



# Margen

INDUSTRIAL SERVICES



**INTERNATIONAL (SA)**  
Engineering & Environmental  
Consultants

## **MATIMBA B (MEDUPI) TRANSMISSION INTEGRATION**

**MATIMBA B-MARANG 400KV  
TRANSMISSION LINE  
CONSTRUCTION AND MARANG  
SUBSTATION UPGRADE**

**ENVIRONMENTAL IMPACT  
ASSESSMENT**

## **ENVIRONMENTAL IMPACT REPORT**

### **VOLUME I – MAIN REPORT (FOR PUBLIC REVIEW)**

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## EXECUTIVE SUMMARY

### INTRODUCTION

Eskom is planning to construct a new power station near the existing Matimba power station at Lephalale in the Limpopo Province. A separate environmental impact assessment (EIA) has been conducted for the proposed power station site, previously named Matimba B for the purposes of this EIA, and a Record of Decision (RoD) has already been issued. The new name for the power station is Medupi. Medupi power station will need to be connected to the transmission network. Studies by Eskom's Transmission System Planning considering the need to evacuate from the power station, network capacity, and stability, as well as centres of growth in electricity demand, have identified the minimum infrastructure required to integrate Matimba B (Medupi) with the rest of the network.

In particular, the following projects would help alleviate stresses on the total transmission network system and more so in the Brits/GaRankuwa and the Rustenburg/Thabane areas which includes more specifically the following:

- an additional 400kV transmission power line to the Marang substation located near Rustenburg from Matimba B (Medupi);
- an additional two 400kV transmission power lines to Dinaledi substation located near Brits also from Matimba looped into the Spitskop substation;
- expansion of the existing substations of Marang, Spitskop and Dinaledi to accommodate the new 400kV transmission power lines.

Together, these projects are combined to form the Matimba B Transmission Integration Project. However, for the purposes of the environmental process, they are separated into two EIAs (and therefore separate applications) as follows:

- the Matimba-Dinaledi power lines (and associated expansions at Spitskop and Dinaledi substations), and
- the Matimba-Marang power line (and associated expansion at Marang substation)

This EIR deals with the second of the two projects.

Margen Industrial Services (Margen) has been appointed by Eskom Transmission to undertake the required environmental authorisation work. Margen appointed PBA International (SA) (PBAI) to assist with this process. The project is being run in parallel with the Matimba B (Medupi)-Dinaledi EIA and makes use of a single Public Participation Process.

**Note:** At the time of writing all the specialist environmental studies for the EIA Phase had been concluded but the Public Participation Process is still ongoing. This version of the EIR sets out the findings to date and is released to the public for comment and input. Any comments received will be incorporated in the final version of the EIR that will be submitted to the authorities for consideration and approval. The final version of the EIR will also be available to the public for review.

## APPROACH

A full EIA process is run for the project. This includes:

- The Scoping Phase – approved by the authorities by late March 2007, and
- the EIA Technical Assessment Phase – targeted for approval by the authorities by the end of August 2007.

Both phases include extensive public consultation. The full EIA process is being carried out in accordance with Regulations 1182 and 1183 (1997) of the Environment Conservation Act No. 73 of 1989, and within the principles of the National Environmental Management Act No.107 of 1998. From the onset of the EIA-project, the consultant has been intent on undertaking an integrated EIA (including the Scoping) process for the Matimba B Transmission Integration Project (1 X 400kV Matimba B (Medupi)-Marang power line and 2 X 400kV Matimba B (Medupi)-Dinaledi power lines) whereby two separate applications were launched for each of the transmission links. This also meant that two separate plans of study for scoping (PoSS), Scoping Reports (SRs) and Plans of Study for EIA (PoS-EIA) were submitted, one for each of these links.

The public participation process (PPP) has, as indicated in the PoS-EIA, to date been conducted as a single process whereby all identified interested and affected parties were consulted with simultaneously. It is still planned that the lead authority will issue two separate RoDs for the two EIAs based on the two separate EIRs that will be submitted.

The scoping phase was used to research the study area and identify those issues relevant to the study. The SR was intended to set out the issues identified and how these would be taken forward into the EIA phase. In essence the scoping phase was used to attempt a 'scoping out' of the initially proposed corridors for the power lines and areas within the study area that would not be environmentally suited for placing the transmission power lines. The EIA phase investigated key issues in more detail, with specialist studies undertaken as identified in the scoping phase and indicated in the PoS-EIA. The PoS-EIA also set out the intended approach to the EIA phase and was submitted to the authorities after completion of the scoping phase.

The project lies within two provinces; Limpopo and North West. The national Department of Environment and Tourism (DEAT) is understood to be the decision-making authority on all transmission projects above 132kV in size. However, the Environmental Assessment Practitioner (EAP) undertakes to copy all correspondence to the offices of the provincial authorities and will invite the case officers to all meetings, site visits, etc. that involve authority participation. The timelines and deliverables on this project are critical to the overall project timelines. The achievement of these deadlines will require that the EAP adheres to deadlines, and also that the authorities assist in minimising document review timeframes. To date several delays have caused an overall delay of approximately eight (8) months for this project.

Initially the consultant determined a study area for the purposes of the scoping phase of which the boundary was determined based on the most extreme boundary area within which the power line routes as proposed by Eskom Transmission could cost-effectively and within reasonable technical ability, be placed. The consultant further appointed a number of specialists to conduct studies mainly focussed on rating the potential routes as indicated by Eskom in order of preference and based on the specific findings of each individual specialist study. This information was used mainly as a guidance to focus efforts towards a final route option with at the most, one or two alternatives, thus resulting in one, two or three most preferred routes for each power line.

For the purposes of presenting the study area and possible corridors to the public, each of the route options were indicated on a map as 5km wide route corridor options. Various maps were viewed by the public but the intention was always that there should be an understanding that the routes could in theory be placed anywhere within the study area.

At the end of the scoping phase a most preferred route option was determined for most of the distance between the proposed Matimba B (Medupi) Power Station and the applicable substations, splitting into as much as three route options closer to the Spitskop Substation area.

During the technical EIA phase to date these route options were carefully considered by the EIA team to further determine their preferences in relation to each other, thus establishing a single route corridor along the entire distance between the required connection points to be further considered by the relevant interested and affected parties during this phase.

Further studies were also conducted to determine what the applicable separation distances between existing power lines and the newly proposed lines should be and where the best location for the actual placing of the lines would be. This final design is proposed as the transmission power line placement that Eskom Transmission will follow. Note however that it is proposed that the route will be considered by the affected landowners during the public review phase for further refining of preferred line placements and then after the issuing of the RoD, the proposed route will further be walked by the relevant specialists to finally indicate the most preferred exact placing of the power line pylons based on these on-site specialist findings.

For this reason the EIR indicates a 55m wide servitude zone on the map as well as an additional 250m wide movement zone on either side of the outer boundaries of the servitude zone to allow for any slight movements in the proposed servitudes after the RoD had been issued, should specialists find any on-site problems that would require any pylon re-placing or should the negotiator become aware of or negotiate any such a power line re-placing.

Servitude negotiations need to be considered and it is possible that individual landowners will have requirements or preferences for exact line placements on their land which will be negotiated with the Eskom negotiator after issuing of the RoD. This means that some leeway is required as to the final commitment of a servitude route and therefore a further requirement to have the 250m movement zone on either side of the proposed transmission power line servitude.

#### **DEVELOPMENT PROPOSAL**

The tower design will be the already used standard cross-rope suspension tower for power lines over normal terrain and for sufficiently straight and level alignments. Currently this option is both the most cost effective and environmentally suitable option. Strain towers will be utilised where difficult terrain is encountered or line deviations of more than 3° is unavoidable.

The proposed 400kV cross-rope pylons will normally be in the order of 38m in height with a minimum conductor clearance of 8.1m. The conductor height is specifically aimed at ensuring that the potential of being affected by human activities or even natural occurrences would be safely minimised and additionally that electromagnetic fields are kept as far away from potentially affected people, animals and vegetation as reasonably possible, based on current knowledge of the effect that these conductors could have.

The standard servitude size for 400kV transmission power lines is 55m and pylons are placed between 350m and 500m apart over the power line length depending on terrain and route angles. Eskom obtains a right of way over the servitude area that allows the company to utilise the servitude land for purposes of electricity transmission to the approved design and technical constraints as approved by the relevant authority in terms of a RoD to be issued in terms of the relevant legislation and pertaining to the environmental impact report (EIR).

The right obtained by Eskom also entails certain restrictions on land owners over whose land the servitude is secured as well as allowances. These would include restrictions on and/or allowance of certain activities within the servitude area in terms of a contract reached between the applicable landowner and Eskom Transmission.

The Marang substation will have to be upgraded to receive the additional 400kV transmission power line from Matimba B(Medupi). The existing 400kV yard terrace is to be extended slightly. The area of expansion is however flat and without any identifiable sensitive environmental features.

It would suffice to indicate that different links between Matimba B (Medupi) and the various substations located towards the south and especially south-east sections of the study area had been considered, also taking into consideration the planned possible transmission links that would be necessary between Botswana, Matimba and the main grid areas.

The study area in itself presents a number of restricting features such as topography, tourism and socio-economic activity zones and settlement zones. All indications are that alternatives that would involve the placement of transmission power lines outside the study area will entail significant additional costs as well as an excessive increase in physical land surface disturbance and potentially an excessive increase in cumulative environmental impacts. Alternatives that would entail placing the power lines outside of the study area are therefore considered to be neither viable nor environmentally acceptable in general.

In addition to the above the majority of the area to the east of the study area hosts the Waterberg Biosphere which is an internationally recognised biosphere. This would render the placing of the lines through this zone more damaging to the environment from a cumulative point of view in addition to the already increased overall environmental impacts caused by the increase in power line distance alone.

It is necessary for Eskom Transmission to establish the necessary transmission links by the time the new power station is operational and this is planned to occur by 2010. The EIA process is envisaged to produce a result no later than middle to late 2007 and this would mean that servitude negotiations will have to be finalised towards the end of 2008. The construction of the power line will take approximately two years so that it is completed towards the end of 2010.

The project is of significant strategic importance to the country and therefore any delays in the project programme is expected to have potential negative consequences from an electricity supply point of view in various areas of the national grid. Various grid connection alternatives have been considered, both by Eskom Transmission and the appointed environmental consultant. Based on the best technical option for linking the entire grid to the Matimba complex, connection points were determined. These were determined to be the Marang substation by means of a single 400kV transmission power line and the Spitskop and Dinaledi substations by means of two 400kV transmission power lines connected to each substation.

After having considered the transmission network planners' connection options, Eskom Transmission's Land and Rights department determined the technically most-suited routes, from an Eskom point of view, for the required 400kV transmission lines to be able to link up with the various substations as indicated by the planners. The consultant has further considered these initially proposed routes as well as the economic and physical constraints for making the project viable in determining a study area and utilising the proposed routes as initial indicator corridors during the scoping phase.

During the public participation process for the scoping phase, the consultant already indicated possible alternatives for the corridors which were also proposed to the public on various maps and which generated significant feedback from the PPP participants. The normal consideration of route alternatives is applicable and has been implemented as part of this study. The consultant has refined this approach by establishing a spatial assessment system whereby various environmental impact factors are mapped to act as an additional indicator of potentially most-suited route options. This was already conducted during the scoping phase for the entire study area and produced successful results that could be used as a power line placement guide early on.

The no-go option for this project is not considered to be applicable in terms of total project go-ahead. In the specialists' assessments for scoping it has been determined that the social and economic benefits that the project would have, are of greater significance than any of the negative environmental impacts and even if a combination of or cumulative impacts exist that would outweigh this total benefit, such impacts would only occur within their applicable smaller spatial zones or areas in the study area and it would be possible to place the lines away from such areas or at least to apply sufficient mitigating measures to ensure this.

Where a project is of the level of strategic importance such as which is applicable to this project, where in fact the electricity supply and therefore the economy of the entire country is affected, it is held that none of the known negative impacts would be a sufficient argument for a total “no-go” scenario. It is however acknowledged that areas of “no-go” for the placing of the applicable electricity transmission infrastructure could and most likely would exist.

During the scoping phase a complete assessment of the potential impacts from the proposed activity on the environment was conducted for the power lines.

## **PUBLIC CONSULTATION**

Margen Industrial Services conducted the Public Participation Process (PPP) for the Scoping Phase of the EIA for Matimba B Transmission Integration Project, involving as many potential interested and affected parties (I&APs) as possible. The comments received and issues raised during the process were collated into the Scoping Report and were used to assist the environmental consultant to determine possible impacts and mitigation measures for the project. Some of the issues raised are further investigated in detail during the EIA Phase and indicated in this EIR. Please see **Appendix I-18** for the complete list of comments and responses to date on this project.

During the period after submission and awaiting approval of the PoS-EIA and the SR, public consultation continued by further informing I&APs of the outcomes of the SR and inviting all parties to continue to be informed of the project and to submit further comments and concerns. Additional I&APs were also identified during this period and an effort was made to continue with the identification of and further consultation with especially landowners but also other stakeholders that were not found and contacted during the PPP during the scoping phase. This process will continue until the final EIR is submitted to the DEAT for consideration and approval. Please see **Appendix I-19** for the map showing the landowners' contact status to date. The further methodology, approach and findings of the PPP after completion of the scoping phase is described and explained in **Section 5** of the EIR.

Any further feedback and/or comment received from the public on the EIR will be indicated and addressed in an amendment document which is submitted to the relevant authorities with the EIR. The EIR will be made available to the public as a draft document for consideration and review. Feedback received on this document will be incorporated into a final EIR to be submitted to the DEAT and also made available to the public for viewing.

## **RECOMMENDATIONS, CONCLUDING REMARKS & WAY FORWARD**

In **Appendix I-9** the proposed transmission line placement with buffer zone for the Matimba B (Medupi) to Marang line is indicated on a map.

Further studies along the proposed corridor during the technical EIA phase included the following:

- Land use identification and accessibility options;
- ecological assessment for fauna and flora and identification of sensitive areas;
- identification of significant archaeological and heritage sites;
- identification of socially sensitive zones; and
- identification of visually sensitive and challenging areas.

In addition to the above, it was necessary to address those issues contained in the Comment & Response Sections of the PPP Report for the SR and this EIR. The identified relevant issues that can be addressed in terms of technical EIA assessment are listed in this document and addressed accordingly.

Finally it was also necessary to address specific issues raised by the DEAT in this document. These issues are also listed in the document and addressed accordingly.



# **MATIMBA B (MEDUPI)-MARANG 400KV TRANSMISSION LINE AND MARANG SUBSTATION UPGRADE**

## ***ENVIRONMENTAL IMPACT ASSESSMENT***

## **ENVIRONMENTAL IMPACT REPORT**

### **1. INTRODUCTION**

Eskom is planning to construct a new power station near the existing Matimba power station at Lephalale in the Limpopo Province. A separate environmental impact assessment (EIA) has been conducted for the proposed power station site, previously named Matimba B for the purposes of this EIA, and a Record of Decision (RoD) has already been issued. The new name for the power station is Medupi. Medupi power station will need to be connected to the transmission network. Studies by Eskom's Transmission System Planning considering the need to evacuate from the power station, network capacity, and stability, as well as centres of growth in electricity demand, have identified the minimum infrastructure required to integrate Matimba B (Medupi) with the rest of the network.

In particular, the following projects would help alleviate stresses on the total transmission network system and more so in the Brits/GaRankuwa and the Rustenburg/Tlhabane areas which includes more specifically the following:

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- expansion of the existing substations of Marang, Spitskop and Dinaledi to accommodate the new 400kV transmission power lines.

Together, these projects are combined to form the Matimba B Transmission Integration Project. However, for the purposes of the environmental process, they are separated into two EIAs (and therefore separate applications) as follows:

- the Matimba-Dinaledi power lines (and associated expansions at Spitskop and Dinaledi substations), and
- the Matimba-Marang power line (and associated expansion at Marang substation).

This EIR deals with the second of the two projects.

The construction of the power line and associated substations is a scheduled activity in terms of Schedule 1 of Regulation 1182 (1997) of the Environmental Conservation Act No. 73 of 1989 accordingly and as such requires environmental authorisation:

- ⇒ *Construction, erection of facilities for commercial electricity generation with an output of at least 10 megawatts and infrastructure for bulk supply;*
- ⇒ *Change of land use from agricultural or zoned undetermined use or an equivalent zoning to any other land use.*

• The integration of the Matimba B (Medupi) power station also involves transmission links with newly planned substations and 765kV power lines as part of what was previously known as the Mmamabula-Matimba Transmission Integration Project. That project has been further divided into a number of smaller projects. In this report the concept planning for these other projects is indicated as background information. Maps and figures indicating any aspects of these other projects are in no way binding to Eskom or the environmental consultants and should be considered as speculative at this point in time and is merely aimed at indicating to potentially interested and/or affected parties the existence or planning for these other projects.

Margen Industrial Services (Margen) has been appointed by Eskom Holdings Limited (Transmission Services) to undertake the required environmental impact assessment work that will enable Eskom to construct lines from the power station. Margen appointed PBA International (SA) (PBAI) to assist with this process. The project is being run in parallel with the Matimba B (Medupi)-Marang EIA and makes use of a single Public Participation Process.

**Note:** At the time of writing all the specialist environmental studies for the EIA Phase had been concluded but the Public Participation Process is still ongoing. This version of the EIR sets out the findings to date and is released to the public for comment and input. Any comments received will be incorporated in the final version of the EIR that will be submitted to the relevant authorities for consideration and approval. The final version of the EIR will also be available to the public for review.

### 1.1. DETAILS OF THE EAP

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### 1.2. EXPERTISE OF THE EAP

Please refer to **Appendix I-11, Appendix I-12 and Appendix I-13** for the respective CVs of the applicable project manager, project reviewer and public participation manager.

### 1.3. ENVIRONMENTAL AUTHORISATION RESPONSIBILITIES

The study area falls in the Limpopo and North West provinces. See **Appendix I-8**. The lead authority is the national Department of Environmental Affairs and Tourism (DEAT) who will issue the final Record of Decision (RoD) for this EIA-project. The EIA-project reference numbers within each provincial office are listed below.

**Table 1.1 – Environmental Authorities and Case Numbers**

Environmental Authority	Matimba B (Medupi)-Marang
National Department of Environment Affairs & Tourism (DEAT) = Lead authority	12/12/20/793
Limpopo Department of Economic Development, Environment and Tourism (L-DEDET)	16/1/4-79
North West Department of Agriculture, Conservation, Environment and Tourism (NW-DACET)	EIA 689/2005 NW

### 1.4. SUMMARY OF THE EIA PROCESS AND PROGRAMME

The EIA process followed is in accordance with the EIA Regulations as promulgated in terms of the Environment Conservation Act no. 73 of 1989. For the purposes of this report the process will not be explained in any detail as it has already been explained during the PPP for scoping and all participating parties are expected to be aware of the required and applicable processes. In addition to this the relevant authorities will not require an explanation of the process in order to make any informed decisions. As far as the programme is concerned, dates are either dictated in terms of the consultant's planning or the applicable legislative requirements and outcomes of the various public participation stages. This also means that the future dates indicated in this report could change and should only be considered as a guideline. \*

**Table 1.2 – EIA Programme**

Activity	Initial Target date	Actual completion
Submission of Plan of Study for Scoping	March 2006	6 March 2006
Approval of Plan of Study for Scoping	April 2006	12 June 2006
Submission of Scoping Report for public comment	July 2006	6 September 2006
Submission of Scoping Report to DEAT & Provinces	August 2006	15 November 2006
Authority approval of Scoping Report & PoS-EIA	September 2006	20 March 2007
		<b>Proposed new date</b>
Specialist studies	September 2006	11 April 2007
Submission of EIR for public comment	October 2006	15 June 2007
Submission of EIR to DEAT & Provinces	November 2006	August 2007
Record of Decision	December 2006	September 2007

\* The consultant and/or the applicant is not responsible for the changing of proposed dates as indicated in this report or any effect that this might have on any person, party or organisation.

## 2. APPROACH TO THE STUDY

A full EIA process is run for the project. This includes:

- The Scoping Phase – approved by the authorities by late March 2007, and
- the EIA Technical Assessment Phase – targeted for approval by the authorities by the end of August 2007.

Both phases include extensive public consultation and this process is described in **Section 5** of this report. The full EIA process is being carried out in accordance with Regulations 1182 and 1183 (1997) of the Environment Conservation Act No. 73 of 1989, and within the principles of the National Environmental Management Act No.107 of 1998. From the onset of the EIA-project, the consultant has been intent on undertaking an integrated EIA (including the Scoping) process for the Matimba B Transmission Integration Project (1 X 400kV Matimba B (Medupi)-Marang power line and 2 X 400kV Matimba B (Medupi)-Dinaledi power lines) whereby two separate applications were launched for each of the transmission links. This also meant that two separate plans of study for scoping (PoSS), Scoping Reports (SRs) and Plans of Study for EIA (PoS-EIA) were submitted, one for each of these links.

The public participation process (PPP) has, as indicated in the PoS-EIA, to date been conducted as a single process whereby all identified interested and affected parties were consulted with simultaneously. It is still planned that the lead authority will issue two separate RoDs for the two EIAs based on the two separate EIRs that will be submitted.

The scoping phase was used to research the study area and identify those issues relevant to the study. The SR was intended to set out the issues identified and how these would be taken forward into the EIA phase. In essence the scoping phase was used to attempt a 'scoping out' of the initially proposed corridors for the power lines and, where reasonable, areas within the study area that would not be environmentally suited for placing the transmission power lines. The EIA phase investigated key issues in more detail, with specialist studies undertaken as identified in the scoping phase and indicated in the PoS-EIA. The PoS-EIA also set out the intended approach to the EIA phase and was submitted to the authorities after completion of the scoping phase.

The project lies within two provinces; Limpopo and North West. The National Department of Environment and Tourism (DEAT) is understood to be the decision-making authority on all transmission projects above 132kV in size. However, the EAP undertakes to copy all correspondence to the offices of the provincial authorities and will invite the case officers to all meetings, site visits, etc. that involve authority participation. The timelines and deliverables on this project are critical to the overall project timelines. The achievement of these deadlines will require that the EAP adheres to deadlines, and also that the authorities assist in minimising document review timeframes. To date several delays have caused an overall delay of approximately eight (8) months for this project.

Initially the consultant determined a study area for the purposes of the scoping phase of which the boundary was determined based on the most extreme boundary area within which the power line routes as proposed by Eskom Transmission could cost-effectively and within reasonable technical ability, not entailing excessive cost, be placed. The consultant further appointed a number of specialists to conduct studies mainly focussed on rating the potential routes as indicated by Eskom in order of preference and based on the specific findings of each individual specialist study. This information was used mainly as a guidance to focus efforts towards a final route option with at the most, one or two alternatives, thus resulting in one, two or three most preferred routes for each power line.

For the purposes of presenting the study area and possible corridors to the public, each of the route options were indicated on a map as 5km wide route corridor options. Various maps were viewed by the public but the intention was always that there should be an understanding that the routes could in theory be placed anywhere within the study area.

At the end of the scoping phase a most preferred route option was determined for most of the distance between the proposed Matimba B (Medupi) Power Station and the applicable substation, splitting into as much as three route options closer to the Spitskop Substation area. During the technical EIA phase to date these route options were carefully considered by the EIA team to further determine their preferences in relation to each other, thus establishing a single route corridor along the entire distance between the required connection points to be further considered by the relevant interested and affected parties during this phase.

Prior to completion however of the EIR for public review, an environmental action group from the Makoppa area raised their specific issues by means of their own proposal for placing the lines through their area of support and representation. The proposal was included into the routes for consideration during the public review process and is indicated on existing maps. In considering this route the consultant also corresponded with Eskom's technical team to determine what the proposed route would entail as far as financial and technical impacts are concerned and also considered the apparent environmental impacts that could be expected from this proposed option.

Further studies were also conducted to determine what the applicable separation distances between existing power lines and the newly proposed lines should be and where the best location for the actual placing of the lines would be. This final design is proposed as the transmission power line placement that Eskom Transmission will follow. Note however that it is proposed that the route will be considered by the affected landowners during the public review phase for further refining of preferred line placements and then after the issuing of the RoD, the proposed route will further be walked by the relevant specialists to finally indicate the most preferred exact placing of the power line pylons based on these on-site specialist findings.

For this reason the EIR indicates a 55m wide servitude zone on the map as well as an additional 250m wide movement zone on either side of the outer boundaries of these servitude zone to allow for any slight movements in the proposed servitude after the RoD had been issued, should specialists find any on-site problems that would require any pylon re-placing or should the negotiator become aware of or negotiate any such a power line re-placing.

Servitude negotiations need to be considered and it is possible that individual landowners will have requirements or preferences for exact line placements on their land which will be negotiated with the Eskom negotiator after issuing of the RoD. This means that some leeway is required as to the final commitment of a servitude route and therefore a further requirement to have the 250m movement zone on either side of the proposed transmission power line servitude.

The following was proposed in the PoS-EIA:

During the EIA phase all activities will be conducted according to a stringent time frame in an attempt to ensure a positive record of decision by early July 2007. The general aim of this phase of study will be to determine the best possible placing of the proposed 400kV power line within the 5km wide proposed route corridor. Two levels of assessment or feedback will be utilised in order to achieve this.

**Firstly** the public participation process initiated during the scoping phase will continue unrestricted for the duration of the EIA process. Stakeholder participation will continue until the EIR is compiled after which the EIR will first be made available to the public for review and then it will be amended as necessary and finally submitted to the relevant authorities for review and approval.

The feedback received through this process will be utilised to further inform and tailor the project design as far as the placing of the power line is concerned. Feedback from potentially affected land owners within the EIA study area regarding land use and planning activities will be of specific concern and therefore focussed on by the relevant specialist(s) and the PPP team.

**Secondly** the appointed environmental specialists will determine areas of sensitivity in more detail as explained in the terms of reference. The general aim will be to determine areas along the route corridor where line placing should be avoided at all cost if little or no mitigation to the extent of absolutely minimising an impact would be possible.

The EAP is intent on identifying and informing all land owners within the study corridor as well as their neighbours of the alternatives.

In addition to the above there will also be full consultation with landowners adjacent the Marang substation and technical environmental assessments will be conducted for the applicable expansions of the substation. *(Note that this will only take place during the public review phase of the initial EIR).*

The study will also aim to generally indicate areas where construction camp placing would be problematic or unwanted and areas most suitable for such camps. The study will indicate where potential power line faults could be expected and propose mitigation measures that could be considered. *(Note again that this will only take place during the public review phase of the initial EIR).*

Finally the EIR will include proposals for mitigation during the various phases of the project as well as environmental issues that would have to be further addressed as part of the environmental management plan.

The following specialist team members will be involved during the technical EIA phase:

<b>Anita Bron</b>	-	<b>Sociology</b>
<b>Chris Van Rooyen</b>	-	<b>Birds</b>
<b>Liana Müller</b>	-	<b>Aesthetics</b>
<b>Dr. Julius Pistorius</b>	-	<b>Archaeology</b>
<b>Riaan Robbeson</b>	-	<b>Floristic</b>
<b>Jean Beater</b>	-	<b>Heritage</b>
<b>Jacques Boonzaaier</b>	-	<b>Geography &amp; Environmental Management</b>

The following has been required by the DEAT upon approval of the SR & PoS-EIA:

- A public participation process that satisfies the requirements of Government Notice R. 1183 and gives the public ample opportunity to assess the draft EIR for comments. Special effort should be made to ensure that all the possibly affected landowners have been informed about the process, especially those in the finally proposed corridor.
- Ensure that all issues raised during the scoping phase is addressed and assessed in the EIA phase of the study.
- Information regarding the effects of electric and magnetic fields (EMF) on the environment. (Please see **Appendix I-1**).
- A detailed socio-economic assessment of the effects on land use, land value and possible loss of jobs by workers on the farms where such a large number (4-5) of power lines will run parallel.
- Detailed design drawings of the proposed extensions at the substation as well as the area affected at the substation to accommodate the new power lines.
- Written comments from relevant Local, Provincial and National Authorities on the EIR.
- Written comments from SAHRA, SANPARKS, Wessa and other NGOs on the EIR.
- A draft Environmental Management Plan (EMP) for the construction phase to give I&APs the opportunity to comment on the EMP.

## 2.1. OBJECTIVES OF THE EIA STUDY

The scoping phase focussed significantly on public consultation to consider the study area and proposed project design with alternatives. The EIA study focussed more on determining technical and environmental transmission power line placement options within the proposed route corridors identified during the scoping phase by means of excluding zones of significant environmental sensitivity as well as zones or points of obstruction. Such zones or points were mainly based on findings of appointed environmental specialists.

The EIR also aims to finally consider feedback from the public to help inform the project design and ultimate lead authority decision-making, confirm the need for the project, describe the latest project design findings and environmental findings, describe the methodology utilised in conducting the study, comparatively assess alternatives, indicate specialist findings and proposals, consider cumulative impacts and clearly indicate all assumptions, uncertainties and knowledge gaps.

The objectives of this EIA study are to:

- further identify relevant interested and affected parties (IA&Ps) and/or stakeholders for the proposed route corridor options that could not be identified during the scoping phase;
- further inform the above parties as well as the general public of the corridor route area about the proposed project to date;
- provide a further opportunity to these parties to raise issues and concerns pertaining to the proposed development and to provide feedback and help inform the project and process design for finalisation in the final EIR;
- further identify potential fatal flaws (impacts that cannot be mitigated to environmentally acceptable levels and render the project environmentally unfeasible);
- consider all available further specialist and technical data in order to determine areas of least environmental suitability for placing the transmission power line within the proposed route options;
- address the requirements of the DEAT received in reply to the proposed PoS-EIA and the SR;
- address the issues raised during the scoping phase by means of focussed detailed studies in the EIA phase; and
- provide sufficient information to the authorities so as to help inform their final decision-making.

## 2.2. SCOPE OF WORK

During the EIA study the following activities occurred and are expected to continue until approval of the final EIR is obtained:

- Arrangements for the specialists to conduct additional specialist studies based on the information gaps identified during scoping and completion of the studies to inform the EIR;
- further arrangements for and meetings with key stakeholders, including municipalities, farmers' associations and unions and various other representative organisations to discuss the EIR;
- further compilation and management of the database of participating parties and land owners;
- preparation and compilation of the initial EIR for public review;
- advertisement of the availability of the EIR for public review;
- consideration of comments on the EIR and compilation of an amended EIR;
- making available of the final EIR to the public;
- submission of a final EIR to the relevant authorities; and
- advertising and handling of the RoD.

## 2.3. PROPOSED STUDY CORRIDORS

**Appendix I-8** indicates the proposed route study corridors as determined and proposed during the scoping phase for further study during the technical EIA phase as well as additional options proposed by an environmental action group from the Makoppa area. The consultant included possible link options in areas where the environmental sensitivity could not clearly dictate any preference and to provide further flexibility in working out the best possible line placement(s) within a route corridor(s) for the proposed transmission power line. The indicated study corridors are indicated as 5km wide zones within which the the central line location would seem to be the most preferred but within which area possible alignment options would be catered for.

## 3. DEVELOPMENT PROPOSAL (UPDATED)

This section gives an explanation of the applicable project aspects for this project including some of the key technical details that would typically be required for the public to understand what the project entails and to help enable the relevant authorities in being able to finally make an informed decision on whether the project should be approved.

### 3.1. PROJECT LOCATION

Please refer to **Appendix I-8** for an indication of the project location and extent, including the transmission line corridor options considered during the technical EIA study to date.

### 3.2. PHYSICAL ELEMENTS OF THE PROJECT

The following is a description of the physical elements of the proposed project.

#### 3.2.1. Power Lines

For both the Marang 400kV power line the tower design will be the already used standard self-supporting cross-rope suspension tower for power lines over normal terrain and for sufficiently straight and level alignments. Currently this option is the most cost effective and environmentally suitable option. Note however that Eskom continually researches new pylon or tower designs most specifically aimed at achieving improved performance in terms of the conflicting demands of cost saving (through material reductions, greater ease of construction and transport and durability) and environmental friendliness (through improved aesthetics, reduced impact on avifauna, improved safety and maximised sustainability of function).

Strain towers will likely be utilised where difficult terrain is encountered or line deviations of more than 3° is unavoidable. The same applies as indicated above for environmental and economic performance but strain towers are much more restricted in terms of design options. The following are examples of the expected towers/pylons to be used:

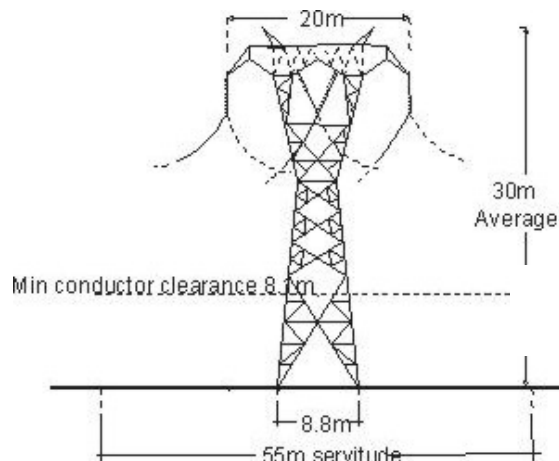
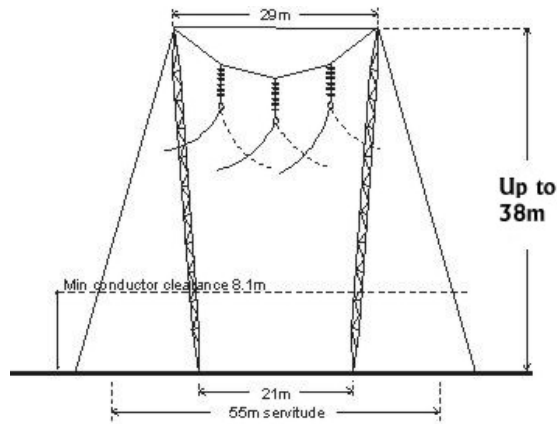


Figure 3.2.1.1 – Strain Tower: 400kV Line

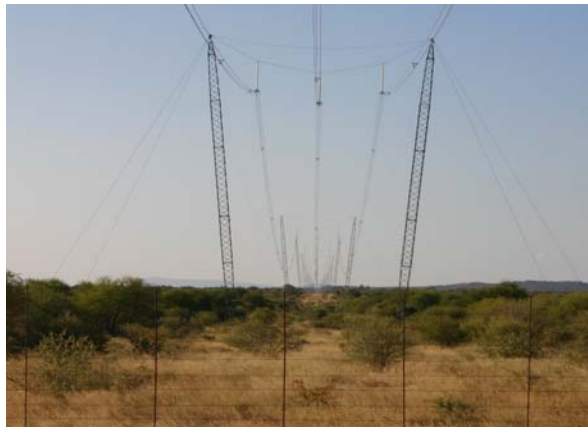




**Figure 3.2.1.2 – Cross-rope Suspension Tower: 400kV Line**



**Plate 3.2.1.1 – 400kV Transmission Power Lines (Cross-rope Suspension & Strain Towers) crossing Distribution Power Line**



**Plate 3.2.1.2 – 400kV Transmission Power Line with Cross-rope Suspension Tower**

The standard servitude size for 400kV transmission power lines is 55m and Pylons are placed between 350m and 500m apart over the power line length depending on terrain and route angles. Eskom Transmission obtains a right of use over the servitude area that allows the company to utilise the servitude land for purposes of electricity transmission to the approved design and technical constraints as approved by the relevant authority in terms of a RoD to be issued in terms of the relevant legislation and pertaining to the environmental impact report (EIR).



The conductor height is specifically aimed at ensuring the potential of being affected by human activities or even natural occurrences would be safely minimised and additionally that electromagnetic fields are kept as far away from potentially affected people, animals and vegetation as reasonably possible, based on current knowledge of the effect that these conductors could have.

The standard servitude size for 400kV transmission power lines is 55m and Pylons are placed between 350m and 500m apart over the power line length depending on terrain and route angles.

Eskom Transmission obtains a right of way over the servitude area that allows them to utilise the servitude land for purposes of electricity transmission to the approved design and technical constraints as approved by the relevant authority in terms of a RoD to be issued in terms of the relevant legislation and pertaining to the environmental impact report (EIR).

The right obtained by the company also entails certain restrictions on land owners over whose land the servitude is secured as well as allowances. These would include restrictions on and/or allowance of certain activities within the servitude area in terms of a contract reached between the applicable landowner and Eskom Transmission.

The following are examples of restrictions<sup>•</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 irrigation points within the servitude area.
- No blasting or excavating within the servitude area without prior approval from Eskom.

The following are examples of allowances<sup>•</sup>:

- 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.

Eskom also has the ability to “customize” tower features according to certain specific local conditions where applicable. Towers could be heightened and the space between two towers increased where for instance significant river, dam or wetland crossings are unavoidable or where human structures or activities such as centre pivots for irrigation exist. Such customizations are normally negotiated with the specifically affected landowner(s) potentially affected.

Power line infrastructure will be most visible when new just after installation but will lose its shine over time so that it becomes less visible and normally blends in better with the natural background of the area where it has been established. The cross-rope design is especially successful in this regard and with the exception of any strain towers, is likely to be only visible when directly encountered or to the trained eye specifically attempting to find these towers from a distance. Observations have shown that this type of tower, even on a clear day would not be visible for more than 5km to 10km even in open and flat areas.

<sup>•</sup> These are only examples of restrictions and should not be considered to be any indication of what the actual contractual agreements would be relating to this project. None of the examples indicated here will necessarily be applicable.

<sup>•</sup> These are only examples of allowances and should not be considered to be any indication of what the actual contractual agreements would be relating to this project. None of the examples indicated here will necessarily be applicable and the examples are by no means a commitment of any kind by Eskom Transmission.

### 3.2.2. Marang Substation Expansion

The HV yard is built with **tubular busbars** in order to minimise the visual impact of the substation on the surrounding area as well as to coup with the amount of injected and through power the busbar systems is required to support. The 400 kV busbar system comprises two normal running busbars (No.1 and No.2), as well as a third busbar that acts as the Transfer/Bypass busbar. This is a standard arrangement in order to obtain the low impact effect. The two running busbars cater for 4 zones of busbar with the installation of a full bus section in the No.1 and No.2 busbars, completed by two bus couplers at the ends to provide for a closed ring. The Transfer/Bypass Busbar is to be solidly connected to the No.2 busbar to form the bypass path.

Double zone outages can result from stuck circuit breaker pole or current transformer failures in the bus couplers and bus sections, faults in the so called “end zone” of the said bays, and bus coupler and bus section circuit breaker pole discrepancy. If feeders are selected onto adjacent zones, any one of these modes of failure will result in more than one feeder tripping. It is therefore necessary to separate the feeders from the power stations and same general destinations by 2 circuit breakers. Hence Matimba 1 and Matimba ‘B’ (Limpopo) 1 are selected such that they are separated by two circuit breakers. The Bighorn 1 and Midas 1 feeders can by default also be selected in this manner.

The 400 kV Marang system will be comprised of the following bays:-

- 1 x fully equipped feeder bays with double busbar selection and bypass (Limpopo 1).

#### Main Electrical Components of the Expansion:

System Voltage (kV)	Rupturing Capacity (kA,min)	BIL (kV,min)	Creepage (mm/kV,min)
400	50	1425	20

#### **400kV Yard**

##### **FEEDER 1 (LIMPOPO 1)**

##### **Primary Plant**

- 1 x 400kV Isolator 1ES LH 3150A 50kA 110V DC Aux. (Motorised) 20mm/kV
- 1 x 400kV Pantograph Isolator 0ES 3150A 63kA 110V DC Aux. (Motorised) 20mm/kV
- 1 x 400kV Circuit Breaker 3150A 50kA 1ARC 110V DC Aux. 20mm/kV
- 1 x 400kV Isolator 1ES RH 3150A 50kA 110V DC Aux. (Motorised) 20mm/kV
- 1 x 400kV Pantograph Isolator 0ES 3150A 63kA 110V DC Aux. (Motorised) 20mm/kV
- 3 x 400kV CT 3150A 50kA 6C (3200/1 2P 2M) (1/1600 2BZ) 20mm/kV
- 1 x 400kV Earth Switch 3ph 50kA 20mm/kV
- 2 x 400kV LT 50kA 20mm/kV
- 3 x 400kV CVT 20mm/kV
- 3 x 400kV Surge Arrester Metal Oxide 20mm/kV
- 17 x 400kV Post Insulator C6-1425 20mm/kV
- Labels
- Bull Conductor

#### Main Civil Works of the Expansion:

Provide main column, equipment foundations and cable trenches in 400kV yard as per Foundation and Trench Layout and Bay Layouts. Steelwork for primary plant and support steelwork for stringers is to be provided. Clear yard stone in the area of foundations, stockpile and replace.

Please see **Appendix I-15** for details on the layout planning.

### 3.3. PROJECT MOTIVATION AND BACKGROUND

The following is a description of the general aspects and planned purpose of the proposed project indicating the relevant motivation and alternatives.

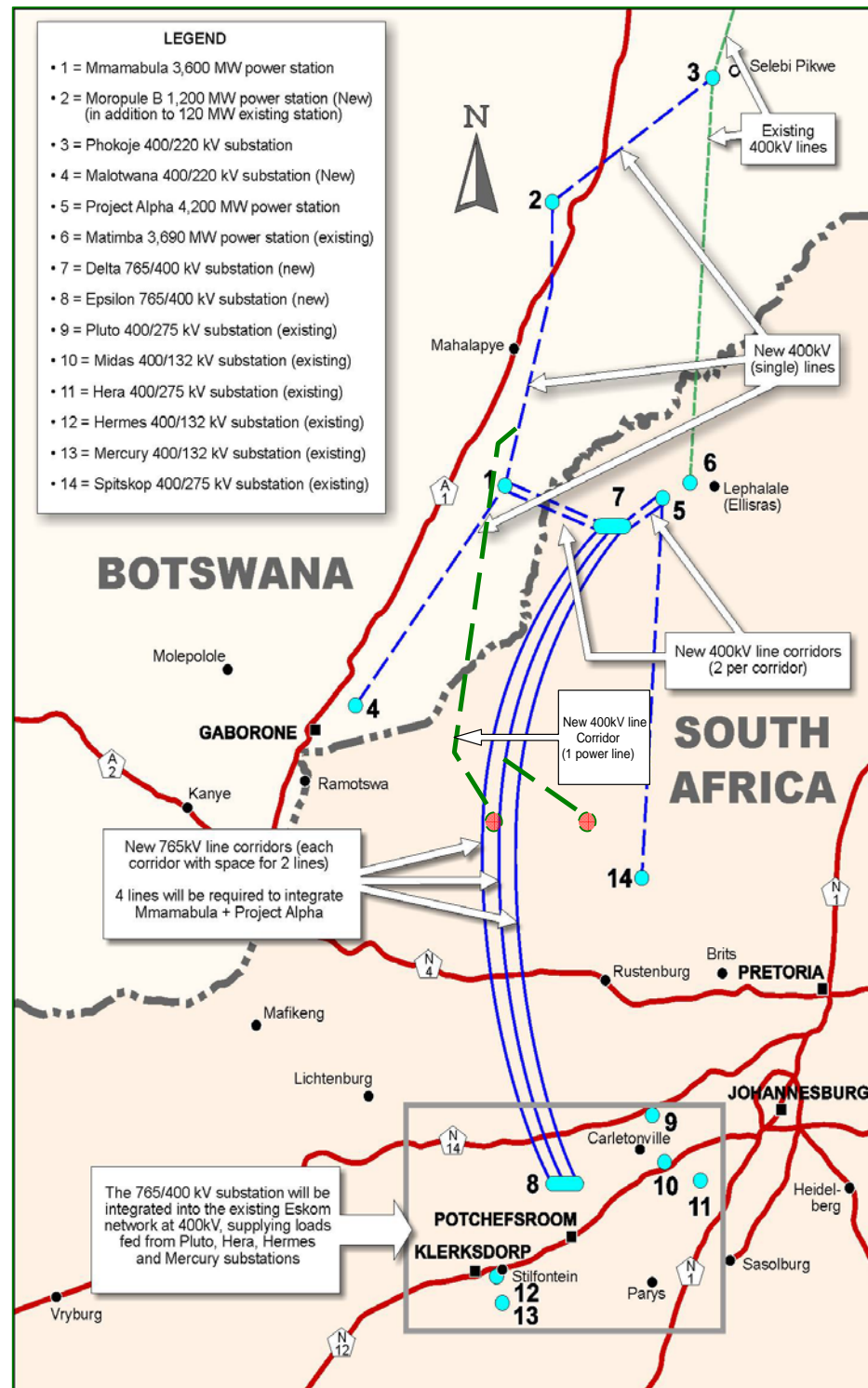


Figure 3.3.1 – Basic Layout of Generally Planned Matimba B and Mmamabula-Matimba Transmission Integration Planning (As provided by Eskom & CIC Energy)

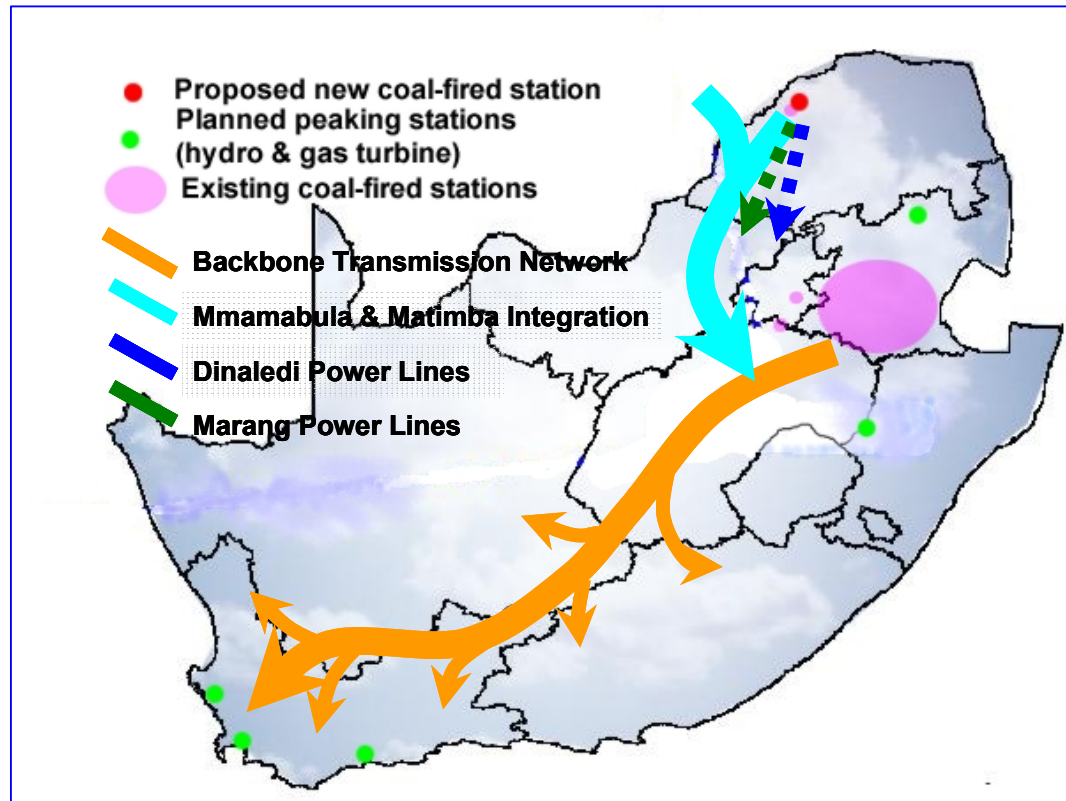


Figure 3.3.2 – Basic Indication of Generally Transmission Requirements for South Africa

### 3.3.1. Generation Expansion

Consider **Figure 3.3.2**. As indicated in the figure the existing coal-fired stations in South Africa is located mostly in the coal fields of the Mpumalanga Highveld. In recent times it has however become clear that these coal fields are nearing exhaustion in as few as the next 20 to 30 years and shortages in stable supply are already being experienced.

At the same time the South African economy has shown significant growth that exceeded the expectations of many economists and large service providers in the country, especially Eskom in providing sufficient electricity to all South Africans and South African Business and Industry.

Due to the expected further growth and keeping in mind the significant additional incentives the government plans to implement towards an even greater increase in growth rates, the expected future electricity demand in the country is expected to place significant pressure on Eskom in coping with and supplying this demand safely, effectively and in a sustainable manner.

Luckily one possible part of a solution for the above has already presented itself in the finding of significant coal reserves in the Lephalale area up to the border with Botswana and also an even larger area within Botswana.

Eskom is therefore in a position of addressing the expected shortages in electricity supply timeously by establishing new generation points in this area in the form of latest technology power stations with high yields and significantly lower pollution generation.

One such power station has already been established and another is expected to be established in the near future pending the final outcome of the relevant environmental studies. There are also definite plans for establishing one or more power stations in Botswana which would have the capacity to supply even more electricity to the SADC region, including South Africa. It is already known that a power station currently named Mmamabula is underway in Botswana.

In order to transport the generated electricity, transmission power lines are however required. This is mainly due to the fact that in recent times coal-fired power stations have not been placed near the point of demand, but rather close to the point of the main resource namely the coal deposits. This has been done for a number of reasons, mostly related to economic considerations but also to other factors such as stability and continuity of electricity supply where railways have become more costly and less reliable and road transport of coal is even more costly and potentially detrimental to the environment.

### **3.3.2. Transmission Network/Grid**

Please again consider **Figure 3.2.2**. As indicated on this figure, the backbone transmission network for the country has always been based on the availability of coal and accompanying electricity generation in the Mpumalanga Highveld area and the demand zones in Gauteng and the Cape regions.

The location of the Waterberg coal fields in the region of the Matimba power station near Lephalale is however so located that it is far removed from the established main transmission grid/network. This is due mainly to the fact that historically this area was not utilised for electricity generation and no significant consumers such as large industry or mining existed in this region.

This has brought about the need to now establish a transmission network expansion and link into the main grid from this newly developing generation area in order to ensure electricity levels are maintained in relation to the national demand, even as it grows, for the entire national grid.

The latest proposed approach in establishing this link is indicated graphically in some detail in **Figure 3.2.1** as well as in a more general and conceptual spatial representation in **Figure 3.2.2**.

### **3.3.3. Network Options in the Study Area**

Various network options have been considered during the feasibility studies by Eskom Transmission System Planning department. Due to the technical and elaborate nature of the study, it is not explained in any detail in this section.

It would suffice to indicate that different links between Matimba B (Medupi) and the various substations located towards the south and especially south-east sections of the study area have been considered, also taking into consideration the planned possible transmission links that would be necessary between Botswana, Matimba and the main grid areas.

All indications are that alternatives that would involve the placement of transmission power lines outside the study area will entail significant additional costs as well as an excessive increase in physical land surface disturbance and potentially an excessive increase in cumulative environmental impacts. Alternatives that would entail placing the power lines outside of the study area are therefore considered to be neither viable nor environmentally acceptable in general.

In addition to the above the majority of the area to the east of the study area hosts the Waterberg Biosphere which is an internationally recognised biosphere. This would render the placing of the lines through this zone more damaging to the environment from a cumulative point of view in addition to the already increased overall environmental impacts caused by the increase in power line distance alone.

### 3.4. PROJECT PROGRAMME

It is necessary for Eskom Transmission to establish the necessary transmission links by the time the new power station is operational and this is planned to occur by 2010. The EIA process is envisaged to produce a result no later than middle 2007 and this would mean that servitude negotiations will have to be finalised towards the end of 2008.

The construction of the line will take approximately two years so that it is completed towards the end of 2010. The project is of significant strategic importance to the country and therefore any delays in the project programme is expected to have potential negative consequences from an electricity supply point of view in various areas of the national grid.

### 3.5. PROJECT ALTERNATIVES

Various grid connection alternatives have been considered, both by Eskom Transmission and the appointed environmental consultant. Based on the best technical option for linking the entire grid to the Matimba complex, connection points were determined. These were determined to be the Marang substation by means of a single 400kV transmission power line and the Spitskop and Dinaledi substations by means of two 400kV transmission power lines connected to each substation.

After having considered the transmission network planners' connection options, Eskom Transmission's Land and Rights department determined the technically most-suited routes, from an Eskom point of view, for the required 400kV transmission lines to be able to link up with the various substations as indicated by the planners. The consultant has further considered these initially proposed routes as well as the economic and physical constraints for making the project viable in determining a study area and utilising the proposed routes as initial indicator corridors.

During the public participation process for the scoping phase, the consultant already indicated possible alternatives for the corridors which were also proposed to the public on various maps and which generated significant feedback from the PPP participants. Based on the initial feedback from the PPP and general specialist field assessments during scoping, it was also possible to determine a number of potential problem areas as well as areas that could be improved in terms of design and alternatives in order to minimise or mitigate environmental damage.

The normal consideration of route alternatives is applicable and has been implemented as part of this study. The consultant has refined this approach by establishing a spatial assessment system whereby various environmental impact factors are mapped to act as an additional indicator of potentially most-suited route options. This was already conducted during the scoping phase for the entire study area and produced successful results that could be used as a power line placement guide early on.

After completion of the Scoping phase but during the continuation of the PPP a representing environmental group from the Makoppa area requested additional discussions with the EIA project manager and proposed a further route consideration through the Makoppa area. This option was also considered and included as a further route alternative for consideration during the EIA. Please consider **Appendix I-8** in this regard.

#### 3.5.1. The 'No-Go' Option

The no-go option for this project is not considered to be applicable in terms of total project go-ahead. In the technical specialist assessment for scoping it has been determined that the social and economic benefits that the project would have, is of greater significance than any of the negative environmental impacts.

Even if a combination of or cumulative impacts exist that would outweigh this total benefit, such impacts would only occur within their applicable smaller spatial zones or areas in the study area and it would be possible to place the lines away from such areas or at least to apply sufficient mitigating measures to ensure this.

Where a project is of the level of strategic importance such as which is applicable to this project, where in fact the electricity supply and therefore the economy of the entire country is affected, it is held that none of the known negative impacts would be a sufficient argument for a total “no-go” scenario.

This issue has already been considered during scoping and no new information or facts have arisen in the meantime that would indicate that a “no-go” scenario would be applicable.

### 3.5.2. Other Project Alternatives

A number of other project alternatives have been identified previously in other EIA studies as alternatives that require consideration. These alternatives were also raised in general by the public during the PPP to date for this EIA. These include the consideration of placing transmission power lines underground, alternative means of generating and transporting electricity and the utilisation of alternative forms of energy to name just the key issues.

Currently South Africa’s economy is based on the availability of amongst other resources, the availability of low cost electricity. The availability of this resource is one of the advantages that the country has at its disposal to enable international economic competitiveness. This is important in the sense that economic competitiveness ensures economic survival, perhaps the most important component in ensuring the country’s ability to develop on all fronts and to reduce poverty and economic and social inequalities.

Poor and underdeveloped countries are known to also have the most significant problems with regards to environmental and social degradation and fiscal ability is directly linked to social and environmental ability.

This means that even if other sources of electricity or energy is available to the country in theory, the economic, social and environmental costs of transforming entire industries and an establishes supply system is potentially devastating and can only be implemented over the long term. The shorter term demand can only be addressed by means of the upgrading of the current system.

Eskom continually spends significant amounts of money and time in researching alternative energy generation and supply alternatives in a drive to enable such a transformation, but in the meantime, while many of these new technologies and approaches are being researched, introduced and implemented, it is necessary to utilise the available technologies and available resources and infrastructure.

The research conducted also takes place on two fronts namely improvements in utilising currently available resources and new and alternative resource and technology alternatives.

Results of such research is already evident in the significant improvements visible in latest power line and pylon designs as well as much improved coal fired power stations where electricity generation is much more sustainable and stable and air pollution levels as well as water usage have been reduced enormously.

Eskom has also conducted viability studies on placing electricity transmission lines underground. Results to date indicate costs to a level that would increase electricity costs to unacceptable levels. The infrastructure required to be able to undertake this would be costly, difficult and more dangerous to service and significant environmental and social costs are still applicable.

Underground transmission power lines are more exposed to feedback impacts from natural occurrences such as flooding and geological shifting. The cost of undertaking such a project is believed to outweigh any environmental benefits at this stage. Please consider **APPENDIX I-1D** in this regard.

**No-go Areas:**

It is acknowledged that areas of “no-go” for the placing of the applicable electricity transmission infrastructure could and most likely would exist. Such areas are addressed from three points of view:

**Firstly**, any areas indicated as “no-go” areas at the onset or at any other stage of the EIA process by the relevant lead authority. In the case of this study the relevant provincial authorities indicated that all national parks and registered nature reserves should be considered as no-go areas.

**Secondly**, the participating environmental specialists are burdened with identifying such areas that would be identifiable during the scoping and technical EIA phases. The status of “no-go area” could be based on specific legal restraints such as the legal protection of certain protected areas against certain developments within such areas or on the professional opinion of a specialist provided that such opinion is verifiable in terms of certain scientific criteria and guidelines which the specific specialist must produce proof of.

**Thirdly**, and in addition to the above Eskom Transmission would also establish criteria for areas that could be considered as “no-go areas” under specific conditions or with certain exemptions. This could be based on the expected cost of disturbing such areas, be it a financial or social cost and the legal and social responsibilities the company perceive to be applicable.

Eskom Transmission would for instance prefer not to cause unnecessary relocation of people from established or informal settlements wherever possible and could indicate to the consultant that such areas need to be indicated as “no-go areas”.

“No-go areas” are also considered in different ways during the scoping and technical EIA phases. During scoping only areas that would affect the placing of the preferred route(s) are considered whereas more specific detail land use activities and physical occurrences such as the location of irrigation points or archaeological sites are only determined during the technical EIA phase.

During the scoping phase a complete assessment of the potential impacts from the proposed activity on the environment was conducted for the power line.



#### 4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The majority of the land in the study corridors (around Spitskop and north of Spitskop) is privately owned and managed. Many of these properties feature game farms, with the remainder comprising of agricultural land. The more southern section of the study corridors features some community settlements and mostly agricultural land under land claims. The towns of Lephalale, Steenbokpan, Sentrum, Thabazimbi, Dwaalboom, Northam, Rustenburg, Marikana and Brits are some of the better known towns near the study corridors.

The sections to the north also fall within an area where few formal settlements and almost no residential areas exist. Closer to the Marang substation however the study corridor runs through a number of informal settlement areas and land portions are generally smaller. The western option is especially difficult due to the existence of significant mining and residential areas with planned expansions of mining areas. This area also carries a number of existing power lines of various types and sizes.

See **Appendix I-8** for an indication of the study corridors and study area dimensions.

The Eskom Project Area incorporates a northern bushveld savanna ecozone that stretches from Lephalale in the north to a series of norite kopjes in the south. The Bankeveld is an intermediary zone between the northern bushveld and the grass veld of the Highveld stretching further to the south. The northern bushveld and the Bankeveld ecozones do not only harbour significantly different types and ranges of heritage resources, but also reflect marked differences in the number of heritage resources that occur in each of these ecozones.

The study area falls within an area popularly known as the 'bushveld'. Surprisingly little is known about the vegetation in this area as most studies have been done in nature reserves and game farms, but five major regions are present, three of which is represented in the scoping study area. Sweet Bushveld occurs on fertile soils in the dry and hot valleys of the Limpopo River and the thorny, small-leaved vegetation is dominated by *Acacia* species that increases to dense, impenetrable thickets at the expense of the grass layer when over utilised. Mixed Bushveld varies from short, dense bushveld to a rather open, tree savannah.

The Waterberg moist mountain bushveld is a typical example of moist, infertile savannah. Due to the high proportion of unpalatable grasses, the area has become known as 'sour bushveld'. An interesting phenomenon is the presence of many plant species showing affinities with the flora of the Drakensberg, which indicated an ancient link with this range.

The savannah biome is populated by a greater diversity of bird species than any other biome in South Africa. The presence of both woody plants and a well developed herbaceous layer provides diverse sources of food and shelter for specialist and generalist bird species, including seed-eaters, insectivores and diurnal and nocturnal birds of prey abound. Much of the area is used for game farming and big game hunting, illustrating that utilization and conservation of an area are not mutually exclusive. ***The savannah biome is the core of the wildlife, ecotourism and meat-production industries.***

The power line route variants are situated within the Limpopo Primary Catchment area. The major rivers are the Krokodil and Moretele Rivers. Numerous perennial and non-perennial streams also exist in the area.

The Lephalale area is defined mostly by its farming gaming and ecotourism areas although the establishment of more mining and industrial areas especially linked to the identified coal fields to the north and west is expected to change the physical, economic and social landscape of this area over the next couple of decades.

## 5. PUBLIC PARTICIPATION (UPDATED)

A public participation occurred after finalisation of the scoping report and during the technical EIA phase to date. This included the following:

### 5.1.1. Consultation with Landowners

The study area has been divided into five sections for easier report writing:

#### *Lephalale/Steenbokpan Area:*

A section of the Lephalale/Steenbokpan area also falls within the study area for the proposed Eskom Delta-Epsilon Project, as well as the proposed Mmamabula-Delta and the proposed Matimba B-Delta projects. For this project, public meetings and public open days were held in Lephalale and Steenbokpan on 13 and 14 April 2007. At this meeting and open day both projects were discussed. A number of I&APs affected by the Matimba B TI Project attended this public event. Please see **Annexure I-20** for a copy of the notes on these public meetings.

Flyers were also printed and delivered to all post boxes in the Lephalale and Steenbokpan area for these meetings. No feedback was received from this. Please see **Annexure I-21** for a copy of this flyer.

The Steenbokpan Environmental Forum was also established that represents a number of landowners within this area and they are actively involved in consultation.

Additional meetings will be held once the EIR is made available for public review.

#### *Makoppa/Sentrum/Dwaalboom Area:*

A section of the Makoppa/Sentrum/Dwaalboom area also falls within the study area for the proposed Eskom Delta-Epsilon Project. For this project, public meetings and public open days were held in Makoppa and Dwaalboom on 7 and 8 March 2007. At this meeting and open day both projects were discussed. A number of I&APs affected by the Matimba B TI Project attended this public event. Please see **Annexure I-22** for a copy of the notes on the public meetings for 7 and 8 March.

Four additional meetings were also held with Focus Groups in these areas. These were held on 4 April at Dwaalboom with the Dwaalboom FA, 16 April with the Makoppa Environmental Action Group, 17 April with the Sentrum FA and 14 May at Makoppa with the Makoppa Environmental Action Group. Please see **Annexure I-23** for copies of the minutes of meetings.

The Makoppa Environmental Action Group is a newly established group representing landowners in the Makoppa, Sentrum, Dwaalboom and Thabazimbi area. They represent almost 300 landowners and are very involved with these projects.

Additional meetings will be held during the EIR phase with these Focus Groups once the EIR has been made available for public review.

#### *Northam/Thabazimbi Area:*

Flyers were also printed and delivered to all post boxes in the Northam area at the post offices. No feedback was received from this. Please see **Annexure I-21** for a copy of this flyer.

No additional meetings have been held with this area as the request was made that meetings only be arranged once the EIR is available for public review.

*Rustenburg/Mankwe Area:*

A section of the Rustenburg area also falls within the study area for the proposed Eskom Delta-Epsilon Project. For this project, public meetings and public open days were held in Rustenburg on the 14<sup>th</sup> of March 2007. At this meeting and open day both projects were discussed. A number of I&APs affected by the Matimba B TI Project attended this public event. Please see **Annexure I-24** for a copy of the notes on this public event.

Flyers were also printed and delivered to all post boxes in the Rustenburg area at the post offices. No feedback was received from this. Please see **Annexure I-21** for a copy of this flyer.

*Brits/Ga-Rankuwa Area:*

Consultation has been poor with I&APs in this area. A number of factors seem to come into play. Many of the properties have land claims registered against them so landowners are not keen to participate. Farming activities in this area will also be able to continue in this area even if power lines cross the properties. The biggest concern from landowners in this area is with regards to compensation and maintenance and servitude issues. Many of the properties in this area also belong to TA's and these groups have been consulted with.

The consultants have also conducted additional activities in this area to ensure that all possibly affected I&APs are consulted with. These activities include:

*Meeting with Atlanta FA:*

This meeting was held on 24 April and was attended by a number of landowners. The main issues from this meeting were servitude acquisition and compensation to be paid. Please see **Annexure I-25** for a copy of the minutes of this meeting.

*Flyers:*

Flyers were printed and delivered to all post boxes at the Madibeng Post Office. No feedback has resulted from the Flyer drop. Please see **Annexure I-21** for a copy of this flyer.

Additional meetings will be held in this area once the EIR is available for public review.

## **5.1.2. Consultation with Municipalities**

There are 4 municipalities that fall within the study area. These are: Lephalale Municipality, Thabazimbi Municipality, Rustenburg Municipality and Madibeng (Brits) Municipality.

A requirement of the Regulations for EIA's is that consultation is required with municipalities and local councils within the study area for the project. Initial meetings were arranged and held during the Scoping Phase of this project. Please refer to the original PPP Report published with the Scoping Report and the Addendum PPP Report for details on this consultation.

Further to those meetings, the following was requested from municipalities and the following consultation has taken place to date:

*Lephalale Municipality:*

A first meeting was held in August 2006. The request from the municipality at that stage was to be kept informed of the progress of the project and to schedule a second meeting with them once the Environmental Impact Report (EIR) is available for public review showing the final routes. This meeting will be arranged once the EIR is available for public review and will be arranged with the Office of the Speaker to include not only Municipal Officials but also all councilors.

All councilors in the Lephalale Municipality, as well as Municipality Officials are on the database for registered Interested and Affected Parties (I&APs) and have therefore received information relating to all scheduled meetings in the area to date and update on the project.

*Thabazimbi Municipality:*

A first meeting was held in August 2006. The request from the municipality at that stage was to be kept informed of the progress of the project and to schedule a second meeting with them once the Environmental Impact Report (EIR) is available for public review showing the final routes. This meeting will be arranged once the EIR is available for public review and will be arranged with the Office of the Speaker to include not only Municipal Officials but also all councilors.

All councilors in the Thabazimbi Municipality, as well as Municipality Officials are on the database for registered Interested and Affected Parties (I&APs) and have therefore received information relating to all scheduled meetings in the area to date and update on the project.

*Rustenburg Municipality:*

A first meeting was arranged for August 2006. This meeting was poorly attended by Municipal Officials. Since this meeting, numerous requests have been issued to this Municipality for a second meeting, but none has been held to date. Requests have been made to the Office of the Speaker, as well as the Chief Whip of the Municipality, but no meeting has been held.

At the first meeting that was held with a couple of officials, the request was also made that the consultants meet with the Municipality once the EIR is available for public review. This meeting will be arranged once the EIR is available for public review and will be arranged with the Office of the Speaker to include not only Municipal Officials but also all councilors.

All councilors in the Rustenburg Municipality, as well as Municipality Officials are on the database for registered Interested and Affected Parties (I&APs) and have therefore received information relating to all scheduled meetings in the area to date and update on the project.

*Madibeng Municipality:*

A first meeting was arranged for August 2006. This meeting was poorly attended by Municipal Officials. Since this meeting, numerous requests have been issued to this Municipality for a second meeting, and a date was set for a meeting on 7 May 2007.

Two members from the Consultants attended this meeting, and a presentation was given to the Municipality Officials and Councilors who attended this meeting. A set of maps was left with the municipality. Please see **Annexure I-26** for a copy of the minutes of this meeting.

At this meeting that was held on 7 May, the request was also made that the consultants meet with the Municipality once the EIR is available for public review. This meeting will be arranged once the EIR is available for public review and will be arranged with the Office of the Speaker to include not only Municipal Officials but also all councilors.

All councilors in the Madibeng Municipality, as well as Municipality Officials are on the database for registered Interested and Affected Parties (I&APs) and have therefore received information relating to all scheduled meetings in the area to date and update on the project.

### 5.1.3. Consultation with Traditional Authorities

Numerous meetings were held with Traditional Authorities (TA's) during the Scoping Phase of this project. Meetings were held with:

Bakgatla Ba Kgafela TA; Baphalane TA; Bakgatla Ba Makau TA; Krokodilkraal Co-owners Committee Community Property; Royal Bafokeng TA.

These TA's requested that meetings be arranged with them once the EIR is available for public review. Such meetings will be arranged during the EIA Phase of this project. All TA's are on the database for registered Interested and Affected Parties (I&APs) and have therefore received information relating to all scheduled meetings in the area to date and update on the project. The TA's who are no longer affected by the project will not be met with but will stay on the database and receive project related information.

### 5.1.4. Requests from Government Departments

#### *Department of Agriculture:*

The database of farms within the corridors as identified and proposed during the Scoping Phase was sent to the Department of Agriculture for their assistance in identifying emerging black farmers. This was sent to the departments in North-West and Limpopo Provinces. No feedback has been received to date from this Department.

The list of farms within the final proposed route alignment will also be sent to the department for their assistance in this regard.

#### *Department of Land Affairs:*

The database of farms within the corridors as identified and proposed during the Scoping Phase was sent to the Department of Land Affairs for their assistance in identifying farms that have land claims registered on them. This was sent to the departments in North-West and Limpopo Provinces. The Limpopo Department of Land Affairs has given feedback and only one property has a land claim registered on it. No feedback has been received to date from the North-West Department.

The list of farms within the final proposed route alignment will again be sent to the departments for their assistance in this regard and to confirm farms with land claims on them.

## 5.2. OVERVIEW OF FURTHER ISSUES RAISED BY THE PUBLIC

Key issues: underground option, separation distance, specialists studies (how did they come to their conclusions), run lines together with existing lines, not all three together, consult with public once we know where final routes will be – cannot determine final routes unless consulted with all landowners, if lines must go together keep them as close as possible to each other...

## 5.3. LATEST COMMENTS AND RESPONSE SUMMARY

Please see **Annexure I-18** for the complete Comment & Response Document, containing all issues received from the onset of this project. This is a lengthy document as this project has had very high levels of public participation.

## 5.4. PUBLIC REVIEW OF THE EIR

The Environmental Impact Report (EIR) will be made available for public review from 20 June 2007 until 24 August 2007. The reason for the additional time for comment is due to the school holidays which run from 22 June to 16 July. The document will be released for public review before the school holidays to ensure that all registered I&APs receive the Executive Summary of the EIR in time.

The Executive Summary of the EIR, together with a letter will be sent to all registered I&APs on the database. Furthermore, advertisements will be placed in local newspapers within the study area, namely: Mogol Post, Thabazimbi Kwevoel, Rustenburg Herald and Brits Pos to advertise the availability of the EIR with the locations where the EIR will be available. These locations are: Lephalale Library, Thabazimbi Library, Northam Library, Phokeng Library, Rustenburg Library, Rustenburg Information Centre, Marikana Library and the Brits (Madibeng) Library. The EIR will also be published on Eskom's website and will also be made available on CD to any I&AP who requests the document.

#### **5.5. CONCLUDING REMARKS**

A list of all farms that will be affected by the proposed final route alignment shows that 60% of all directly affected landowners have been consulted with. Furthermore, all municipalities within the study area have been consulted with – during the Scoping Phase as well as during the EIA Phase. Extensive consultation has also taken place with all Traditional Authorities within the study area and these authorities will also be consulted with individually once the EIR is available for public review. Please see **Annexure I-27** for a complete copy of the I&AP Database and **Annexure I-28** for a list of all farms within the final proposed route alignment.

The list of directly affected farms has also been sent to the Department of Land Affairs in Limpopo and North West provinces to assist in identifying farms that have land claims registered on them.

Further consultation, especially with directly affected landowners will continue to take place during the EIA phase, and comments received during this period will be collated into the C&R document for final submission to DEAT.

## 6. ENVIRONMENTAL IMPACT ASSESSMENT & PROPOSED MITIGATION

Initially Eskom Transmission provided the environmental assessment practitioner (EAP) with a number of route options that would suit Eskom Transmission's needs best from a technical point of view. Eskom Transmission already considered a number of environmental and design aspects and constraints in determining these possible routes. Considerations such as power line distance, topography and physical spatial constraints have been considered.

The EAP had determined a study area for the purposes of the scoping phase of which the boundary was determined based on the most extreme boundary area within which the power line routes as proposed by Eskom Transmission could be placed. Please see **Appendix I-8** of the report for the originally proposed study area as indicated in the PoSS for both the Matimba B (Medupi)-Dinaledi and Matimba B (Medupi)-Marang projects and accepted by the relevant authorities.

The EAP further appointed a number of specialists to conduct studies mainly focussed on rating the potential routes as indicated by Eskom in order of preference and based on the specific findings of each individual specialist study. This information was used mainly as a guidance to focus efforts towards a final route option with at the most, one alternative, thus resulting in one or two most preferred routes for each power line.

For the purposes of presenting the study area and possible corridors to the public, each of the route options were indicated on a map as 5km wide route corridor options. Various maps were viewed by the public but the intention was always that there should be an understanding that the routes could in theory be placed anywhere within the study area.

The EAP also utilised the information obtained from the specialist reports and other available sources obtained during the PPP to identify areas of sensitivity and accessibility in a spatial format by utilising an Impact Evaluation & Matrix System (IE&MS) that was further utilised in a Geographical Information System Assessment Approach (GISAA).

In this part of the document the impact of each Project Activity Aspect (PAA) or *the Effect-causing Aspect* on each of the Environmental Aspects (EA) pertaining to the EIA study corridors as identified at the end of the scoping phase and which was initially determined for the entire scoping study area is further refined and assessed. Mitigation measures are proposed and the expected post-mitigation status is also indicated. Studies have focussed on those issues identified during the scoping phase as being significant and are indicated accordingly in this report.

### 6.1. ASSESSMENT METHODOLOGY:

The following assessment approach has been utilised:

- Focussed specialist studies for known environmental aspects of significance as identified during scoping indicating areas within the study corridors where transmission power line placements would be least preferred.
- Further public and stakeholder participation from which additional issues and concerns are identified and utilised.
- Rating/evaluation of study corridor sections where more than one alternative exists to help determine where the most preferred routes/corridors could be expected to run.
- Impact evaluation on impact sheets focussing on and considering all relevant environmental aspects in terms of project activity aspects which is represented on matrices for the construction and operational phases of the proposed project. (IE&MS).
- Comparison of pre-mitigation and post-mitigation impact scenarios.
- Comparative assessment of any alternatives as applicable.
- Proposed mitigation measures based on expected potential impacts.

Please see **APPENDIX I-10** for a complete description of the assessment methodology used in this assessment.

## 6.2. AESTHETIC ASPECT

### Impact & Mitigation:

Due to the linear nature of the project, a number of potential conflict areas in terms of potential visual impact had been identified. These potential conflict areas have been rated in terms of intensity of visual impact and the significance of each impact. Concluding from the rating and assessment of each area, it has been assessed that the construction of the 400kV line from Matimba B (Medupi) to Marang substation would have a **moderate negative** impact on the surrounding landscape. It is however imperative that the specific potential conflict areas be considered and the mitigation measures successfully implemented.

**Figure 9** in the specialist visual assessment (**Appendix I-2**) indicates the preferred corridors, eliminating those options that feature too many potential conflict areas or landscapes with a high landscape sensitivity/visual resource value.

The following general mitigation measures should be followed for the entire project:

- The proposed corridor should never be allowed to traverse the crest of a hill. All lines should be located at the base of a hill and continued along the valleys encompassed by hills.
- Where possible, the proposed corridor should continue adjacent to an existing corridor.
- The mixing of pylon-types should be avoided to reduce visual conglomeration and create the illusion of visual harmony.

Post mitigation significance has not been determined as part of this study.

**Table 6.2.**

Description of Impact	Pre-mitigation Significance	Proposed Mitigation	Post-mitigation Significance
AREA 1: - The power transmission line will cause a moderate change in landscape characteristics over an extensive area resulting in a moderate change to key views. Operational activities will add to the cumulative negative effect on the visual quality of the landscape.	Medium	Ensure that the proposed corridor runs adjacent to the existing lines.	No Indication
AREA 2A: - The power transmission line will cause a moderate change in landscape characteristics over an extensive area resulting in a moderate change to key views. Operational activities will add to the cumulative negative effect on the visual quality of the landscape.	Medium	The crest of the Mmumbana hill should be avoided at all costs. The corridor should be positioned at the base of the hill, preferably to the west of it to screen some views from the nearby settlement.	No Indication
AREA 2B: -The power transmission lines will cause a notable change in landscape characteristics over an extensive area (alternative 1A) and/or intensive change over a localized area resulting in major changes in key views.	Medium	Avoid the crest of the ridge at all costs. It is recommended that this option be avoided due to the sensitive nature of the visual environment.	No Indication
AREA 4: - The power transmission line will cause a moderate change in landscape characteristics over localized area resulting in a minor change to a few key views. Operational activities will add to the cumulative negative effect on the visual quality of the landscape.	Medium	Ensure that the proposed corridor runs adjacent to the existing lines.	No Indication

### Alignment Implications:

Please see **APPENDIX I-2** for the relevant visual assessment report. In the northern part of the study corridor where no options have been indicated at the end of scoping, a few zones of significant visual sensitivity is indicated. These zones are however too large for any sensible re-alignment of the proposed transmission power lines and therefore the impact in this regard will have to be addressed by means of the proposed mitigation measures.

Towards the Spitskop substation a number of study corridor alternatives were determined during scoping. In terms of the visual assessment, the western-most option would have the least impact whereas both of the remaining options would have higher visual impacts. From a visual point of view, this option is most preferred.



South of the Spitskop substation and nearer the Marang substation there is a preference for the eastern-most option based on the visual assessment.

### 6.3. ECOLOGICAL ASPECT

The impacts on the ecology was assessed by means of two specialist assessments namely an avifauna study and a strategic ecology study. Please see **APPENDIX I-5** for the avifauna report and **APPENDIX I-6** for the ecology report.

From the avifaunal report, the following:

#### Impact & Mitigation:

Generic measures are indicated for the purpose of this aspect which will affect the post-mitigation situation.

**Table 6.3.1.**

Description of Impact	Pre-mitigation Significance	Proposed Mitigation	Post-mitigation Significance
Black Stork Collision with earth wire during operation (Dams and river crossings, particularly the Matlabas and Crocodile Rivers)	Medium	See generic measures indicated in specialist report ( <b>Appendix I-5</b> )	Low
Tawny Eagle Collision with earth wire during operation. Disturbance during construction (Near nests in commercial farming area)	Medium		Low
	Medium		Medium
Martial Eagle Collision with earth wire during operation. Disturbance during construction (Near nests in commercial farming area)	Medium		Low
	Medium		Medium
Lanner Falcon	No impacts are foreseen		
Kori Bustard Collision with earth wire during operation (In open, flat areas mostly in the grassland patches in the commercial farming areas.)	Medium		Low
White-backed Vulture Collision with earth wire during operation. Disturbance during construction (Near nests in commercial farming area)	Medium		Low
	Medium		Medium
Cape Vulture Collision with earth wire during operation (Anywhere at a carcass.)	Low		Low
Lappet-faced Vulture Collision with earth wire during operation (Anywhere at a carcass.)	Low		Low
Marabou Stork Collision with earth wire during operation (Dams and river crossings, particularly the Matlabas and Crocodile Rivers)	Medium		Low
Secretarybird Collision with earth wire (In open, flat areas particularly in grassland patches and old lands)	Medium		Low
Lesser Flamingo Collision with earth wire during operation	Medium		Low
African Mars Harrier	No impacts are foreseen		
African Grass –owl	No impacts are foreseen		
Lesser Kestrel	No impacts are foreseen		
Blue Crane Collision with earth wire	Medium		Low
Bateleur	No impacts envisaged		

#### Alignment Implications:

Please see **APPENDIX I-5** for the Marang power line specialist avifauna study. No alternative study corridor selection could be based on the outcomes of this report as most of the study area corridor options are similar. In the areas where sensitive zones such as rivers are crossed, these sensitive zones are existing linear zones that cannot be missed by means of any reasonable re-alignment and therefore can only be addressed by means of other mitigation measures as described in the specialist report.

From the ecology report, the following:

Impact & Mitigation:

Respective results of the floristic and faunal sensitivity analysis are combined to present an overview of the ecological sensitivity of the study area. Habitat encountered along the proposed route is divided into the following categories:

- ☞ Natural habitat (regional habitat types, of which there are numerous varieties);
- ☞ Transformed habitat [the extent of this habitat type is indicated in the scoping report, Section 7.10 (page 17), Figure 9 (page 23)];
- ☞ Protected habitat (wetlands, RAMSAR Convention); and
- ☞ Sensitive habitat (Ridge habitat).

In order to present the reader with an indication of the ecological sensitivity of the respective sensitive habitat types, the highest sensitivity for each ecological unit is selected as being representative of the ecological sensitivity of the specific ecological unit. Combined results from the floristic and faunal sensitivity analysis indicate the high sensitivity of wetland regimes and ridge habitat types. The status of these areas is fairly pristine and are therefore considered suitable habitat for a variety of Red Data flora and fauna species. The largest extent of the study area exhibit medium sensitivity ecological attributes and the proposed activity is not expected to result in significant impacts in these areas.

Table 6.3.2.

Description of Impact	Pre-mitigation Significance	Proposed Mitigation	Post-mitigation Significance
<u>Ridges Habitat:</u> Destruction of threatened species & habitat	High	Realignment of lines to avoid ridges Limited maintenance activities, no severe impact on habitat Implementation of rehabilitation, monitoring & control programmes Final recommendations during walk-through survey Remove threatened and protected plant species	Low
<u>Riparian Habitat:</u> Destruction of threatened species & habitat	High	Avoid surface impacts on riparian systems - 30m buffer zones Generic mitigation measures Implementation of rehabilitation, monitoring & control programmes Final recommendations during walk-through survey Remove threatened and protected plant species	Low
<u>Regional Habitat:</u> Destruction of threatened species & habitat	High	Implementation of bio- monitoring programmes Adaptive management & conservation Implementation of rehabilitation, monitoring & control Programmes Final recommendations during walk-through survey Remove threatened and protected plant species	Medium
<u>Substation Upgrade Sites:</u> Destruction of threatened species & habitat	Low	Implementation of bio- monitoring programmes Generic mitigation measures Rehabilitation, monitoring & control Programmes Final recommendations during walk-through survey Remove threatened and protected plant species	Low
<u>Ridges Habitat:</u> Destruction of sensitive habitat & areas of high biodiversity	High	Realignment of lines to avoid ridges Limited maintenance activities, no severe impact on habitat Implementation of rehabilitation, monitoring & control programmes Final recommendations during walk-through survey	Medium
<u>Riparian Habitat:</u> Destruction of sensitive habitat & areas of high biodiversity	High	Avoid surface impacts on riparian systems - 30m buffer zones Generic mitigation measures Implementation of rehabilitation, monitoring & control programmes Final recommendations during walk-through survey	Low
<u>Regional Habitat:</u> Destruction of sensitive habitat & areas of high biodiversity	Medium	Implementation of bio- monitoring programmes Adaptive management & conservation strategies Implementation of rehabilitation, monitoring & control programmes Final recommendations during walk-through survey	Low
<u>Substation Upgrade Sites:</u> Destruction of sensitive habitat & areas of high biodiversity	Low	Implementation of bio- monitoring programmes Generic mitigation measures Rehabilitation, monitoring & control programmes	Low
<u>Ridges Habitat:</u> Destruction of pristine habitat types	High	Realignment of lines to avoid ridges Limited maintenance activities, no severe impact on habitat Implementation of rehabilitation, monitoring & control programmes Final recommendations during walk-through survey	Low
<u>Riparian Habitat:</u> Destruction of pristine habitat types	High	Avoid surface impacts on riparian systems - 30m buffer zones Generic mitigation measures Implementation of rehabilitation, monitoring & control programmes Final recommendations during walk-through survey	Low
<u>Regional Habitat:</u> Destruction of pristine habitat types	Medium	Implementation of bio- monitoring programmes Adaptive management & conservation strategies Implementation of rehabilitation, monitoring & control programmes Final recommendations during walk-through survey	Low
<u>Substation Upgrade Sites:</u> Destruction of pristine habitat types	Low	Implementation of bio- monitoring programmes Generic mitigation measures Rehabilitation, monitoring & control programmes	Low
<u>Ridges Habitat:</u>	High	Realignment of lines to avoid ridges	Low

Description of Impact	Pre-mitigation Significance	Proposed Mitigation	Post-mitigation Significance
		Limited maintenance activities, no severe impact on habitat	
		Implementation of rehabilitation, monitoring & control programmes	
		Final recommendations during walk-through survey	
<u>Riparian Habitat:</u> Changes to habitat diversity & biodiversity	High	Avoid surface impacts on riparian systems - 30m buffer zones	Low
		Generic mitigation measures	
		Implementation of rehabilitation, monitoring & control programmes	
		Final recommendations during walk-through survey	
<u>Regional Habitat:</u> Changes to habitat diversity & biodiversity	High	Implementation of bio- monitoring programmes	Medium
		Adaptive management & conservation strategies	
		Implementation of rehabilitation, monitoring & control programmes	
		Final recommendations during walk-through survey	
<u>Substation Upgrade Sites:</u> Changes to habitat diversity & biodiversity	Low	Implementation of bio- monitoring programmes	Low
		Generic mitigation measures	
		Rehabilitation, monitoring & control programmes	
<u>Ridges Habitat:</u> Impacts on surrounding natural habitat and species	Medium	Implementation of bio- monitoring programmes	Low
		Adaptive management & conservation strategies	
		Rehabilitation and control programmes	
<u>Riparian Habitat:</u> Impacts on surrounding natural habitat and species	Medium	Avoid surface impacts on riparian systems - 30m buffer zones	Low
		Generic mitigation measures	
		Implementation of rehabilitation, monitoring & control programmes	
		Final recommendations during walk-through survey	
<u>Regional Habitat:</u> Impacts on surrounding natural habitat and species	Medium	Implementation of bio- monitoring programmes	Low
		Adaptive management & conservation strategies	
		Rehabilitation and control programmes	
<u>Substation Upgrade Sites:</u> Impacts on surrounding natural habitat and species	Medium	Implementation of bio- monitoring programmes	Low
		Adaptive management & conservation strategies	
		Rehabilitation and control programmes	

Alignment Implications:

Please see **APPENDIX I-6** for the Marang power line specialist ecology study with specific reference to **Figure 8** in the same report. The specialist in this regard numbered the various deviations of the study corridor from running along the existing lines in the north near the Matimba B (Medupi) power station towards the Spitskop substation from 1 to 4 with 1 being the first or eastern-most deviation and 4 the western-most or last deviation. South of Spitskop the specialist numbered the eastern option 5 and the western option 6.

A recommendation of route variants between variants 1 to 4, 5 and 6 is made on the basis of ecological sensitivity, expected impact and mitigation potential of likely impacts.

Of line variants 1, 2, 3 or 4, the use of variant 2 or 3 is recommended. Although it will pass in close proximity to sensitive natural features, the number of ridges that will be crossed is less and slight realignment is likely to limit potential impacts to a minimum. It is emphasized that the expected impacts arising from the use of variants 1 or 2 will be only slightly less, while variant 4 is considered least preferable.

The specialist indicated a preference for variant 5 rather than 6. Likely impacts arising from both these options are considered similar and could be mitigated effectively.

#### 6.4. CULTURAL AND HERITAGE ASPECTS

The impacts on the cultural and heritage aspects were assessed by means of two specialist assessments namely a specialist heritage study and a specialist cultural landscape study. Please see **APPENDIX I-3** for the heritage report and **APPENDIX I-4** for the cultural landscape study.

From the heritage report, the following:

Impact & Mitigation:

No post-mitigation significance has been determined for this aspect but it is expected that the implementation of proposed mitigation measures will reduce the significance of all impacts.

Table 6.4.1.

Description of Impact	Pre-mitigation Significance	Proposed Mitigation	Post-mitigation Significance
<b>Northern Stretch</b>			
Matimba B – Matlabas River (Ruin, Geelhoutkloof 359)	Low	See notes below.	Not Indicated.
Matlabas River – Crocodile River At least 5 ruins close to Crocodile River (one may be impacted)			
Crocodile River – Zoetdoorns 259 Ruin on Geluk 212	Low		Not Indicated.
Zoetdoorns – Spitskop			
Stone walled sites, base of Sefikele kopje	High		Not Indicated.
Graves, south-west of Spitskop	High		Not Indicated.
<b>Southern Stretch</b>			
<b>(Western/Eastern Matimba B- Dinaledi options)</b>			
Spitskop-east of Mogwase Graves at junction between Eastern Matimba B-Dinaledi and southernmost stretch	High		Not Indicated.
<b>Western Matimba B-Marang option</b>			
Thlating – Na Gape Stone walled sites at Ga Nape	High		Not Indicated.
Paardekraal – Marang Stone walled sites close to kopjes near Marang	High		Not Indicated.
<b>Eastern Matimba B-Marang option</b>			
Mogwase – Moordkop Moordkop	High		Not Indicated.
Moordkop – Makgope/Malepe Stone walled sites along Makgope's eastern end	High		Not Indicated.
Makgope/Malepe-southern turning point Graveyard close to the power line	High		Not Indicated.
Southern turning point – Marang Stone walled sites along western edge of Thaba-ea-Nape mountains	Medium-high		Not Indicated.
<b>Marang substation</b>			
Stone walled sites near substation	High		Not Indicated.

It is possible that ruins on Geelhoutskloof 359JQ and Geluk 212KP may be impacted by the new power line. The nature, extent and significance of these 'ruins' which have been identified from the 1: 500 000 topographical maps is unknown. These remains were mostly constructed with durable material such as brick and cement walls and usually do not have outstanding significance as they date from the more recent past. However, if these ruins are older than sixty years they do qualify as heritage resources and are protected by Section 34 of the National Heritage Resources Act (No 25 of 1999).

Stone walled sites are abundant in and near the Eskom Project Area. These sites date from the Late Iron Age. They are mostly associated with kopjes and mountains, where norite and dolerite were used in the construction of these sites. The sites are usually single settlements on kopjes or are clustered along the lower foot slopes and spurs of large mountains. The clusters of stone walled sites are composed of varying numbers of individual sites (*dikgôrô*) that were grouped together to form villages which covered large areas. The majority of the stone walled sites are confined to mountains and kopjes on the farms Nooitgedacht 282JQ, August Mokgatles, Welbekend 117JQ and Beestkraal 290JQ. The following settlement types can be distinguished:

- Tswana villages (singular *motse*, plural *metse*) which were composed of a single village (*kgôrô*) or a conglomeration of villages (*dikgôrô*). A typical *kgôrô* is characterized by an outer scalloped wall that encircles central kraal complexes that were usually linked together. The outer scalloped walls still contain the remains of dwellings (huts) within their surrounding yards (*malapa*) that were occupied by the various family groups (*masika*), central kraal complexes composed of courts (*makgotla*) and enclosures for domestic stock. Tswana sites are common throughout the Project Area.

- There are some sites that are composed of long terrace walls that are 'stepped' down the slopes of mountains. The terrace walls are associated with a few small and large enclosures. These sites are not demarcated with clear outer boundary walls. It is possible that these sites may have been built by Ndebele people.
- There were some sites with spatial compositions that could not be interpreted as yet, due to the dense vegetation cover on these sites at the time of the year when the study was done. However, it is expected that settlement types not previously recorded may occur in the clusters that were discovered in the Eskom Project Area.

The stone walled sites in and near the Eskom Project Area can be rated as significant in terms of criteria such as the following:

- The Thaba-ea-Nape range of mountains with individual mountains in this range such as Malejane, Nape, Mofothelo, Motlhabe, etc are historical beacons, as they are associated with human occupation during the last three hundred and fifty to four hundred years.
- These sites and clusters of sites represent different villages which were occupied simultaneously by several thousands of people who lived in these villages from pre-historical times (AD1650) well into the historical period. (Some of the sites may still have been occupied during the Transvaal Anglo War [1899-1902]).
- Many of the sites and clusters of sites with their surrounding landscape represent 'cultural landscapes or townscapes' which are unique, as these sites and complexes of sites reflects a regional history, in particular that of Kwena clans such as the Bafokeng.
- These townscapes incorporate intangible heritage attributes such as a sense of place, the majesty of mountains associated with the social (political) importance of rulers, activity areas which served as pastures for stock, wood and water collecting spots, possible places of sacrifice and worship, etc.
- These site complexes are unique in the context of the Late Iron Age, as they contain settlements that are characteristic of Tswana and mixed Tswana/Zulu (Ndebele) populations.
- Some of the settlements and clusters of settlements are in an excellent (pristine) condition and have not been affected by any development in the past. (However, it is also true that many sites and clusters of sites have been affected in one way or another by mining or other development activities in the past).
- These sites offer outstanding research opportunities, as they represent archaeological 'laboratories' which can be utilized for decades to come. Tangible heritage remains in the form of artefacts, structures and features are in abundance in the archaeological deposits that are associated with the sites.
- The village complexes offer exceptional educational and tourism potential, if they are developed according to correct scientific and museological principles.

Graves and graveyards hold high significance and are protected by various laws. Legislation with regard to graves includes the National Heritage Resources Act (No 25 of 1999) whenever graves are older than sixty years. The act also distinguishes various categories of graves and burial grounds. Other legislation with regard to graves includes those which apply when graves are exhumed and relocated, namely the Ordinance on Exhumations (No 12 of 1980) and the Human Tissues Act (No 65 of 1983 as amended).

The magnitude of the impact of the various stretches of the Matimba B-Marang power line and the Marang Substation on various heritage resources and graves has been indicated and is discussed below:

It is possible that ruins on Geelhoutskloof 359JQ and Geluk 212KP may be impacted by the new power line. The following stretches of the proposed Matimba B-Marang power line together with the Marang Substation may have a negative impact on single stone walled sites or clusters of stone walled sites, namely:

- The Western Matimba B-Marang option: The stretch runs from Paardekraal eastwards and then south-eastwards to the Marang Substation. Stone walled settlements occur at most of the isolated, scattered norite hills close to the Marang Substation.
- The 1<sup>st</sup> Eastern Matimba B-Marang option: The stretch runs between Makgope/Malepe mountains and the southernmost point. The eastern end of Makgope mountain is covered with stone walled sites which may be impacted by the power line.
- The 2<sup>nd</sup> Eastern Matimba B-Marang option: This stretch runs from the southern most turning point along the western edge of the Thaba-ea-Nape range of mountains to the Marang Substation. This stretch of the Thabaeae – Nape mountain range is covered with a number of stone walled sites.
- The Marang Substation: Kopjes to the north and south of Marang Substation are associated with stone walled settlements. Upgrading of the Marang Substation may have an affect on these settlements.

It seems as if a graveyard along the Makgope/Malepe mountains to the southern most point (1st Eastern Matimba B-Marang Option) may be affected by the new power line.

Alignment Implications:

Please see **APPENDIX I-3** for the Marang power line specialist heritage study. The most significant impact on stone walled sites and complexes of stone walled sites (cultural landscapes) may occur along the 2<sup>nd</sup> Eastern Matimba B-Marang option considering the large number of sites and complexes of sites which occur along this option. The Western Matimba B-Marang option therefore may be a preferred option if the 2<sup>nd</sup> Eastern Matimba B-Marang option's new trajectory along Eskom's existing power line may not guarantee the unaffected continued existence of stone walled sites and cultural landscapes along this option.

From the cultural landscapes report, the following:

Please see **APPENDIX I-4** for the Marang power line specialist cultural landscapes study. The report is inconclusive as far as any route selection is concerned.

## 6.5. SOCIAL AND SOCIO-ECONOMIC ASPECTS

Please see **APPENDIX I-7** for the Marang power line specialist social study.

Impact & Mitigation:

**Table 6.5.1. Summary of Impacts per Phase**

CHANGE PROCESS	CHANGE PROCESS	SIGNIFICANCE (pre-mitigation)	SIGNIFICANCE (post-mitigation)
<b>PRE CONSTRUCTION AND CONSTRUCTION</b>			
<b>ECONOMIC</b>	<i>Direct formal job opportunities for local individuals and/or contractors</i>	Medium +	High +
	<i>Indirect formal and/or informal job opportunities for local individuals and/or contractors – if accommodated in the communities</i>	Medium +	High +
	<i>Compensation for servitude</i>	Low +	High +
	Visibility of construction activities that could lead to indirect economic change	High -	Medium -
<b>LAND USE</b>	Temporary loss of cultivated land due to construction activities	Medium -	Low -
	Temporary loss of grazing land due to construction activities - cattle	Medium -	Low -
	Temporary loss of grazing land due to construction activities – game	High -	Medium -
	Mining	High -	Low -
	Impact of construction activities on movement patterns of local community	Medium -	Low -
<b>DEMOGRAPHIC</b>	Relocation as a result of servitude negotiation	High-	Depends on individual/families
	Influx of construction workers on size and composition of local community	Medium -	Medium +
	Influx of job seekers on size and composition of local community	Medium -	Low -
	Outflow of locally employed labourers to move with the construction team	Medium - and medium +	Medium +
<b>EMPOWERMENT AND INSTITUTIONAL</b>	<i>The negotiation process</i>	Low - to High +	Low + to Medium+
	<i>Control – feels lack of control because of presence of construction and maintenance workers.</i>	Medium -	Low + or Medium +
<b>ENVIRONMENTAL</b>	Pollution and fire risk on construction workers and local community, economic	Medium - to High -	Low -
<b>SOCIO-CULTURAL</b>	Integration with local community, including risk of spreading STI and HIV/AIDS	Very high -	High -
	Construction related noise	Medium -	Low -
<b>OPERATION</b>			
<b>ECONOMIC</b>	<i>Direct formal job opportunities for local individuals and/or contractors</i>	Low +	Medium +
	<i>Indirect formal and/or informal job opportunities for local individuals and/or contractors</i>	Low +	Medium +

CHANGE PROCESS	CHANGE PROCESS	SIGNIFICANCE (pre-mitigation)	SIGNIFICANCE (post-mitigation)
	Visibility of Transmission power line that could lead to indirect economic change	High -	Medium -
	Increase in electricity	High +	High +
LAND USE	Permanent loss of cultivated land due to presence of pylons on the land	Medium -	Low -
	Permanent loss of grazing land due to presence of pylons on the land	Medium -	Low -
	Impact of Transmission power lines on mining activities	High -	Medium -
	Impact of Transmission power lines on game	High -	Medium -
	Impact of Transmission power lines on spatial development	Medium -	Low -
	Impact of Transmission power lines on movement patterns of local community	Low -	Low /
SOCIO-CULTURAL	Integration of maintenance workers with local community, including risk of spreading STI and HIV/AIDS	High -	Medium -
	Presence of Transmission power lines on physical well-being	Low -	Low -
	Presence of Transmission power lines on mental well-being	High -	Medium -

**Table 6.5.2. Summary of Impacts per Change Process**

PHASE	IMPACT	SIGNIFICANCE (pre-mitigation)	SIGNIFICANCE (post-mitigation)
<b>ECONOMIC CHANGE PROCESS</b>			
<b>PRE-CONSTRUCTION AND CONSTRUCTION</b>	Direct formal job opportunities for local individuals and/or contractors	Medium +	High +
	Indirect formal and/or informal job opportunities for local individuals and/or contractors	Medium +	High +
	Compensation for servitude	Low +	High +
	Visibility of construction activities that could lead to indirect economic change	High -	Medium -
<b>OPERATION</b>	Direct formal job opportunities for local individuals and/or contractors	Low +	Medium +
	Indirect formal and/or informal job opportunities for local individuals and/or contractors	Low +	Medium +
	Visibility of Transmission power line that could lead to indirect economic change	High -	Medium -
<b>LAND USE CHANGE PROCESS</b>			
<b>PRE-CONSTRUCTION AND CONSTRUCTION</b>	Temporary loss of cultivated land due to construction activities	Medium -	Low -
	Temporary loss of grazing land due to construction activities - cattle	Medium -	Low -
	Temporary loss of grazing land due to construction activities – game	High -	Medium -
	Mining	High -	Low -
	Impact of construction activities on movement patterns of local community	Medium -	Low -
<b>OPERATION</b>	Permanent loss of cultivated land due to presence of pylons on the land	Medium -	Low -
	Permanent loss of grazing land due to presence of pylons on the land	Medium -	Low -
	Impact of Transmission power lines on mining activities	High -	Medium -
	Impact of Transmission power lines on game	High -	Medium -
	Impact of Transmission power lines on spatial development	Medium -	Low -
	Impact of Transmission power lines on movement patterns of local community	Low -	Low /
<b>DEMOGRAPHIC CHANGE PROCESS</b>			
<b>PRE-CONSTRUCTION AND CONSTRUCTION</b>	Relocation as a result of servitude negotiation	High-	Depends on individual/families
	Influx of construction workers on size and composition of local community	Medium -	Medium +
	Influx of job seekers on size and composition of local community	Medium -	Low -
	Outflow of locally employed labourers to move with the construction team	Medium – and +	Medium +
<b>ENVIRONMENTAL CHANGE PROCESS</b>			
<b>PRE-CONSTRUCTION AND CONSTRUCTION</b>	Pollution and fire risk on construction workers and local community	Medium to high -	Low -

PHASE	IMPACT	SIGNIFICANCE (pre-mitigation)	SIGNIFICANCE (post-mitigation)
<b>SOCIO-CULTURAL</b>			
<b>PRE-CONSTRUCTION CONSTRUCTION</b>	<b>AND</b> Integration with local community, including risk of spreading STI and HIV/AIDS	Very high -	High -
	Construction related noise	Medium -	Low -
<b>OPERATIONAL</b>	Integration of maintenance workers with local community, including risk of spreading STI and HIV/AIDS	High -	Medium -
	Presence of Transmission power lines on physical wellbeing of local community	Low -	Low -
	Presence of Transmission power lines on mental wellbeing of local community	High -	Medium
<b>EMPOWERMENT AND INSTITUTIONAL CHANGE PROCESS</b>			
<b>PRE-CONSTRUCTION CONSTRUCTION AND OPERATION</b>	<b>AND</b> <i>The negotiation process</i>	<i>Low - to High +</i>	<i>Low + to Medium+</i>
	<i>Control – feels lack of control because of presence of construction and maintenance workers.</i>	<i>Medium -</i>	<i>Low + or Medium +</i>

Alignment Implications:

Please see **APPENDIX I-7** for the Marang power line specialist social study.

In the specialist study the study corridors are divided into sections that have been considered. The study indicates a number of problem areas that require special attention but as far as preferred transmission power line placement is concerned, the following is applicable:

- From Matimba B (Medupi) power station the power lines should be placed east of the existing power lines running towards Spitskop and should follow the eastern-most option towards Spitskop substation.
- From Spitskop substation the western-most route is again proposed along the eastern side of the existing power line before turning west as far south as possible.
- At Marang substation it is proposed that the eastern-most option is followed for entry to the substation.

**6.6. PRE-MITIGATION IMPACT SCENARIO**

Please observe **APPENDIX I-16** for the pre-mitigation impact matrix as determined during the scoping phase.

**6.7. POST-MITIGATION IMPACT SCENARIO**

Please observe **APPENDIX I-17** for the post-mitigation impact matrix.

**6.8. IDENTIFIED PREFERRED ROUTES & CORRIDORS**

From specialist studies a preferred servitude route has been determined and is indicated in the following section.

**6.8.1. Alternative Routes Comparison and Final Placement: Matimba B (Medupi)-Dinaledi**

The scoping phase resulted in the selection of a route with some alternatives that showed the least possible total environmental impact within the study area based on both the total environmental impact sensitivity map and the most significant issues raised by the general public and more specifically affected landowners. The route alignments with a 5km width of study corridor were established for further study during the technical EIA. See **Appendix I-8** for the applicable map indicating the study corridors and original scoping study area.

During the technical EIA phase these corridors were further studied in terms of those issues raised during scoping that seemed to require further assessment. Most of the studies with the exception of the social impact study and the visual impact study, indicated no clear preference of the possible study corridor alternatives that was indicated and preferences in specific power line placements.



From the heritage and archaeological studies there is a clear preference for a western option south of Spitskop. The social and ecological studies indicated that the western-most options north of Spitskop would be least preferred.

Based on these studies as well as some of the physical constraints already identified on the ground that give some indication, most preferred corridors were however determined. The social impact assessment especially, makes some clear recommendations with regards to more exact line placements.

Based on the above, the EAP designed a proposed alignment for the Marang 400kV power line as indicated in **Appendix I-9**. These proposed alignments are for the servitude required for the proposed 400kV power line linking Matimba B (Medupi) power station with Marang substation. The map also indicates a 250m buffer on each side of the servitude for possible re-alignments after the issuing of the RoD and consequent negotiations with landowners for final servitude rights.

Please note that since the 400kV power line to Marang runs along the same corridors for most of the route as the Dinaledi power lines, all maps indicate the Dinaledi power lines as well. The placement of the Marang line could not be considered in isolation due to the use of a single electricity transmission utility corridor for as much as possible of the proposed route.

During the process of conducting the above-mentioned studies and assessments, an environmental action group from Makoppa requested that they be allowed to represent the community of Makoppa in proposing a route option that would most suit the community of Makoppa, most specifically the landowners.

The route option(s) proposed was included as additional route options to be considered by the EAP. In order to firstly test the viability of the presented option(s), the EAP approached Eskom for a technical analysis of cost and construction implications. This information provided a sufficient indication to the EAP as to whether the proposed option(s) would be viable. The findings are included in the following sections.

## **7. RECOMMENDATIONS AND CONCLUDING REMARKS**

### **7.1. MATIMBA B (MEDUPI)-MARANG POWER LINES**

The EAP would like to make the following recommendations at this stage:

- a. That all mitigation measures proposed by the various specialists and which are included into the draft EMP for public review during the EIR review period, should be considered for inclusion into the final EMP based on the outcome of the public review process and the consequent feedback received from participants.
- b. That more exact power line placements along the proposed route corridors are discussed with all affected land owners (including land owners adjacent to proposed servitudes) during the review period.
- c. That the options of modifying pylons and/or servitudes to blend in with certain visually sensitive environments are tested and implemented where found to be viable based on site specific occurrences and where proven not to be viable, that a complete explanation should be attached to the final EIR to the relevant authority.
- d. That the options of placing lines underground where landowners are willing to commit to some sort of financial support in achieving this should be seriously considered. The underground option should consider an actual cost-benefit assessment that includes land use, infrastructure establishment, maintenance, environmental benefits and losses, national economic and regional economic considerations. The findings should indicate whether undergrounding is possible and if so, under what circumstances. If it is not possible, reasons for this should also be included into the final EIR for submission to the relevant authority.
- e. That sufficient signage are placed at the boundary of any area containing magnetic fields due to the existence of the power lines to at least warn any person entering such area of potential dangers and that Eskom will not be held responsible for damages or injury where such area is in close proximity to any public place, high density residential area or any school or urban recreational facility where there is potential for people to constantly move underneath the power lines. The signs should also indicate a web-site address where readers could obtain further information with regards to unsafe activities within such areas.

### **7.2. SUBSTATION**

For the substation it has been determined that no apparent significant impacts are expected. In order to ensure implementation of the Precautionary Principle, the EAP proposes the following:

- a. Conduct discussions with the landowners and/or adjacent land owners as may be applicable during the review of the EIR by the public for both substations.
- b. Conduct a further detailed on-site inspection with the responsible or representing party from Eskom of the proposed expansion at each of the substation sites before finalising the EIR and submitting the document to the relevant authorities.
- c. Indicate any additional findings with the final EIR as an addition.

### **7.3. ASSUMPTIONS, UNCERTAINTIES AND KNOWLEDGE GAPS**

The report contains no assumptions. Main uncertainties and knowledge gaps go hand in hand and are as follows:

- a. There is a general uncertainty as to the actual economic impacts that the proposed project will have on land that is used for hunting, lodging, eco-tourism and tourism in general and although there is some indication of a potential negative impact, it is not possible to confirm or verify any quantities or to establish certainty. To date stakeholders have provided very little if any evidence of such impacts. It is however noticeable that there is general consensus amongst the relating communities of an expectancy of such impacts and there is also some indication from estate agents of land value losses.

- b. There is a general concern from many land owners that the visual impact on land owners neighbouring land with power lines, especially when placed on the boundary of a neighbour's land and especially in game farming or tourism areas, could be severely damaging. There is however no basis at this stage of determining visual value or damage that is sufficiently suitable for providing an indication in the report. If the precautionary principle is applied then it could be argued that a visual impact will occur and that at least some mitigation to the effect of absolutely minimising the visibility of the lines and blending the lines in with specific natural environments and backgrounds should be ensured. However no proven options for blending and hiding these types of power lines are currently available or known to exist.

#### **7.4. EAP OPINION AND WAY FORWARD**

It is the opinion of the EAP that the EIR should be adapted according to the outcomes of the upcoming review process with the specific aim of addressing any uncertainties and knowledge gaps.

More specifically it is proposed that the EAP's proposal as indicated **Appendix I-9** should only be viewed as a proposal to the public and that all alternatives as indicated on **Appendix I-8** should be open for further investigation and discussions. Should any of the possible alternatives be found to be more viable after considering community feedback, the proposed route should be adapted accordingly.

## **APPENDIX I-1: – TECHNICAL NOTE: EMFS**

## **APPENDIX I-2: SPECIALIST AESTHETICS ASSESSMENT**

### **APPENDIX I-3: SPECIALIST HERITAGE ASSESSMENT**

## **APPENDIX I-4: SPECIALIST CULTURAL LANDSCAPE ASSESSMENT**

## **APPENDIX I-5: SPECIALIST AVIFAUNA ASSESSMENT**



## **APPENDIX I-6: SPECIALIST ECOLOGY ASSESSMENT**

## **APPENDIX I-7: SPECIALIST SOCIAL IMPACT ASSESSMENT**

## **APPENDIX I-8: MAP OF STUDY CORRIDORS DETERMINED DURING SCOPING REPORT & FURTHER PUBLIC PARTICIPATION**

## **APPENDIX I-9: MAP OF PROPOSED SERVITUDE PLACEMENTS WITH BUFFER AREA**

## APPENDIX I-10: TECHNICAL EIA STUDY – ASSESSMENT METHODOLOGY

The EAP has determined an EIA study corridor of 5km width with a number of alternative routing options in some of the sections of the route, in particular closer to the substation locations.

Each specialist conducted further detailed studies of these study corridors in order to identify more site specific points or zones that would in their professional opinion, based on their individual assessments, not be preferable for the placement of the proposed transmission power lines. This information is utilised by the EAP as a guidance tool in conjunction with the outcomes of further stakeholder consultation and the outcomes of the public participation process during scoping for final transmission line placement decision-making.

The following table indicates the updated Project Activity Aspects (PAA) which were initially identified during scoping and further refined in this EIA study:

**Table I-10a**

Category	Project Activity Aspect Description	Project Phase	
		Construction (C)	Operational (O)
<b>1. Servitudes</b>	1.1 Servitude clearance	X	
	1.2 Vegetation control		X
	1.3 Servitude rehabilitation	-	-
	1.4 Servitude procurement	X	
	1.5 Servitude location and area - Spread	X	X
	1.6 Servitude location and area - Concentrated	X	X
<b>2. Access</b>	2.1 Gate & fence construction	X	
	2.2 Gate & fence maintenance		X
	2.3 Gate & fence removal	-	-
	2.4 Road construction or clearance	X	
	2.5 Road maintenance		X
	2.6 Road rehabilitation	-	-
	2.7 Access to land by alien elements	X	X
<b>3. Lightning &amp; Fire</b>	3.1 Lightning attraction	X	X
	3.2 Fire from construction workers	X	
	3.3 Fire from maintenance crews		X
	3.4 Fire from lightning	X	X
	3.5 Chemical fires	X	
	3.6 Explosions	X	
<b>4. Employees</b>	4.1 Worker accommodation & facilities	X	
	4.2 Worker movement	X	X
	4.3 Crime, theft and poaching	X	X
<b>5. Vehicles &amp; Equipment</b>	5.1 Parking space	X	
	5.2 Vehicle movement	X	X
	5.3 Vehicle maintenance	X	
	5.4 Equipment storage	X	
<b>6. Waste</b>	6.1 Domestic waste	X	X
	6.2 Industrial waste	X	X
	6.3 Human waste	X	
<b>7. Chemicals</b>	7.1 Chemical spillages	X	
	7.2 Chemical reactions	X	
<b>8. Visibility</b>	8.1 Visibility of construction workers	X	
	8.2 Visibility of demolition crew	-	-
	8.3 Visibility of camps and storage	X	
	8.4 Visibility of construction vehicles	X	
	8.5 Visibility of maintenance vehicles & helicopters		X
	8.6 Visibility of maintenance crew		X
	8.7 Visibility of Structures	X	X
<b>9. Building materials &amp; Structures</b>	9.1 Excess concrete & cement	X	
	9.2 Concrete & cement rubble	X	
	9.3 Remaining Structures	-	-
	9.4 Excavation	X	
	9.5 Structure location/presence		X
	9.6 Structure dimensions		X
	9.7 Structure erection	X	
<b>10. Electricity</b>	10.1 Electro-magnetic fields		X
	10.2 Electrically induced shock		X

It is generally intended that the infrastructure for electricity transmission would last for more than the average person's lifetime. Unless there is a specific reason for the removal of the mentioned infrastructure related to it not being required for its primary purpose any further, it would remain indefinitely or for as long as refurbishment is viable. Over such long periods of time several changes to the environment is likely and for this reason it is not foreseeable to the EAP what potential impacts on the environment could occur should a decommissioning phase in fact occur. For this reason, the decommissioning phase is not evaluated. The following Environmental Aspects as revised after scoping are considered in this EIA study:

**Table I-10b**

Main Aspect Category	Environmental Aspect Sub-category	Focus Point
<b>A. Aesthetic</b>	Visibility	Visual Sensitivity Zones
	Aesthetic Blending	
<b>B. Atmospheric</b>	Climate & Weather (Wind, Temperature, Precipitation)	Dust Pollution Levels
	Air Quality	
	Sound Quality	
<b>C. Ecological</b>	Fauna	Avifauna Sensitivity Zones
	Flora	Ecological Sensitivity Zones
<b>D. Geological</b>	Ecology Systems	
	Geological Structure	Surface Geology Sensitivity
<b>E. Hydrological</b>	Vibration	
	Water Quality	Perennial Rivers ('Not Preferred' Areas)
<b>F. Pedological</b>	Water Quantity	Wetlands ('Not Preferred' Areas)
	Water Systems (Wetlands, aquifers, rivers and streams)	
	Soil Quality	
<b>G. Sociological</b>	Soil Capability	Soil Landtype Sensitivity
		Soil Depth Sensitivity
		Clay Content Sensitivity
	Social Systems	Health and Safety Risks
		Mental Aspect - Sense of Place
	Socio-economic Systems	Local Economies
	Heritage (Historicity, Palaeontology & Archaeology)	Archaeological Sites ('Not Preferred' Areas)
<b>H. Spatial</b>		Historical Sites ('Not Preferred' Areas)
	Space Utilisation	Population Density Sensitivity Zones - Residential Areas ('Not Preferred' Areas)
		Conservation ('No Go' Areas)
		Tourism Zones ('Not Preferred' Areas)
		Mining Zones
		Industrial Zones ('Not Preferred' Areas)
	Space Potential	Tourism Potential
<b>I. Topographical</b>		Economic Development Potential
		Agricultural Potential
	Topographical Structure	Ridges ('Not Preferred' Areas)
		Mountains ('Not Preferred' Areas)

Note that focus points have been listed in the above table. These focus points are used during the technical EIA phase as the basis for determining points or zones that: <sup>1</sup>are not accessible ('No Go' Points or Areas) for placing the transmission power line servitudes; <sup>2</sup>are areas that should be avoided at all possible cost ('Not Preferred' Areas) due to specific accepted attributes generally assigned by the community or government or by the scientific community (in this case the appointed EIA specialists) due to known potential significant environmental risks. Impacts are considered in terms of being positive or negative and in terms of frequency, duration, extent, intensity and probability. These ratings are summed to indicate a significance rating of high, medium or low. The following table indicates the rating method, values and colour codes:

**Table I-10c**

Rating Aspect:	Rating Levels:				
Frequency:	Infrequent = 1	Frequently = 2	Constantly = 3		
Duration:	Short term = 1	Medium term = 2	Long term = 3	Permanent = 4	
Extent:	On-site = 1	Local = 2	Regional = 3	National = 4	International = 5
Intensity:	Processes continue undisturbed = 1	Processes continue in a modified way = 2	Processes stop = 3		
Probability:	Unlikely = 1	Possible = 2	Likely = 3	Definite = 4	
Significance:	Low: 5-9	Medium: 10-14	High: 15-19		
Positive:	(Value X -1)	(Value X -1)	(Value X -1)		
Negative:	(Value X 1)	(Value X 1)	(Value X 1)		
No Go = ∞					
No Impact = 0					

Following is an explanation of the terms used in the rating levels:

**Table I-10d**

<b><u>Frequency:</u></b>	
How frequently the considered Project Activity Aspect impacts on the considered Environmental Aspect.	
<b><u>Infrequent:</u></b>	On some rare occasions, where occurrences would be the exception rather than the rule.
<b><u>Frequently:</u></b>	On regular occasions and at intervals, although not constantly or necessarily according to a set pattern.
<b><u>Constantly:</u></b>	Continuously or always, without end and normally according to a set pattern.
<b><u>Duration:</u></b>	
For what time period the considered Project Activity Aspect impacts on the considered Environmental Aspect.	
<b><u>Short term:</u></b>	Less than five years.
<b><u>Medium term:</u></b>	Five to fifteen years.
<b><u>Long term:</u></b>	The impact ends when the activity ends.
<b><u>Permanent:</u></b>	The impact continues even after the activity ends.
<b><u>Extent:</u></b>	
The scale of the area that the considered Project Activity Aspect impacts on, with regards to the considered Environmental Aspect.	
<b><u>On-site:</u></b>	On the Project Activity property or expected authorised area.
<b><u>Local:</u></b>	Within one kilometre from the Project Activity property or expected authorised area.
<b><u>Regional:</u></b>	Within an approximate 100 kilometre radius of or distance from the Project Activity property or expected authorised area or within a defined Province if applicable.
<b><u>National:</u></b>	Within the Republic of South Africa.
<b><u>International:</u></b>	Across international borders.
<b><u>Intensity:</u></b>	
The intensity of the considered Project Activity Aspect's impact on the considered Environmental Aspect.	
<b><u>Low Intensity:</u></b>	Environmental processes continue undisturbed or continue to the same effect.
<b><u>Medium Intensity:</u></b>	Environmental processes continue in a modified way and continue to a similar effect.
<b><u>High Intensity:</u></b>	Environmental processes stop or are altered to result in a different effect.
<b><u>Probability:</u></b>	
The likelihood or probability of the considered Project Activity Aspect of having an impact on the considered Environmental Aspect. <i>(An estimated probability is possible only from reasonable experience in environmental matters, legal aspects and knowledge of the relevant industry.)</i>	
<b><u>Unlikely:</u></b>	The chance of occurrence is very low and it is not expected to occur. An estimated statistical probability of less than 15% is determined if it is calculable.
<b><u>Possible:</u></b>	There is a chance of occurrence but there is no clear indication whether it would be possible. An estimated statistical probability of between 15% and 75% is determined if calculable.
<b><u>Likely:</u></b>	There is a good chance of occurrence and there is a clear indication that it would be possible. An estimated statistical probability of between 75% and 100% is determined if calculable.
<b><u>Definite:</u></b>	There is certainty that an occurrence will take place.
<b><u>Significance:</u></b>	
The significance is calculated by adding the values of the respective Rating Aspects to acquire a total. The result gives an indication of whether an impact is to be considered during decision-making.	
<b><u>Low:</u></b>	The impact on the Environmental Aspect does not influence a decision on continuation.
<b><u>Medium:</u></b>	The impact on the Environmental Aspect influences a decision on continuation if no mitigation is possible.
<b><u>High:</u></b>	The impact on the Environmental Aspect influences the decision on continuation even if some mitigation is possible. Continuation is not possible if no mitigation is possible.

The following is an example of an assessment sheet used to determine the value for each coordinate block in the impact matrix:

Coordinate:	Rating Aspect:	Value:
A 1.1	Frequency	1
EA:	Duration	2
Agricultural Potential	Extent	3
PAA:	Intensity	4
Servitude Clearance	Probability	5
Significance:	High	15
Negative		
Impact Description:		

**Figure I-10a**

## **APPENDIX I-11: EIA – PROJECT MANAGER’S CV**



## **APPENDIX I-12: EIA – PROJECT REVIEWER’S CV**

## **APPENDIX I-13: EIA – PPP PROJECT MANAGER’S CV**

## **APPENDIX I-14: MATIMBA B (MEDUPI) POWER LINE LINKS AND POWER STATION LAYOUT**

## **APPENDIX I-15: MARANG POWER LINE LINKS AND SUBSTATION LAYOUT**

**APPENDIX I-16: PRE-MITIGATION MATRIX (CONSTRUCTION & OPERATIONAL PHASES)**

**APPENDIX I-17: POST-MITIGATION MATRIX (CONSTRUCTION & OPERATIONAL PHASES)**

**APPENDIX I-18: COMMENTS FROM AND RESPONSES TO I&APS**

## **APPENDIX I-19: PPP MAP**



## **APPENDIX I-20: LEPHALALE/STEENBOKPAN NOTES**

## **APPENDIX I-21: FLYERS**

## **APPENDIX I-22: MAKOPPA/SENTRUM/DWAALBOOM 7&8 MARCH NOTES**

## **APPENDIX I-23: MAKOPPA/SENTRUM/DWAALBOOM 16&17 APRIL NOTES**

## **APPENDIX I-24: RUSTENBURG/MANKWE NOTES**

## **APPENDIX I-25: ATLANTA FA NOTES**

A brief meeting was held with the Atlanta FA and the attending representative from PBAI was afforded approximately 10 minutes with those landowners expected to be affected by the project.

Mr. Boonzaaier very briefly gave a few potentially affected landowners a description of where the power lines could possibly run.

During the meeting maps were shown to some of the landowners in the area who indicated their details on the maps and who also indicated that they would inform their applicable neighbours to contact the relevant PPP person at Margen or PBAI.

## **APPENDIX I-26: MADIBENG MUNICIPALITY NOTES**

## **APPENDIX I-27: I&AP DATABASE**



## **APPENDIX I-28: LANDOWNERS LIST**

## **APPENDIX I-29: DRAFT EMP**