Corridor 8** followed by 2 (Medupi-Mokopane) and **Corridor 5 or 6** (Mokopane-Witkop).
- » The impact of involuntary resettlement could be high and should be avoided. Should Corridor 1 be selected the likelihood of the servitude following the proposed road south of Lephalale (P138-1) is high. This will result in the involuntary settlement of people. On the other hand, this option will be in line with the Spatial Development Framework of the municipality and therefore not completely undesirable. Corridor 8 could also lead to involuntary resettlement. It is likely that one household will have to be resettled and maybe more, should it be necessary to deviate from the existing lines as a result of technical challenges. It seems possible to avoid involuntary

resettlement of households in Corridor 2, and **Corridor 8** is therefore preferred in this regard.

- » When considering the potential for development into the corridors, it seems a possibility that development will take place into the servitude for all corridors. Although the preference is that settlements are avoided to mitigate the potential health impacts as a result, all the corridors cross settlements. **Corridor 1** crosses the lowest number of settlements and is therefore the preferred option in this regard. Corridor 2 shows rapid developments between villages closer to Lephahale, but it is more likely that these developments would occur along the main roads. The settlements in Corridor 2 should already be sensitive to the fact that development should not occur towards the servitude. Nevertheless, power lines close to settlements remain a health and safety concern and villages in this corridor also show a tendency to develop towards each other.
- » The other Category 2 impacts that could occur during both construction and operation are the potential psychosocial and physical health impacts as a result of changes that occur in land use activities to accommodate the construction and maintenance activities of the 2x400kV transmission power lines. However, the significance of these impacts is low and very similar for different land uses after mitigation - during construction and operation.

The selection of a preferred corridor should therefore not be based on the differences in the occurrence in crop and cattle farming activities between corridors because it is possible to manage these potential impacts and reduce the significance to a very low level. The corridor selection should also not be made on the basis of the game farming activities between corridors because the occurrence of game farms between the corridors are very similar for Corridors 1, 2 and 8. Should land use be regarded as the primary selection criteria, a detailed study should be done regarding the hectares of different land uses within the different corridors.

Rather, following involuntary resettlement and health and safety of people, the impact on sense of place should be regarded as a primary corridor selection criterion, which is closely linked to economic impacts. However, it should be kept in mind that it is difficult to determine the economic impacts of a power line on tourism activities because the indication is that people still visit nature reserves and game farms despite the presence of power lines. It is therefore more than the visual impact of the power line that could detract people from visiting a place or the mere lack of a power line that detract people from a place.

The impact on sense of place can be reversed after decommissioning, providing that rehabilitation is done to a satisfactory level (as opposed to involuntary resettlement, which is irreversible). The impact on sense of place should be considered in the context of the study area as a whole, as the impact on sense of

place per farm portion will depend on a number of variables, such as the visual impact, the biodiversity impact, the placement of the line in relation to dwellings and lodges, the activities on the land, the attachment of the landowner to the land, etc.

In light of the guiding principles of the Waterberg Biosphere, the compatibility of the transmission power lines with development plans and existing activities in the area, cultural landscape and settlements along corridors, **Corridor 8** followed by Corridor 2 is nominated as the preferred alternative between the Medupi Power Station and Mokopane Substation. Corridor 8 should follow the existing line without deviation, except for the alternative around Tafelkop and the deviation where it joins Corridor 2 for some distance (i.e. **Corridor 8 Deviation**).

For the Mokopane-Witkop section of the power line **Corridor 5** is preferred, followed by Corridor 6.

Corridor 7, from Delta substation, should follow the existing lines in the corridor to consolidate the impact on sense of place.

7.6.2. Conclusions and Recommendations

Involuntary resettlement is irreversible and the involuntary resettlement of people should be avoided and kept to a minimum as far as possible. Corridor selection is therefore mainly based on avoiding involuntary resettlement. Only if avoidance of involuntary resettlement would lead to unsustainable practices in the area, should the involuntary resettlement of large numbers of people be deemed acceptable. The effective and participatory execution of the negotiation and compensation process is crucial to ensure that the impact is kept to a minimum.

A decommissioning and closure plan should be in place to ensure that social impacts are reversed. The impact on sense of place during operation could impact the sustainability of game farms. Knock-on effects of unsustainable farms would be loss of jobs, impacts on neighbouring farms and loss of livelihood. The impact on sense of place should be kept to a minimum and the mitigation measures for the reduction of the visual and ecological impacts should be implemented, monitored and evaluated. The proper maintenance of the servitude is one of these.

Across all impact categories it seems that **Corridor 8** followed by **Corridor 2** (Medupi-Mokopane) and **Corridor 5 and 6** (Mokopane-Witkop) are the most preferable for the minimisation of negative impacts. Corridor 8 should follow the existing line without deviation, except for the alternative around Tafelkop and the deviation where it joins Corridor 2 for some distance (i.e. **Corridor 8 Deviation**).

It is highly recommended that Eskom investigates the general use of wide service corridors between all major power generation areas that can accommodate further development in the future in order to avoid the “spider web” effect often associated with short term focused planning of economic development. This study therefore places a strong emphasis on long-range economic planning.

Corridor 7, from Masa (Delta) substation, should follow the existing lines in the corridor to consolidate the impact on sense of place.

Finally, to ensure that social impacts are mitigated during construction and operation it is recommended that the following be implemented and monitored by a Social Engagement Officer:

- » A Social Management Plan during construction and operation;
- » A social Impact Assessment during construction and operation;
- » A Local Labour and Workforce Plan;
- » An Influx Management Plan;
- » A Decommissioning Plan;
- » A Grievances Mechanism for the construction and operational phases;
- » A Stakeholder Engagement and Education plan for construction and operation.

7.7. Potential Impacts on Economics

For purposes of identifying the possible economic impacts of the power lines, the different corridors have been grouped in four options as explained below:

- » **Option 1:** Corridor 7 ► Corridor 1 ► Corridor 4, 5 and 6;
- » **Option 2:** Corridor 7 ► Corridor 2 ► Corridor 4, 5 and 6;
- » **Option 3:** Corridor 7 ► Corridor 8 ► Corridor 4, 5 and 6.
- » **Option 4:** Corridor 7 ► Corridor 8 ► Corridor 8 Deviation ► Corridor 2 ► Corridor 8 Deviation ► Corridor 8 ► Corridor 4,5 and 6

7.7.1. Macro Economic Impact Analysis Results

» Current Macro Economic Results

The current macro-economic parameters for the four routes are presented in Table 7.1.

Table 7.1: Current macro-economic parameters for the four Identified route options (2009 prices)

	Option 1 (Corridors 7, 1, 4, 5 and 6)	Option 2 (Corridors 7, 2, 4, 5 and 6)	Option 3 (Corridor 7, 8, 4, 5 and 6)	Option 4 (Corridors 7, 8, 8dev, 2, 8dev, 8, 4, 5 and 6)
Gross Domestic Product (R.mil.)				
Direct	R67.13	R62.54	R46.45	R50.15
Indirect/Induced	R40.47	R38.82	R28.09	R30.39
Total	R107.60	R101.36	R74.54	R80.54
Employment (Numbers)				
Direct	1 235	1 183	849	920
Indirect/Induced	644	618	447	484
Total	1 879	1 801	1 296	1 403
Capital Formation (R.mil.)	R160.95	R152.99	R112.74	R121.56
Household Income (R.mil.)				
Low Income	R8.48	R8.26	R5.83	R6.33
Medium/High	R46.39	R44.64	R32.10	R34.77
Total	R54.87	R52.89	R37.93	R41.11

The above table indicates that in all four route options the economic activities are relatively extensive. In terms of employment creation in the area, the direct number varies between 1 235 for Route Option 1 and 849 for Route Option 3. A number of the indirect and induced parameters are also in the Lephalale area. Overall Route Option 1 is at present the route with the most economic activities with Route Option 3 the lowest.

» *Impacted Macro Economic Results*

Table 7.2 presents the potential negative impact of the construction of the power lines as a percentage per route after the Delphi technique was applied to each of the routes and was used in the monetary calculation (refer to specialist economic report contained within Appendix L for further details). In the interpretation of the following table it must be kept in mind that it is an average percentage shown, in the calculations different impacts are used for the individual sections.

Table 7.2: Average negative percentage applied to the respective corridor options

Corridor Option	Option 1 (Corridors 7, 1 plus 4, 5 and 6)	Option 2 (Corridors 7, 2 plus 4, 5 and 6)	Option 3 (Corridors 7, 8 plus 4, 5 and 6)	Option 4 (Corridors 7, 8, 8dev, 2, 8dev, 8 plus 4, 5 and 6)
Negative Impact	-52.9%	-51.9%	-38.0%	-34.4%

Table 7.3 presents the potential negative impacts due to the construction and operation of the power lines after the negative percentages were applied to the respective bench marks.

Table 7.3: The estimated negative annual macro economic impacts of the impact of the construction and operation of the power lines (2009 prices)

	Option 1 (Corridors 7, 1 plus 4, 5 and 6)	Option 2 (Corridors 7, 2 plus 4, 5 and 6)	Option 3 (Corridors 7, 8 plus 4, 5 and 6)	Option 4 (Corridors 7, 8, 8dev, 2, 8dev, 8 plus 4, 5 and 6)
Gross Domestic Product (R.mil.)				
Direct	-R29.53	-R28.26	-R6.21	-R14.32
Indirect/Induced	-R19.60	-R18.75	-R4.12	-R9.51
Total	-R49.13	-R47.01	-R10.33	-R23.83
Employment (Numbers)				
Direct	-613	-587	-129	-298
Indirect/Induced	-312	-298	-66	-151
Total	-925	-885	-194	-449
Capital Formation (R.mil.)	-R73.10	-R69.96	-R15.37	-R35.46
Household Income (R.mil.)				
Low Income	-R4.46	-R4.27	-R0.94	-R2.16
Medium/High	-R22.93	-R21.95	-R4.82	-R11.13
Total	-R27.39	-R26.21	-R5.76	-R13.29

From the above table it appears that the construction of the power lines will have a negative impact on all four route options.

7.7.2. Results of the Cost Effectiveness Analysis

The Cost Effectiveness Analysis for the four route options was performed in terms of the construction and maintenance cost involved for Eskom and added is the estimated negative impact on the existing economic activities in the each of the corridor options. These negative economic impacts are a cost to the system and therefore added to attain the total cost over a period of time to the system.

Table 7.4 provides the discounted Present Value (PV) for Eskom and the farms per corridor option.

Table 7.4: Cost effectiveness comparison for the four corridor options

Option	Present Value Eskom R Mil.	Present Value Farms R.Mil.	Total Present Value Rand Mil.
Option 1 (Corridors 7, 1 plus 4, 5 and 6)	R1247.44	R556.82	R1 804.25
Option 2 (Corridors 7, 2 plus 4, 5 and 6)	R1271.32	R532.86	R1 804.18
Option 3 (Corridors 7, 8 plus 4, 5 and 6)	R1315.41	R274.47	R1 589.88
Option 4 (Corridors 7, 8, 8dev, 2, 8dev, 8 plus 4, 5 and 6)	R1363.18	R270.12	R1 633.30

From the above table it appears that Corridor Options 3 and 4 are the more costly options to Eskom (as indicated in column 1), but once the negative impacts are taken into consideration (as indicated in column 4), it appears that Options 3 and 4 are in terms of cost to the system the preferable options.

7.7.3. Comparison of the four Corridor Options

Table 7.5 provides a comparison of various parameters for the corridor options.

Table 7.5: Comparison of the different Corridor Options using a number of Parameters (2009 prices)

	Option 1 (Corridors 7, 1 plus 4, 5 and 6)	Option 2 (Corridors 7, 2 plus 4, 5 and 6)	Option 3 (Corridors 7, 8 plus 4, 5 and 6)	Option 4 (Corridors 7, 8, 8dev, 2, 8dev, 8 plus 4, 5 and 6)
Annual Turnover (R. Mil.)	R99.28	R96.78	R68.18	R74.11
Annual Impact on Turnover (R.mil)	-R52.51	-R50.25	-R25.88	-R25.47
Total Annual GDP (R.mil)	R107.60	R101.36	R74.54	R80.54
Annual Impact on GDP (R.mil)	-R49.13	-R47.01	-R10.33	-R23.83
Direct Employment Losses	-613	-587	-129	-298
Overall Percentage Impact	-52.9%	-51.9%	-38.0%	-34.4%
Negative Impact (Rand/meter)	R208.81	R196.07	R97.61	R92.70
Total PV	R1 804.18	RR1 804.18	R1 589.88	R1 633.30

From the above table it appears that the various parameters considered indicate that of the four corridor options, Options 3 and 4 appear to be the more acceptable options, with Options 1 and 2 less acceptable. If the negative impact is expressed as an impact per meter of the respective corridor length, Options 3 and 4 are less than 50% of the impact on Options 1 and 2. The CEA analysis also shows that the PV for Option 3 and 4 is the less costly to the system

The results included in Table 7.5 indicates that the annual turnover on Corridor Option 3 (Corridors 7, 8 plus 4, 5 and 6), which consists mostly of Corridor 8, is the lowest of all four options, and it could be argued that the reason for less development is the presence of the existing power lines within this corridor. Although there might be truth in the argument, the counter argument is that by again utilising it Eskom would intrude less on present activities.

7.7.4. Interpretation and Recommendation

In terms of the above analysis, it is concluded that in terms of economic parameters the least impact will be in either Corridor Option 3 or 4. If it is accepted that the two options are defined as follows:

- **Option 3:** - Corridor 7 ► Corridor 8 ► Corridor 4, 5 and 6.
- **Option 4:** - Corridor 7 ► Corridor 8 ► Corridor 8 Deviation ► Corridor 2 ► Corridor 8 Deviation ► Corridor 8 ► Corridor 4,5 and 6

It must be noted however that in the case of both options there are potential negative impacts associated with the construction of the power lines, and that the final route determination will be of utmost importance.

7.7.5. Recommended Mitigation

All four route options include areas of commercial cattle and game farming as well as tribal areas where the inhabitants practise subsistence farming. Taking this into consideration, the following are recommended to mitigate the possible impacts of the construction and operation of the power lines:

- » The determination of the final route within a corridor must be done in consultation with the landowner.
- » Where tribal land is involved Eskom must involve the local chief structure in the determination of the final route.
- » Compensation must be determined through consultation with an appropriate independent valuator, and compensation must be in line with market value.
- » In the case of homesteads, Eskom must in the determination of the final route minimise the impact.
- » Where tourist facilities are involved the impact must be minimised.
- » On many of the properties hunting is practised and is it necessary that Eskom establish contact with the landowner before entering the property.
- » In the case of tribal land the lines must avoid house clusters and minimise impact on the lands and vegetable gardens.

7.8. Comparative Assessment and Nomination of Preferred Transmission Line Corridors

The transmission power line alternatives proposed for the 400kV transmission power lines cross various habitats sensitivity classes and potentially impact on numerous land uses, land owners and communities. From the specialist studies undertaken a number of impacts of high significance have been identified which will require extensive mitigation to be implemented.

7.7.1. Nomination of a Preferred Alternative between Medupi Power Station and the proposed Mokopane Substation (Corridors 1, 2, 8 and 8 Deviation)

From the conclusions of the specialist studies undertaken, the following recommendations have been made:

	Corridor 1	Corridor 2	Corridor 8	Corridor 8 Deviation
Biodiversity	Least preferred	Preferred	Acceptable	Second preferred
Agricultural potential	Preferred	Least preferred	Second preferred	Acceptable
Avifauna	Least preferred	Acceptable, provided no go areas identified are avoided	Acceptable	Preferred , provided no go areas identified are avoided
Visual impacts	Least preferred	Second preferred	Acceptable	Preferred
Heritage sites	Least preferred	Preferred	Second preferred provided recommended conditions are met	Preferred
Social impact	Least preferred	Acceptable	Second preferred	Preferred
Economics	Least preferred	Least preferred	Preferred	Preferred

From the above table, it is clear that there are varying conclusions from the specialist studies undertaken. The majority of specialists nominated **Corridor 8 Deviation** as the preferred alternative. From the conclusions of the remaining specialist studies undertaken, this corridor is considered to be acceptable from an environmental perspective. Therefore, **Corridor 8 Deviation** is nominated as the **preferred alternative** from a holistic environmental perspective. However, it is considered vital that construction of the power line within this corridor take the recommended conditions identified by the specialist studies into account. In addition, should the project be authorised by DEA, the final routing of the power lines within this corridor should be undertaken in consultation with the affected landowners and the following specialists:

» Biodiversity specialist

- » Avifauna specialist
- » Heritage specialist

In addition, once the final transmission power line alignment has been negotiated and the tower positions surveyed and pegged, a walk-through survey must be undertaken by these specialists in order to minimise potential environmental impacts associated with the proposed project.

7.7.2. Nomination of a Preferred Alternative between the proposed Mokopane Substation and the existing Witkop Substation (Corridors 4, 5 and 6)

From the conclusions of the specialist studies undertaken, the following recommendations have been made:

	Corridor 4	Corridor 5	Corridor 6
Biodiversity	Least preferred	Preferred	Second preferred
Agricultural potential	No preference	No preference	No preference
Avifauna	Least preferred	Second preferred	Preferred
Visual impacts	Least preferred	Preferred	Second preferred
Heritage sites	Preferred	Preferred	Least preferred
Social Impact	Least preferred	Preferred	Second preferred

From the above table, it is clear that there are varying conclusions from the specialist studies undertaken. The majority of specialists nominated Corridor 5 as the preferred alternative. From the conclusions of the specialist workshop undertaken, it was concluded that Corridor 4 is not preferred and development within this corridor should be avoided. **Corridor 5** was nominated as the preferred alternative from a holistic environmental perspective. However, it is considered vital that construction of the power line within this corridor take the recommended conditions identified by the specialist studies into account. Should the project be authorised by DEA, the final routing of the power lines within this corridor should be undertaken in consultation with the affected landowners and the following specialists:

- » Biodiversity specialist
- » Avifauna specialist
- » Heritage specialist

In addition, once the final transmission power line alignment has been negotiated and the tower positions surveyed and pegged, a walk-through survey must be undertaken by these specialists in order to minimise potential environmental impacts associated with the proposed project.

CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 8

The conclusions and recommendations of this EIA are the result of the assessment of identified impacts by specialists, and the parallel process of public participation. The public consultation process has been extensive and every effort has been made to include representatives of all stakeholders in the study area.

8.1. Evaluation of the Proposed Project

The preceding chapters of this report together with the specialist studies contained within Appendices F - K provide a detailed assessment of the environmental impacts on the social and biophysical environment as a result of the proposed project. This chapter concludes the EIA process by providing a summary of the conclusions of the assessment of the proposed substation site and alternative transmission line corridors identified for the 400kV transmission power lines. In so doing, it draws on the information gathered as part of the EIA process and the knowledge gained by the environmental consultants during the course of the EIA and presents an informed opinion of the environmental impacts associated with the proposed project. Environmental specifications for the management of potential impacts are detailed within the draft Environmental Management Plan (EMP) included within Appendix N.

8.1.1. Conclusions and Recommendations drawn from the Assessment of the Proposed Substation Sites and Associated Turn-in Lines

The following conclusions were drawn from the specialist studies undertaken:

- » Substation **Site Option 1** has the lowest ecological sensitivity (moderate sensitivity) from a terrestrial fauna and flora perspective.
- » Substation **Site Option 1** is transformed compared to Substation Site Options 3 and 4, and is therefore considered to be the preferred alternative from an avifaunal perspective.
- » **Substation Site Option 4** is preferred from an agricultural perspective as it is completely comprised of shallow soils.
- » **Substation Site Option 4** is the furthest removed from sensitive visual receptors and is preferred from a visual perspective.
- » No heritage resources with outstanding significance were observed near any of the three substation site options.
- » **Substation Site Option 4** is preferred from a social perspective as it avoids potential negative impacts on health and safety and settlement developments.

Overall Substation Site Options 1 and 4 are both considered suitable locations for the proposed substation. **Substation Site Option 4** and associated turn-in lines is nominated as the preferred option, largely due to the lower potential social and visual impacts.

8.1.2. Conclusions and Recommendations drawn from the Assessment and Comparison of the Transmission Power Line Alternatives

Nomination of a Preferred Alternative from Medupi Power Station to the Proposed Mokopane Substation (Corridors 1, 2 and 8)

- » In terms of impacts on biodiversity, **Corridor 2** is regarded as the least sensitive in terms of ecological attributes and is therefore recommended. Corridor 8 Deviation is regarded as the second preferred with a moderate ecological sensitivity.
- » In terms of Agricultural Potential the preferred route would be the **Corridor 1** (potentially fewer high potential soils) followed by the existing Matimba-Witkop corridor (Corridor 8).
- » **Corridor 8 Deviation** is considered to hold the least risk from a bird-interaction perspective, provided that deviations indicated in Figure 7.2 are:
 - * the only areas where the proposed lines will deviate from the existing lines
 - * the deviation distances are kept short and
 - * the deviations denoted in Figure 7.2 of this report are still located within the 5km corridor that was originally assessed during the EIA phase of the project.

The proposed Medupi-Mokopane power lines alongside the nature reserve indicated in Figure 7.2 cannot be placed anywhere within the 5 km corridor. It is highly recommended that the proposed line be placed to the north of the existing lines, on the outer side of reserve's northern boundary as indicated in Chapter 7, Figure 7.3.

- » The Visual Impact Assessment indicated a marginal mathematical preference for **Corridor 8 Deviation and Corridor 2** over Corridor 1 and 8. Corridor 2 however has a low potential to consolidate the visual impact of linear infrastructure within the region. Corridor 8 (utilising the proposed deviation) has a higher potential to succeed should this principle be followed in order to prevent the spreading of power line infrastructure across the region. The true benefit of this visual impact mitigation measure will only be achieved if the additional lines are placed directly parallel to the existing lines. **Alternative 8 Deviation** is therefore preferred from a visual perspective.

- » From a heritage perspective, construction of the proposed power lines within **Corridor 2 or Corridor 8 Deviation** will affect the lowest number of heritage resources, the least types and ranges of heritage resources, as well as no outstanding significant heritage resources. Corridor 08 Deviation will be required to be constructed to the north of Tafelkoppe and Ga Mabula (along the R518) in order to avoid impacting on significant heritage resources in these areas.
- » From a Social perspective, **Corridor 8** followed by **Corridor 2** are expected to have lower impacts on the social environment. Corridor 8 should follow the existing line without deviation, except for the alternative around Tafelkop and the deviation where it joins Corridor 2 for some distance (i.e. **Corridor 8 Deviation**).
- » From an economic perspective, **Corridor 8 or Corridor 8 Deviation** are expected to have lower impacts.

From the conclusions of the specialist studies undertaken it was concluded that Corridor 1 is not preferred and development within this corridor should be avoided. The majority of specialist studies nominate Corridor 8 Deviation as the preferred alternative, while all specialist studies consider this alternative as acceptable for development. Therefore, **Corridor 8 Deviation** is nominated as the preferred alternative for the construction of the proposed 400kV power lines between the Medupi Power Station and the proposed Mokopane Substation. However, it is considered vital that construction of the power line within this corridor take the recommended conditions identified by the specialist studies into account. In addition, should the project be authorised by DEA, the final routing of the power lines within this corridor should be undertaken in consultation with the affected landowners and the following specialists:

- » Biodiversity specialist
- » Avifauna specialist
- » Heritage specialist

In addition, once the final transmission power line alignment has been negotiated and the tower positions surveyed and pegged, a walk-through survey must be undertaken by these specialists in order to minimise potential environmental impacts associated with the proposed project.

Nomination of a Preferred Alternative from the Proposed Mokopane Substation to the Existing Witkop Substation (Corridors 4, 5 and 6)

- » In terms of impacts on biodiversity, **Corridor 5** is regarded as the least sensitive in terms of ecological attributes and is therefore recommended. Corridor 6 is the second preferred option in this regard.
- » In terms of Agricultural Potential, there is **no preference** for any of the Mokopane – Witkop corridors based on soils.
- » **Corridor 6** presents itself as the preferred alternative in terms of avifauna. This is directly attributed to the presence of an existing transmission line within the corridor. This placement of the proposed Mokopane-Witkop 400kV power line within this corridor will partially mitigate for all of the impacts on avifauna.
- » The Visual Impact Assessment indicated that both Corridor 5 and 6 will follow existing power line infrastructure, but Corridor 4 will increase the length of the alignment by 2km. The preferred development corridor for the proposed Mokopane substation to Witkop substation section is therefore **Corridor 5**.
- » **Corridor 5** is the preferred corridor from a social perspective.

The majority of specialists nominated Corridor 5 as the preferred alternative. From the conclusions of the specialist workshop undertaken, it was concluded that Corridor 4 is not preferred and development within this corridor should be avoided. **Corridor 5** was nominated as the preferred alternative from a holistic environmental perspective. However, it is considered vital that construction of the power line within this corridor take the recommended conditions identified by the specialist studies into account. Should the project be authorised by DEA, the final routing of the power lines within this corridor should be undertaken in consultation with the affected landowners and the following specialists:

- » Biodiversity specialist
- » Avifauna specialist
- » Heritage specialist

In addition, once the final transmission power line alignment has been negotiated and the tower positions surveyed and pegged, a walk-through survey must be undertaken by these specialists in order to minimise potential environmental impacts associated with the proposed project.

Delta – Medupi (Corridor 7)

- » No significantly sensitive faunal habitat or outstanding landscape features were observed within this corridor.
- » Impacts on avifauna are considered to be relatively low in contrast with the larger Medupi-Mokopane and Mokopane-Witkop corridors and can be mitigated where necessary.
- » Corridor 7, from Delta substation, should follow the existing lines in the corridor to consolidate the impact on sense of place
- » No significant environmental impacts are expected to be associated with Corridor 7.

8.2. Overall Conclusion (Impact Statement)

The findings of the specialist studies undertaken within this EIA to assess both the benefits and potential negative impacts anticipated as a result of the proposed project conclude that:

- » **Corridor 1** is considered to be a **no-go option** from the conclusions of the majority of the specialist studies undertaken. This option was only preferred from an agricultural potential perspective. However, it was noted that most agricultural activities can be undertaken underneath power lines and therefore this issue is not considered to be significant.
- » **Corridor 8 Deviation** is considered to be the **preferred overall alternative** for the Medupi-Mokopane section of the power line.
- » **Corridor 5** is considered to be the **preferred alternative** for the Mokopane-Witkop section of the power line.
- » No issues of significance were identified to be associated with **Corridor 7** (Delta-Medupi). This corridor should follow the existing lines in the corridor to consolidate the impact on sense of place.
- » Sites 1 or 4 are considered suitable for the construction of the proposed substation. Either site could be selected from an environmental perspective. Substation **Site Option 4** is nominated as the preferred site for the construction of the substation due to the lower potential social impacts associated with the site.
- » Although some impacts of potential high significance are associated with the transmission lines and substation, there are no environmental fatal flaws that should prevent these proposed lines and substation from being constructed within the nominated preferred corridors and the proposed substation site respectively, provided that the recommended no-go areas are adhered to and the recommended mitigation measures are implemented.
- » The significance levels of the majority of identified negative impacts can be minimised by implementing the recommended mitigation measures.

8.3. Overall Recommendation

Based on the nature and extent of the proposed project, the local level of disturbance predicted as a result of the construction and operation of the substation and transmission power lines, the findings of the EIA, and the understanding of the significance level of potential environmental impacts, it is the opinion of the EIA project team that the application for the proposed Mokopane Integration Project be authorised by the DEA to include the following (refer to Figures 8.1 and 8.2):

- » Construction of the new **substation** at proposed **Site Option 4**.
- » Construction of **two new 400kV transmission power lines in parallel** between the Delta Substation (a new substation to be located near the Medupi Power Station) and the existing Witkop Substation (near Polokwane), as follows:
 - * Within **Corridor 7** and **Corridor 8 Deviation** between the Delta Substation and the new Mokopane Substation.
 - * Within **Corridor 5** between the new Mokopane Substation and the Witkop Substation.
- » **Associated works** to integrate the proposed new substation and transmission power lines into Eskom's electricity Transmission grid.

The following conditions of this recommendation must be included within the authorisation issued:

- » All mitigation measures detailed within this report and the specialist report contained within Appendices F to K must be implemented.
- » The draft Environmental Management Plan (EMP) as contained within Appendix N of this report should form part of the contract with the Contractors appointed to construct and maintain the proposed Mokopane Integration Project, and will be used to ensure compliance with environmental specifications and management measures. The implementation of this EMP for all life cycle phases of the proposed project is considered to be key in achieving the appropriate environmental management standards as detailed for this project.
- » Applications for all other relevant and required permits required to be obtained by Eskom must be submitted to the relevant regulating authorities. This includes permits for the transporting of all components (abnormal loads) to site and disturbance of protected vegetation.
- » An ornithologist must identify the exact power line spans requiring marking in order to minimise the risk of collision of birds with the earth wire. Recommendations must be made regarding the installation of Bird Guards on all self-supporting towers according to the existing Eskom guidelines. This will prevent birds from perching in high risk areas on the towers directly

above live conductors. It is likely that extensive marking will be required within Corridor 2 owing to the open nature of the vegetation and its ability to support the large terrestrial bird species recorded in the area.

- » Avoid construction in the no go areas within Corridor 2 (Refer to Section 7.3 of this report, Figures 7.4 – 7.9).
- » An ecological specialist must conduct a final walkthrough before construction in order to identify and relocate any possible plant species of conservation importance.
- » A heritage specialist must conduct a final walkthrough before construction in order to identify any important heritage resources. Transmission lines can be rerouted or realigned in order to avoid heritage sites and heritage resources can be conserved unaffected underneath power lines.
- » The EMP for construction must be updated to include site-specific information and specifications resulting from the final walk-through surveys. This EMP must be submitted to DEA for approval prior to the commencement of construction.
- » The transmission line towers should, in spatially constrained sections of the development corridors (i.e. in built-up areas), consist of monopole structures that are less bulky (albeit slightly taller) and less visually intrusive than conventional power line towers. Where space and technical considerations permit, the utilisation of cross rope suspension tower structures is recommended above the conventional self supporting strain towers that are more obtrusive.
- » During construction, unnecessary disturbance to habitats should be strictly controlled and the footprint of the impact should be kept to a minimum.
- » It is highly recommended that Eskom investigates the general use of wide service corridors between all major power generation areas that can accommodate further development in the future in order to avoid the “spider web” effect often associated with short term focused planning of economic development.
- » Finally, to ensure that social impacts are mitigated during construction and operation it is recommended that the following be implemented and monitored by a Social Engagement Officer:
 - * A Social Management Plan during construction and operation;
 - * A social Impact Assessment during construction and operation;
 - * A Local Labour and Workforce Plan;
 - * An Influx Management Plan;
 - * A Decommissioning and Closure Plan;
 - * A Grievances Mechanism for the construction and operational phases; and
 - * A Stakeholder Engagement and Education plan for construction and operation.

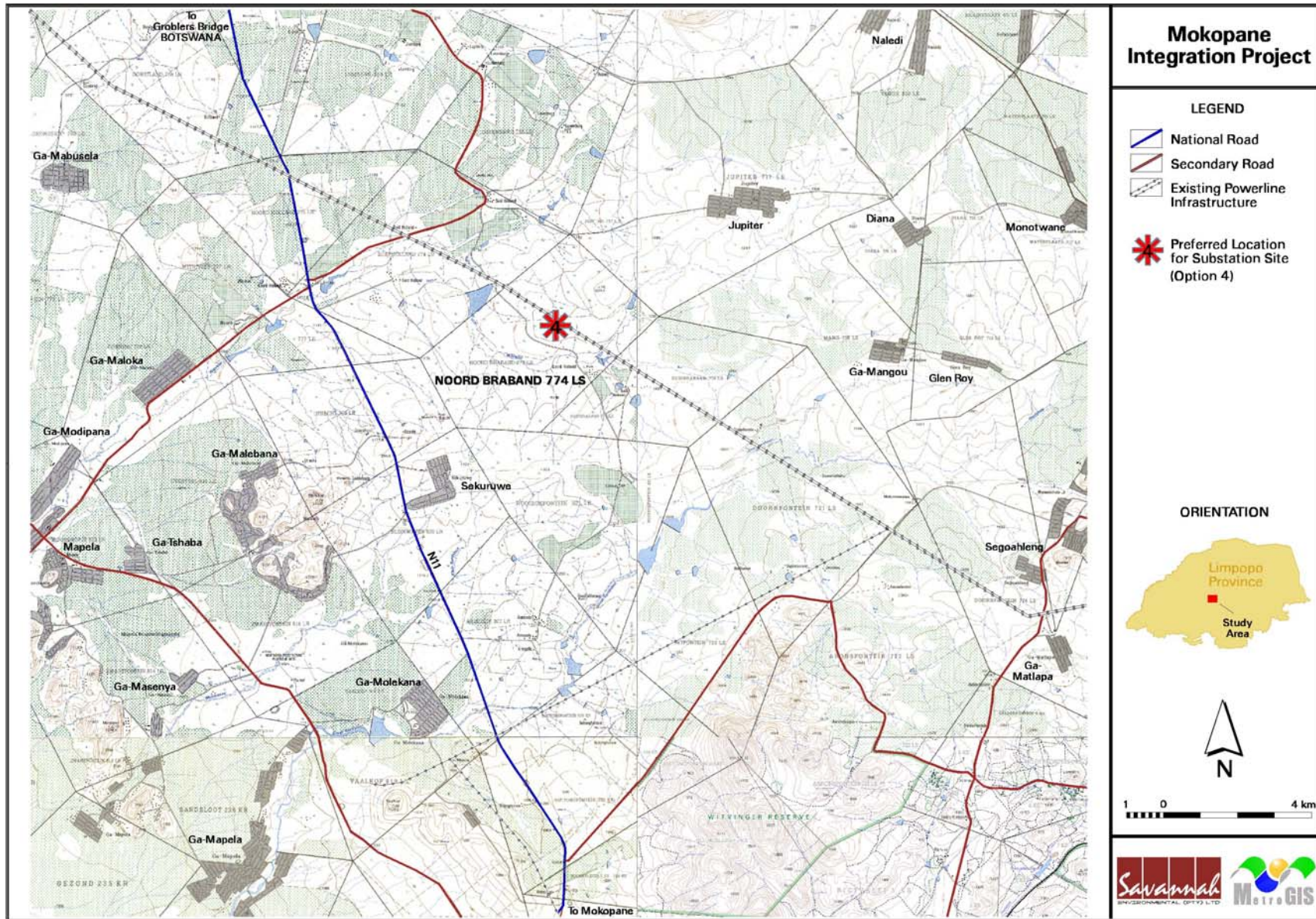


Figure 8.1: Nominated preferred alternative for the proposed Mokopane Substation

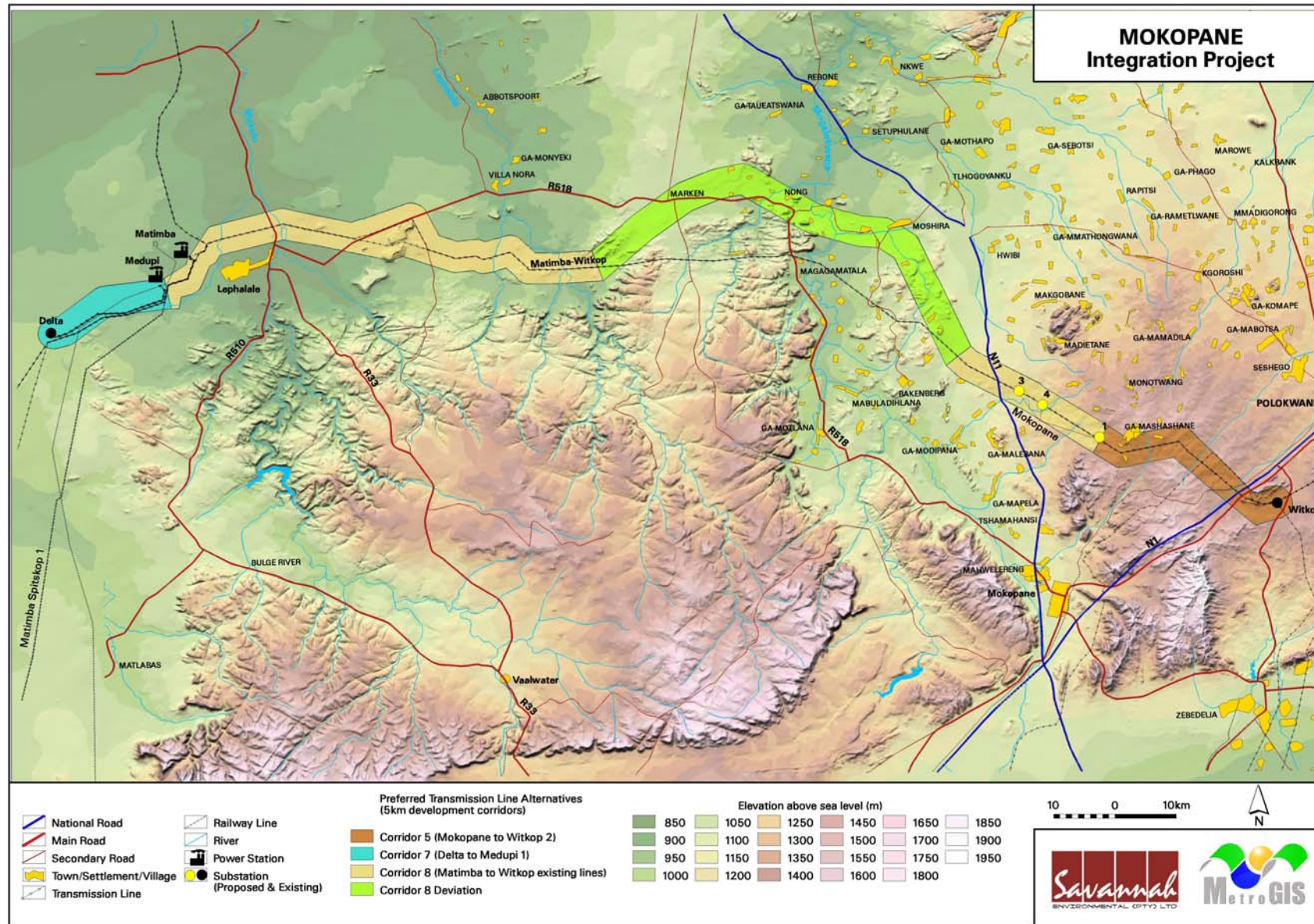


Figure 8.2: Nominated preferred alternative transmission line corridors for the proposed Mokopane Integration Project

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