



**ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE  
PROPOSED MATIMBA-WITKOP NO 2 400 kV TRANSMISSION  
LINE, NORTHERN PROVINCE**

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## EXECUTIVE SUMMARY

### 1. OVERVIEW OF THE PROPOSED PROJECT

#### 1.1. Motivation for the Proposed Project

As electricity cannot be stored, power is generated and delivered over long distances at the very instant that it is required. In South Africa, thousands of kilometres of high voltage Transmission lines (i.e. 765 kV, 400 kV and 275 kV Transmission lines) transmit this power, which is predominantly generated at the powerstations located within the Mpumalanga Province, to Eskom's major substations. At these major substations, the voltage is down-rated and distributed to smaller substations all over the country via Distribution lines (e.g. 132 kV, 88 kV and 66 kV lines). Here the voltage is down-rated further for distribution to industry, businesses, farms and homes. In order to maintain a reliable power supply within the entire network, the voltages at all substations are required to be within certain desired limits. If the network is operated at voltages which are below these limits, voltage collapse problems and power outages may be experienced.

In the event of a network being increasingly operated above its design capacity during peak periods, and two particular concerns arise:

- energy losses increase significantly along the Transmission lines; and
- the voltage drop along the lines increases to a point where supply becomes unstable and the line “goes down”, and supply on that Transmission line is lost.

The Transmission network in the greater Pietersburg area is currently reaching capacity, and the peak electricity load required in this area is anticipated to increase significantly in the near future. Therefore, Eskom Transmission propose the establishment of a second 400 kV Transmission line between Matimba and Witkop Substations in order to meet this increasing demand.

#### 1.1. Proposed Transmission Line Corridors

The distance between the Matimba and Witkop Substations is approximately 250 km. In order to determine the most appropriate route for the establishment of a new 400 kV Transmission line, initial environmental studies investigated a broader study area between

these two substations. Following the investigations during the Scoping Phase (Bohlweki Environmental, 2002), the corridor alternatives which have been investigated in this EIA include (refer to Figure 1 overleaf):

- *Corridor 1:*

This proposed corridor begins at the existing Matimba Powerstation, approximately 5 km west of Ellissras. It extends in an easterly direction up to the Mokolo River, from where it follows a south-easterly direction for approximately 40 km up to the farm Windsor Castle. From this point, the corridor follows a more easterly direction for approximately 60 km, and passes through the nek between the Moepel Farms and the Masebe Nature Reserve. Beyond this area, in the vicinity of Diretsaneng, it continues in a south-easterly direction for approximately 175 km to the Witkop Substation, located approximately 20 km south-west of Pietersburg.

- *Corridor 2:*

This corridor provides an alternative route to corridor 1 for approximately 100 km of the line length. This proposed corridor follows the same alignment as corridor 1 from the Matimba Substation up to Road R518, approximately 30 km west of Ellissras. At the point where the existing Matimba-Witkop No 1 400 kV Transmission line crosses the R518 Road, corridor 2 turns in a north-easterly direction, following the R518, past Setateng and Marken. From the Marken area, this corridor continues in an easterly direction following a gravel road past Nong, to the north of Masebe Nature Reserve. This corridor skirts the boundary of this Nature Reserve, turning south to join up with corridor 1 in the vicinity of Diretsaneng. Thereafter, the same route as discussed under corridor 1 would be followed for approximately 120 km to the Witkop Substation.

- *Corridor 3:*

This corridor provides an alternative route to corridor 1 for approximately 80 km of the line length. This proposed corridor follows the same alignment as corridor 1 from the Matimba Substation up to a point approximately 8 km south-west of Overysseel, and extends diagonally in a north-easterly direction to the juncture with the R518 (as well as corridor 2). This corridor then follows the route as described for corridor 2, past Marken, skirting the boundary of the Masebe Nature Reserve to rejoin corridor 1. Thereafter, the same route as discussed under corridor 1 would be followed for approximately 120 km to the Witkop Substation.

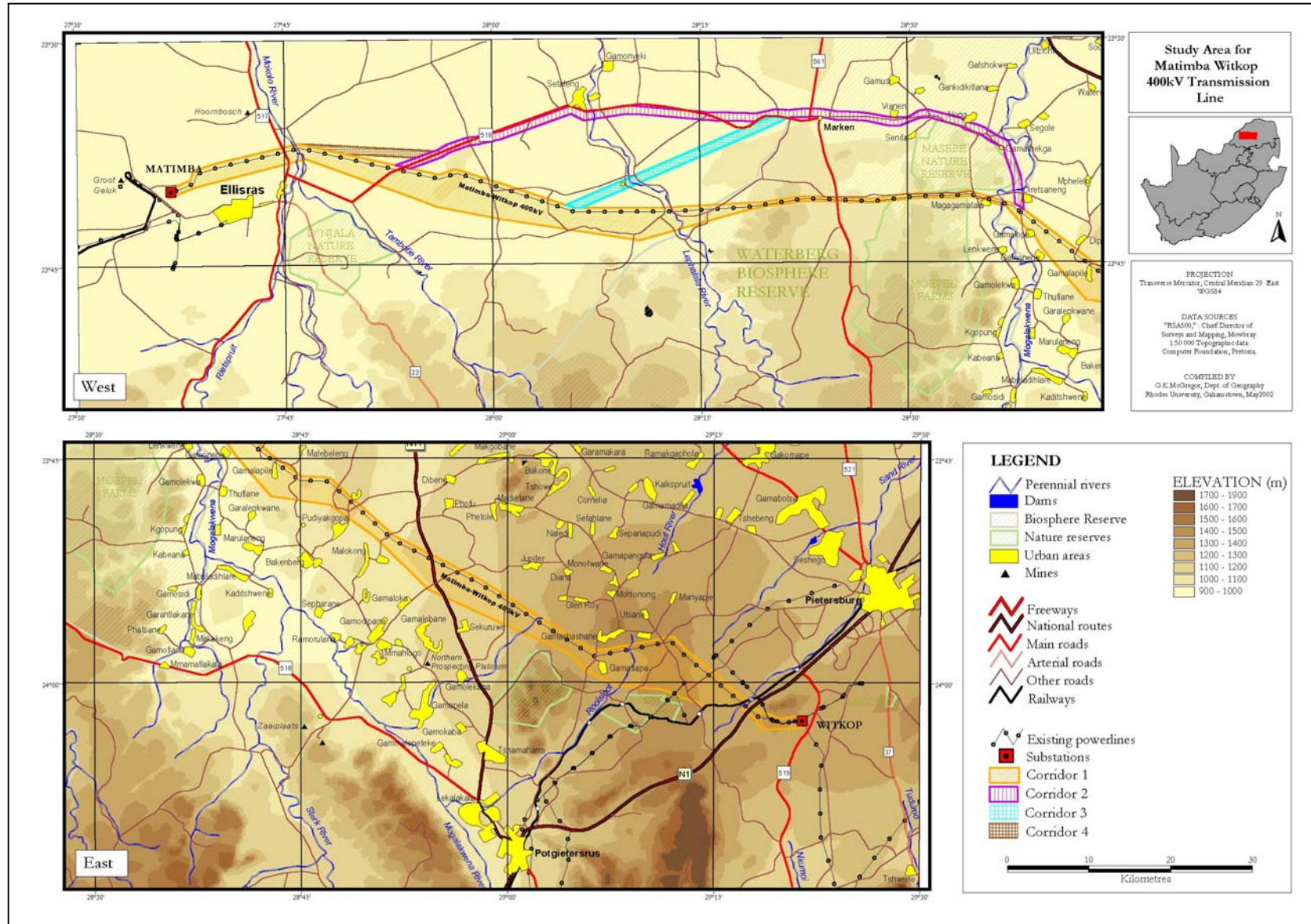


Figure 1: Basemap showing all identified Transmission line corridors

- *Corridor 4:*

This corridor provides an alternative route to corridor 1 for approximately 110 km of the line length. This proposed corridor follows the same alignment as corridor 1 from the Matimba Substation up to the Mokolo River. From this point, corridor 3 extends in an easterly direction along an alignment currently utilised by Distribution lines, to the juncture with the R518 (and corridor 2), approximately 20 km from the Matimba Substation. This corridor then follows the route as described for corridor 2, past Marken, skirting the boundary of the Masebe Nature Reserve to rejoin corridor 1. Thereafter, the same route as discussed under corridor 1 would be followed for approximately 120 km to the Witkop Substation.

## **2.2. Extension of the Existing Matimba and Witkop Substations**

In order to accommodate the new 400 kV Transmission line, both the existing Matimba and Witkop Substations will require an additional 400 kV line feeder bay. These extensions to the substations will be accommodated within the existing Eskom property boundaries at these existing substations. No impacts are anticipated to be associated with this extension work, and therefore this was not required to be considered in detail within the EIA.

## **2. ENVIRONMENTAL STUDIES AND PUBLIC PARTICIPATION**

An Environmental Impact Assessment (EIA) for the proposed Matimba-Witkop No 2 400 kV Transmission line has been undertaken in accordance with the Environmental Impact Assessment (EIA) Regulations published in Government Notice R1182 to R1184 of 5 September 1997 in terms of Section 21 of the Environment Conservation Act (No 73 of 1989), as well as the National Environmental Management Act (NEMA; No 107 of 1998). This EIA was undertaken in order to identify and assess potential environmental impacts (biophysical and social) associated with the proposed project, and nominate a preferred Transmission line corridor.

Specialist studies undertaken within the EIA included the assessment of potential impacts on:

- avifauna (bird life);
- vegetation;
- agricultural potential;
- archaeological, cultural and historical sites;

- aesthetics and visual quality;
- tourism potential;
- land use; and
- the social environment.

To ensure effective public participation throughout the environmental studies for this project, an on-going public participation process was implemented. The aim of the public participation process was to establish efficient communication channels which would provide all I&APs with the opportunity to participate meaningfully in the process. Individuals and organisations throughout the broader study area representing a broad range of sectors of society were consulted telephonically, through individual meetings/interviews, through documentation distributed via mail and via the printed media throughout the EIA process. Special attention was paid to consultation with potentially directly affected landowners (e.g. within the demarcated corridors).

The EIA process identified and recorded landowners' details within the study area, as well as issues and concerns raised. Issues and concerns raised during the feedback meetings and the EIA Phase of the public participation process were compiled into an Issues Trail. This information, together with issues captured during the Environmental Scoping Study, is incorporated as the core of the assessment of social issues within this Environmental Impact Assessment Report.

The Draft Environmental Impact Assessment Report has been made available for public review. Comments received from the public will be captured within a final Environmental Impact Assessment Report, which is to be presented to the National and Northern Province Departments of Environment Affairs for comment and approval.

### **3. SUMMARY OF SPECIALIST STUDY FINDINGS**

Each corridor was ranked from most preferred to least preferred, and these findings were workshopped by all the specialists in order to provide a considered and consolidated preferred nominations. In addition to the environmental specialist evaluations, the technical feasibility and associated costs are required to be considered by Eskom Transmission. Table 1 overleaf provides a summary of the findings of the specialist studies, as well as the preferences per specialist discipline.

**Table 1:** Summary of findings of detailed specialist studies undertaken regarding the proposed Matimba-Witkop No 2 400 kV Transmission line

Issue	Corridor 1	Corridor 2	Corridor 3	Corridor 4
<i>Social Environment</i>				
Land use	<p>Impacts on possible future expansion plans of Marapong township near Matimba powerstation. The proposed Transmission line will be required to be aligned as far to the north or south of the township as possible. Remainder of corridor has few land use issues as other settlements can be avoided by minor realignment within corridor.</p> <p>Option 1</p>	<p>Impacts on possible future expansion plans of Marapong township near Matimba powerstation. Construction of the Transmission line in this corridor will result in the “Boxing in” of Masebe Reserve by Transmission lines, which will have a significant negative impact on this reserve. Eastern section of corridor has few land use issues as other settlements can be avoided by minor realignment within corridor</p> <p>Option 2</p>	<p>Impacts on possible future expansion plans of Marapong township near Matimba powerstation. “Boxing in” of Masebe Reserve by Transmission lines. The construction of the Transmission line within this corridor may restrict irrigation activities along the Lephhalala River. Division of properties (game farms) if farm boundaries are not followed.</p> <p>Option 4</p>	<p>Impacts on possible future expansion plans of Marapong township near Matimba powerstation. “Boxing in” of Masebe Reserve by Transmission lines. Division of game farms if the construction of the Transmission line does not take farm boundaries into account. Eastern section of corridor has few land use issues as other settlements can be avoided by minor realignment within corridor</p> <p>Option 3</p>
Tourism potential	<p>It is reasonable to assume that existing tourism developments within this corridor have taken the existing 400 kV Transmission line into account during planning. This is the preferred option by the Biosphere Reserve and UNESCO.</p> <p>Option 1</p>	<p>“Boxing in” of Masebe Reserve by Transmission lines. West of Marken – impacts in terms of traversing small farms. Potentially high impact on game farms between east of Masebe Nature Reserve and Ellisras (e.g. Rhinoland Safaris)</p> <p>Option 3</p>	<p>“Boxing in” of Masebe Reserve by Transmission lines. Potential impact on smaller game farms near Marken. Potential impacts on the farms Goedgedacht and Twiga (breed endangered species). Potential impacts on game farms in Overysseel area.</p> <p>Option 4</p>	<p>“Boxing in” of Masebe Reserve by Transmission lines. Potential impact on smaller game farms near Marken.</p> <p>Option 2</p>



Issue	Corridor 1	Corridor 2	Corridor 3	Corridor 4
Social Impacts	<p>Potential impact on game and hunting lodges and other tourism operations.</p> <p>Potential impacts on hunting activities.</p> <p>Impacts minimised by presence of existing Transmission line.</p> <p>Impacts on properties around Witkop Substation.</p> <p>Option 1</p>	<p>Potentially negative impact on game farms in the Marken area, unless the Transmission line is constructed parallel to the R518.</p> <p>Some areas are impacted by existing lines across farms (275 and 132 kV).</p> <p>Some areas have no existing lines, and therefore, the proposed Transmission line will introduce a new impact.</p> <p>Potential impact on the town of Marken and Setateng.</p> <p>Potential impact on small game and hunting lodges.</p> <p>Impacts on properties around Witkop Substation.</p> <p>Option 2</p>	<p>Potentially negative impact on game farms in the Marken area, unless the Transmission line is constructed parallel to the R518.</p> <p>Most opposition received to this option. Considered a no-go option.</p> <p>Potential impact on the town of Marken and Overysse.</p> <p>Potential impact on small game and hunting lodges in the vicinity of Marken.</p> <p>Impacts on properties around Witkop Substation.</p> <p>Option 4</p>	<p>Potentially negative impact on game farms in the Marken area, unless the Transmission line is constructed parallel to the R518.</p> <p>Division of small game farms.</p> <p>Potential impact on the town of Marken and Setateng.</p> <p>Potential impact on small game and hunting lodges.</p> <p>Impacts on properties around Witkop Substation.</p> <p>Option 3</p>
Archaeological, cultural and historical sites	No significant sites identified.	<p>No significant sites identified.</p> <p>Community graveyards identified – will have to be avoided during placement of line.</p>	No significant sites identified.	No significant sites identified.
Visual/Aesthetic quality	<p>Vegetation and topography reduce visual impact in the Waterberg Biosphere area, particularly the nek between Moepel Farms and Masebe Nature Reserve.</p> <p>Impact minimised by visual character of Ellisras area.</p> <p>Existing visual impact from Matimba-Witkop No 1 400 kV</p>	<p>High impact on communities north and east of Masebe Nature Reserve.</p> <p>“Boxing in” of Masebe Nature Reserve will have a high impact on this reserve.</p> <p>Impact minimised by visual character of Ellisras area.</p>	<p>“Boxing in” of Masebe Nature Reserve will have a high impact on this reserve.</p> <p>Impact high in Overysse area due to the limited nature of linear infrastructure in this area.</p> <p>High impact on Goedgedacht and Twiga.</p> <p>Impact minimised by visual</p>	<p>High visibility along corridor, imposing a new impact in areas where no there are no existing powerlines.</p> <p>“Boxing in” of Masebe Nature Reserve will have a high impact on this reserve.</p> <p>Impact minimised by visual character of Ellisras area.</p>

Issue	Corridor 1	Corridor 2	Corridor 3	Corridor 4
	Transmission line.  Option 1	Option 3	character of Ellisras area.  Option 4	Option 2
<b><i>Biophysical Environment</i></b>				
Flora and fauna	Potentially 29 Red Data plant species within the Waterberg Biosphere area; 11 with a high probability of occurrence. Certain trees conserved by the local community (medicinal, food value). Wetland area identified.  Option 2 (with implementation of mitigation measures potentially Option 1)	Vegetation degraded except in localised areas (i.e. on game farms). Wetland area identified west of Marken.  Option 1	Vegetation on game farms considered to be in a fairly good condition.  Option 3	Vegetation degraded except in localised areas (i.e. on game farms). Wetland area identified west of Marken.  Option 1
Avifauna	Between Witkop Substation and the Biosphere the area is degraded with localised patches of natural vegetation. More river crossings than other corridors. Less disturbance to habitats (only existing 400 kV line from Biosphere to Matimba).  Option 2 (with implementation of mitigation measures potentially Option 1)	Fewer river crossings than corridor 1. Higher disturbance of the area implies that birds will avoid this area. Existing 132 kV Distribution line imposes an existing impact on the area.  Option 1	The construction of a Transmission line within this corridor will introduce a new impact into this area. Irrigation along river implies a concentration of birds. Not recommended.  Option 3	Fewer river crossings than corridor 1. Higher disturbance of the area implies that birds will avoid this area. Existing Distribution lines impose an existing impact on the area.  Option 1

Issue	Corridor 1	Corridor 2	Corridor 3	Corridor 4
Agricultural potential	Area through Biosphere has low agricultural potential.  Option 1	Limited agricultural potential.  Option 2	Higher agricultural potential associated with the Lephalala River where irrigation is currently being undertaken.  Option 3	Limited agricultural potential.  Option 2

## **4. CONCLUSIONS AND RECOMMENDATIONS**

### **4.1. Overall Conclusions**

Considering the findings of all the detailed studies undertaken (refer to Table.1), as well as the results from the specialist workshop, the order of preference for the corridor for the construction of the Transmission line is as follows:

- Corridor 1 is recommended as the first option.
- Corridors 2 or 4 are recommended as the second option.
- Corridor 3 is not recommended as this option is anticipated to have an impact of high significance on both the biophysical and social environment.

Although biophysical impacts are potentially higher on corridor 1 than the routes skirting Masebe (corridors 2, 3 and 4), these impacts can be minimised through the implementation of appropriate mitigation measures. Therefore, for the establishment of Transmission line within the study area, the impacts on the social environment are anticipated to be greater impact to the environment as a whole. In light of this, the nominated preferred corridor is Corridor 1, including the section of corridor 3 which follows the existing Distribution line from the Matimba Substation to the juncture with the R518. This decision is the consensus of all specialists on the project and includes sufficient scope to allow for local deviation of the servitude to avoid sensitive areas identified in this study, and other sensitive sites that may be identified during the design phase.

### **4.2. Overall Recommendations**

The recommendations arising from this study focus predominantly on the role and implementation of the Environmental Management Plan (EMP). The specialist studies identify areas and issues which are required to be addressed by this EMP, and the role of the EMP is seen to be vital to the successful implementation of the various mitigation measures which have been recommended at various points within this report. The application of the EMP for all life cycle phases of the new line, including design, construction, operation and decommissioning is considered to be key in achieving appropriate environmental management standards.

Specific to these developments, it is recommended that use of the specialists is actively planned as part of the design and construction phases:

- Specialist botanist to survey the final Transmission line route to identify sensitive and endangered plants, particularly at the tower footings.
- Specialist archaeologist to survey the final Transmission line route to assess the site specific impacts on sites on the route, particularly the tower footings.
- Bird specialist to review placement of ‘bird flight diverters’ and bird guards at key locations along the preferred alignment within the preferred corridor.

It is also recommended that the process of communication and consultation with the community representatives is maintained after the award of environmental authorisation, but particularly during the construction phase.

## TABLE OF CONTENTS

	<b>PAGE</b>
<b>EXECUTIVE SUMMARY</b>	i
<b>TABLE OF CONTENTS</b>	xii
<b>LIST OF TABLES</b>	xvi
<b>LIST OF FIGURES</b>	xvii
<b>ACRONYMS AND ABBREVIATIONS</b>	xix
<b>DEFINITIONS</b>	xx
<b>ACKNOWLEDGEMENTS</b>	xxi
<b>1. INTRODUCTION</b>	<b>1</b>
1.1. Motivation for the Proposed Project	1
1.2. The Purpose and Need for the Proposed Project	2
1.3. Eskom's Planning Process and the Role of the Environmental Impact Assessment Process	3
1.3.1. <i>Servitude Negotiation and the EIA Process</i>	4
1.4. Project Overview	4
1.4.1. <i>Proposed Transmission Line Corridors</i>	6
1.4.2. <i>Extension of the Existing Matimba and Witkop Substations</i>	8
1.4.3. <i>Technical Details</i>	9
<b>2. SCOPE OF ENVIRONMENTAL INVESTIGATIONS</b>	<b>11</b>
2.1. Phase 1: Issues-based Environmental Scoping Study	11
2.1.1. <i>Review of the Draft Environmental Scoping Report</i>	11
2.1.2. <i>Final Environmental Scoping Report</i>	12
2.2. Phase 2: Environmental Impact Assessment	13
2.2.1. <i>Specialist Studies</i>	13
2.2.2. <i>Assumptions and Limitations of the Study</i>	14
2.2.3. <i>Overview of the Public Participation Process undertaken within the EIA Phase</i>	15
2.2.4. <i>Public Review of Draft Environmental Impact Assessment Report</i>	19
2.2.5. <i>Final Environmental Impact Assessment Report</i>	19
<b>3. OVERVIEW OF THE STUDY AREA</b>	<b>20</b>
3.1. Location of the Study Area	20
3.2. Key Demographic Information	20
3.2.1. <i>General Description of the Study Area</i>	20

<b>3.2.2.</b>	<b><i>Demographic and Socio-Economic Characteristics</i></b>	<b>20</b>
<b>3.2.3.</b>	<b><i>Infrastructure</i></b>	<b>21</b>
<b>3.3.</b>	<b>Land-Use Profile</b>	<b>22</b>
<b>3.4.</b>	<b>Climate and Atmospheric Conditions</b>	<b>22</b>
<b>3.4.1.</b>	<b><i>Precipitation</i></b>	<b>22</b>
<b>3.4.2.</b>	<b><i>Temperature</i></b>	<b>23</b>
<b>3.4.3.</b>	<b><i>Wind</i></b>	<b>23</b>
<b>3.4.4.</b>	<b><i>Lightening</i></b>	<b>23</b>
<b>3.4.5.</b>	<b><i>Extreme Events</i></b>	<b>23</b>
<b>3.5.</b>	<b>Topography</b>	<b>25</b>
<b>3.6.</b>	<b>Surface Water</b>	<b>25</b>
<b>3.7.</b>	<b>Geology and Soils</b>	<b>25</b>
<b>3.7.1.</b>	<b><i>Mineral Deposits</i></b>	<b>25</b>
<b>3.7.2.</b>	<b><i>Dolomitic/Limestone Areas</i></b>	<b>26</b>
<b>3.8.</b>	<b>Agricultural Potential</b>	<b>26</b>
<b>3.9.</b>	<b>Flora</b>	<b>29</b>
<b>3.9.1.</b>	<b><i>Vegetation Types and Condition within the Study Area</i></b>	<b>29</b>
<b>3.9.2.</b>	<b><i>Red Data Species</i></b>	<b>29</b>
<b>3.10.</b>	<b>Terrestrial Fauna</b>	<b>33</b>
<b>3.11.</b>	<b>Avifauna</b>	<b>33</b>
<b>3.11.1.</b>	<b><i>Western Section of Study Area</i></b>	<b>34</b>
<b>3.11.2.</b>	<b><i>Eastern Section of Study Area</i></b>	<b>34</b>
<b>3.12.</b>	<b>Tourism Attractions</b>	<b>34</b>
<b>3.12.1.</b>	<b><i>D’Nyala Game Reserve</i></b>	<b>35</b>
<b>3.12.2.</b>	<b><i>Zingela Lodge</i></b>	<b>35</b>
<b>3.12.3.</b>	<b><i>Rhinoland Safaris</i></b>	<b>36</b>
<b>3.12.4.</b>	<b><i>The Waterberg Biosphere Reserve</i></b>	<b>36</b>
<b>3.12.5.</b>	<b><i>Twiga Wildlife Sanctuary</i></b>	<b>37</b>
<b>3.12.6.</b>	<b><i>Witvinger Nature Reserve</i></b>	<b>37</b>
<b>3.12.7.</b>	<b><i>Percy Fyfe Nature Reserve</i></b>	<b>37</b>
<b>3.12.8.</b>	<b><i>Kuschke Nature Reserve</i></b>	<b>38</b>
<b>3.12.9.</b>	<b><i>Other Tourism Attractions in the Study Area</i></b>	<b>38</b>
<b>3.13.</b>	<b>Visual/Aesthetic Aspects</b>	<b>38</b>
<b>3.14.</b>	<b>Sites of Archaeological, Cultural and Historical Interest</b>	<b>39</b>

<b>4.</b>	<b>ASSESSMENT OF POTENTIAL IMPACTS ASSOCIATED WITH THE CONSTRUCTION OF THE PROPOSED MATIMBA-WITKOP NO 2 400 kV TRANSMISSION LINE</b>	<b>43</b>
<b>4.1.</b>	<b>Potential Impacts on the Biophysical Environment</b>	<b>43</b>
<i>4.1.1.</i>	<i>Overview of the Ecological Condition of the Study Area</i>	<i>43</i>
<i>4.1.2.</i>	<i>Potential Impacts on Flora</i>	<i>44</i>
<i>4.1.3.</i>	<i>Potential Impacts on Avifauna</i>	<i>48</i>
<i>4.1.4.</i>	<i>Erosion Risk</i>	<i>50</i>
<i>4.1.5.</i>	<i>Conclusions and Recommendations</i>	<i>52</i>
<b>4.2.</b>	<b>Potential Impacts on the Social Environment</b>	<b>52</b>
<i>4.2.1.</i>	<i>Potential Social Impacts</i>	<i>52</i>
<i>4.2.2.</i>	<i>Potential Impacts on Land Use</i>	<i>54</i>
<i>4.2.3.</i>	<i>Potential Impacts on Tourism Potential</i>	<i>56</i>
<i>4.2.4.</i>	<i>Potential Visual Impacts</i>	<i>58</i>
<i>4.2.5.</i>	<i>Potential Impacts on Heritage Sites</i>	<i>61</i>
<i>4.2.6.</i>	<i>Conclusions and Recommendations</i>	<i>62</i>
<b>4.3.</b>	<b>Overall Conclusions</b>	<b>62</b>
<b>4.4.</b>	<b>Overall Recommendations</b>	<b>70</b>
<b>5.</b>	<b>REFERENCES</b>	<b>71</b>

## **APPENDICES**

- Appendix A:** Servitude Negotiation and the EIA Process
- Appendix B:** Construction Process for Transmission Lines
- Appendix C:** Issues Trail
- Appendix D:** Examples of Advertisement Placed during the Environmental Impact Assessment Process
- Appendix E:** Minutes of Feedback Meetings Held During the Public Review Period
- Appendix F:** Specialist Study – Land Use Implications
- Appendix G:** Specialist Study – Social Impact Assessment
- Appendix H:** Specialist Study – Tourism Impact Assessment
- Appendix I:** Specialist Study – Visual Impact Assessment
- Appendix J:** Specialist Study – Heritage Impact Assessment
- Appendix K:** Specialist Study – Geohazards
- Appendix L:** Specialist Study – Agricultural Potential
- Appendix M:** Specialist Study – Flora



- Appendix N:** Specialist Study – Bird Impact Assessment
- Appendix O:** Specialist Study – Generic Veld Management Plan
- Appendix P:** EIA Newsletter
- Appendix Q:** I&AP Database
- Appendix R:** List of Properties Identified within the Study Area

### **LIST OF TABLES**

	<b>PAGE</b>
<b>Table 3.1:</b> Red Data species that may occur within the study area	31
<b>Table 4.1:</b> Summary of findings of detailed specialist studies undertaken regarding the proposed Matimba-Witkop No 2 400 kV Transmission line	64

## LIST OF FIGURES

	<b>PAGE</b>
<b>Figure 1.1:</b> Existing transmission network within the Northern Province	2
<b>Figure 1.2:</b> The proposed 400 kV line between the Matimba Powerstation and the Witkop Substation	5
<b>Figure 1.3:</b> Basemap of the study area showing all identified alternative Transmission line corridors	7
<b>Figure 1.4:</b> Diagrammatic representation of the cross-rope suspension tower	9
<b>Figure 1.5:</b> Diagrammatic representation of the self-supporting tower	10
<b>Figure 2.1:</b> Map of potentially affected properties identified and owners consulted along all identified corridors	18
<b>Figure 3.1:</b> Lightning density for South Africa (1994 – 2000; Clara, 2001)	24
<b>Figure 3.2a:</b> Land type boundaries for western section of study area (single solid lines) shown in relation to the proposed Transmission line corridors (double dashed lines)	27
<b>Figure 3.2b:</b> Land type boundaries for eastern section of study area (single solid lines) shown in relation to the proposed Transmission line corridors (double dashed lines)	28
<b>Figure 3.3:</b> Basemap showing vegetation types within the study area	30
<b>Figure 3.4:</b> South Africa's game/wildlife product supply by Province (Grant Thornton Kessel Feinstein, 2001)	35
<b>Figure 3.5:</b> Heritage sites identified within the study area	39
<b>Figure 4.1:</b> Bird guards should be implemented in areas where the streamer effect could pose a threat to the reliable operation of the Transmission line	48
<b>Figure 4.2:</b> Bird diverters have been developed and have effectively reduced the incidents of bird collisions with Transmission lines	50
<b>Figure 4.3:</b> Potentially sensitive areas identified within the study area in terms of avifauna	51
<b>Figure 4.4:</b> Use of the cross-rope suspension tower will enable landowners to use valuable agricultural land around the smaller footprint of this tower type	55
<b>Figure 4.5:</b> Map indicating the proposed position of Corridors 1 and 2 in the vicinity of the Masebe Nature Reserve, and the Waterberg Biosphere Reserve area	58
<b>Figure 4.6:</b> Uninterrupted vista with low vegetation promotes visibility of the towers	59

<b>Figure 4.7:</b>	Tower of the existing 400 kV Transmission line against a mottled, vegetation backdrop near Moepel Farms in the Waterberg Biosphere Reserve indicates the reduction in visual impact as a result of dense vegetation and topographical relief	59
<b>Figure 4.8:</b>	Potentially sensitive areas identified by specialist studies undertaken	68
<b>Figure 4.9</b>	Preferred corridor nominated by the EIA studies	69

## ACRONYMS AND ABBREVIATIONS

AINP	Archeo-Info Northern Province
NP DAEA	Northern Province Department of Agriculture and Environmental Affairs
DEAT	National Department of Environmental Affairs and Tourism
DEM	Digital elevation model
EIA	Environmental Impact Assessment
ESS	Environmental Scoping Study
EMP	Environmental Management Plan
GIS	Global information system
HIA	Heritage Impact Assessment
I&AP	Interested and affected party
I&APs	Interested and affected parties
IDP	Integrated Development Plan
kV	Kilovolt
LDO	Land Development Objective
NEMA	National Environmental Management Act (No 107 of 1998)
SIA	Social Impact Assessment
TB	Tuberculosis

## DEFINITIONS

**Endangered Species:** Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating

**Vulnerable Species:** Taxa believed likely to move into the Endangered category in the near future if the factors causing decline continue operating

**Rare Species:** Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline

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