

# EMKHIWENI SUBSTATION AND 400Kv LINE FROM EMKHIWENI SUBSTATION TO SILIMELA

## Scoping Report

April 2018

Draft

Prepared for: Eskom Holdings SOC Ltd



Environmental, Social and OHS Consultants

P.O. Box 1673    147 Bram Fisher Drive    Tel: 011 781 1730  
Sunninghill    Ferndale    Fax: 011 781 1731  
2157    2194    Email: info@nemai.co.za

# Title and Approval Page

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Applicant:	Eskom Holdings SOC Ltd
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Prepared By:	Nemai Consulting		
	 +27 11 781 1730		147 Bram Fischer Drive, FERNDALE, 2194
	 +27 11 781 1731		
	 <a href="mailto:kristyr@nemai.co.za">kristyr@nemai.co.za</a>		PO Box 1673, SUNNINGHILL, 2157
	 <a href="http://www.nemai.co.za">www.nemai.co.za</a>		
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<p>Authors: K Robertson and N. Naidoo</p>
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# Amendments Page

Date:	Nature of Amendment	Amendment Number:
25/10/2017	First Draft for Client Review	01
16/04/2018	Draft for Public Review	02

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# Executive Summary

This document serves as the Draft Scoping Report for the proposed Emkhiweni Substation and 400KV Line from Emkhiweni Substation to Silimela. The proposed activity entails the construction of a 400kV power line from the Middelburg area in the south to the Marble Hall/Wolwekraal area in the north.

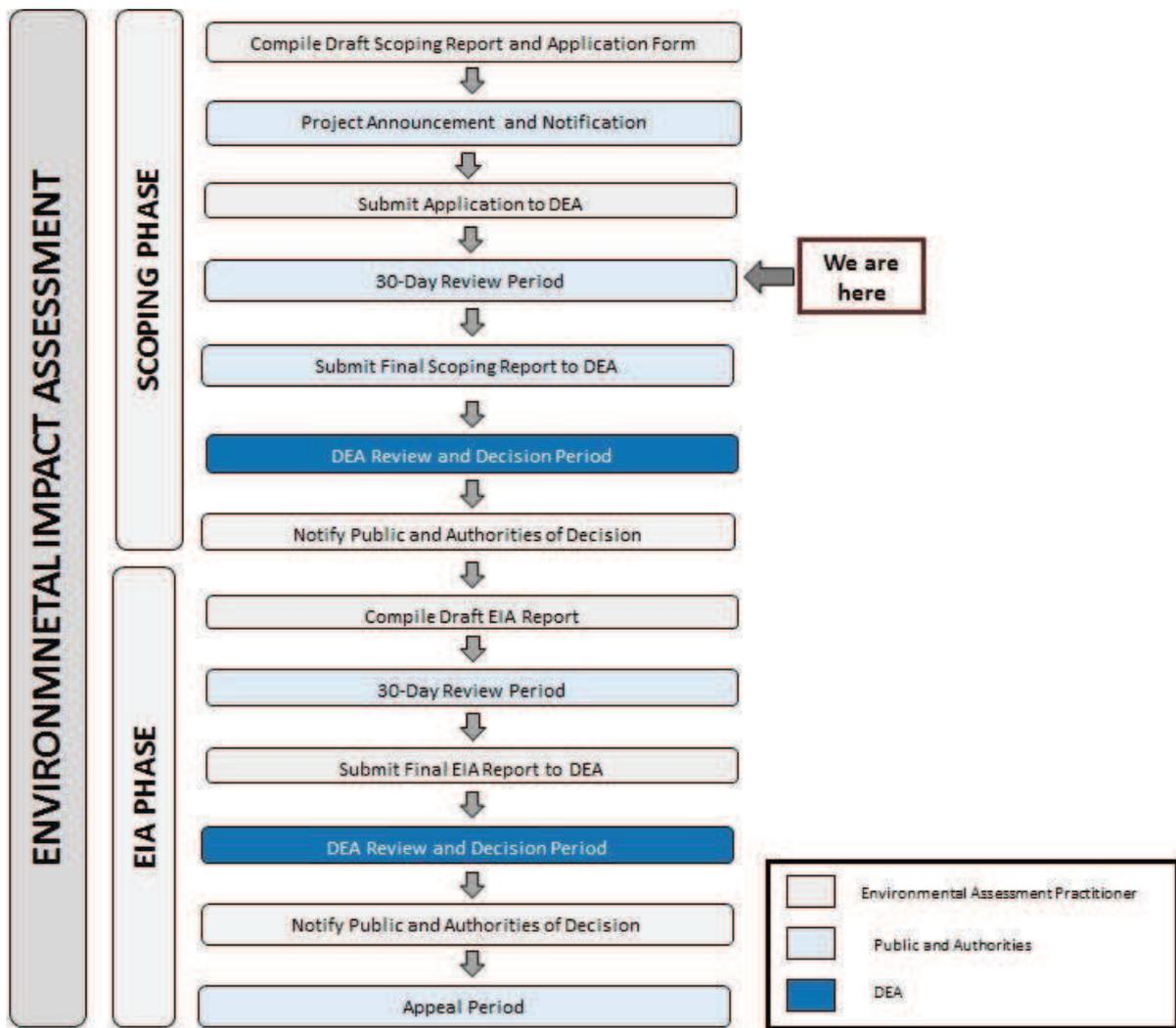
Nemai Consulting were appointed by Eskom in 2009 to undertake the Environmental Impact Assessment (EIA) as part of the 2006 EIA Regulations for the following projects:

1. Construction of the Rockdale B Substation (now referred to as Emkhiweni Substation), with 2x500MVA 400/132kV transformers; and
2. Construction of the Rockdale B to Wolwekraal 400kV line (now referred to as the Emkhiweni Substation to Silimela 400kV line).

The projects were authorised in May 2011 (Emkhiweni Substation) and July 2011 (Emkhiweni-Silimela 400kV line). Eskom has decided to proceed with the construction of Emkhiweni-Silimela 400kV line (which is approximately 80kms) however the previous Record of Decision (RoD) has lapsed. Therefore Nemai Consulting are undertaking a new application for Environmental Authorisation (EA) as part of the 2014 EIA Regulations, as amended (07 April 2017).

The pertinent environmental legislation that has bearing on the proposed development is considered. A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.

The process for seeking authorisation is undertaken in accordance with the EIA Regulations (Government Notice No. R. 982, R. 983, R. 984 and R. 985, as amended in 07 April 2017), promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No. 107 of 1998) (NEMA), which therefore requires an environmental assessment through a Scoping and EIA Process.



Scoping and EIA Process

In terms of the Regulations, the lead decision-making authority for the Scoping and EIA Process is the Department of Environmental Affairs.

A general description of the status quo of the receiving environment in the project area is discussed. This serves to provide the context within which the Scoping exercise was conducted. It also allows for an appreciation of sensitive environmental features and possible receptors of the effects of the proposed development.

The following environmental features have been considered:

1. Climate
2. Geology
3. Soil

- 
4. Topography
  5. Surface Water
  6. Flora
  7. Fauna
  8. Land Use
  9. Agricultural Land
  10. Heritage
  11. Air Quality
  12. Noise
  13. Traffic
  14. Visual Quality
  15. Socio-Economic Environment

The public participation process that was followed for the proposed project is governed by NEMA and Government Notice No. R. 982 of the EIA Regulations, as amended (07 April 2017). The public participation process conducted to date as well as the details on the public participation review period for the Draft Scoping Report are discussed.

In accordance with the purpose of the Scoping exercise as part of the overall environmental assessment, this section aims to identify potentially significant environmental issues for further consideration and prioritisation during the EIA stage. This allows for a more efficient and focused impact assessment in the ensuing EIA Phase, where the analysis is largely limited to significant issues and reasonable alternatives.

The Plan of Study explains the approach to be adopted to conduct the EIA for the proposed development. This includes a summary of the key environmental issues, Specialist Studies, public participation and proposed timeframes.

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# List of Abbreviations

BID	Background Information Document
BPEO	Best Practicable Environmental Option
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
CR	Critically Endangered
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMF	Environmental Management Frameworks
EMPr	Environmental Management Programme
EMZ	Environmental Management Zones
EN	Endangered
ESA	Ecological Support Areas
GIS	Geographic Information System
GN	Government Notice
GVA	Gross Value Added
HIA	Heritage Impact Assessment
IAP	Interested and Affected Party
IBA	Important Bird and Biodiversity Areas
IUCN	International Union for Conservation of Nature
IBA	Important Bird and Biodiversity Area
IDP	Integrated Development Plan
kV	Kilovolt
km	Kilometre
m <sup>3</sup>	Cubic metre
mm	Millimetre
MPHRA	Mpumalanga Provincial Heritage Resources Authority
MPRDA	Mineral and Petroleum Resources Development Act
NEMA	National Environmental Management Act

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NEM:AQA	National Environmental Management: Air Quality Act
NEM:BA	National Environmental Management: Biodiversity Act
NEM:WA	National Environmental Management: Waste Act
NT	Near Threatened
NWA	National Water Act
OHS	Occupational Health and Safety
PRECIS	Pretoria Computerised Information System
QDS	Quarter Degree Square
ROD	Record of Decision
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
ToR	Terms of Reference
VU	Vulnerable
WMA	Water Management Area
WULA	Water Use License Application

## Definitions of Key Terms

Term	Definition
Alternatives	<p>In terms of the 2014 EIA Regulations, alternatives refer to the different means of meeting the general purpose and requirements of the activity, which may include alternatives to:</p> <ul style="list-style-type: none"> <li>a) property or location where the activity is proposed to be undertaken;</li> <li>b) type of activity to be undertaken;</li> <li>c) design or layout of the activity;</li> <li>d) technology to be used in the activity; or</li> <li>e) operational aspects of the activity.</li> </ul> <p>And includes the option of not implementing the activity.</p>
Application	<p>In terms of the 2014 EIA Regulations (GN No. R. 982), this is defined as an Application for:</p> <ul style="list-style-type: none"> <li>a) environmental authorisation in terms of Chapter 4;</li> <li>b) amendment to an environmental authorisation in terms of Chapter 5;</li> <li>c) amendment to an EMPr in terms of Chapter 5; and</li> <li>d) amendment of a closure plan in terms of Chapter 5.</li> </ul>
Biodiversity	<p>The variety of life forms, including the plants, animals and micro-organisms, the genes they contain and the ecosystems and ecological processes of which they are a part.</p>
Cumulative Impact	<p>In relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.</p>
Development	<p>The building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pits, that is necessary for the undertaking of a listed or specified activity, including any associated post development monitoring, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.</p>
Endangered	<p>A taxon is regarded as endangered when it faces a high risk of extinction in the wild. This is defined as a 20% probability of extinction within 20 years.</p>
Environment	<p>The biophysical, social, economic, cultural, political and historical context within which people live and within which development takes place.</p>

Term	Definition
Environmental Impact	A change resulting from the effect of an activity on the environment, whether desirable or undesirable. Impacts may be the direct consequence of an organisation's activities or may be indirectly caused by them.
Environmental Impact Assessment	A systematic process of identifying, assessing and reporting environmental impacts associated with an activity.
Environmental Issue	A concern felt by one or more parties about some existing, potential or perceived environmental impact.
Environmental Management Programme	A detailed plan of action prepared to ensure that recommendations for enhancing positive impacts and/or limiting or preventing negative environmental impacts are implemented during the life-cycle of a project.
Habitat	The place where a population (e.g. animal, plant, micro-organism) lives and its surroundings, both living and non-living.
Heritage Resource	Any place or object of cultural significance including buildings, structures, landscapes, graves and geological, archaeological and palaeontological sites.
Independent	<p>In terms of the 2014 EIA Regulations (GN No. R. 982), this is defined as: In relation to an EAP, a specialist or the person responsible for the preparation of an environmental audit report, means:</p> <ul style="list-style-type: none"> <li>a) that such EAP, specialist or person has no business, financial, personal or other interest in the activity or application in respect of which that EAP, specialist or person is appointed in terms of these Regulations; or</li> <li>b) that there are no circumstances that may compromise the objectivity of that EAP, specialist or person in performing such work.</li> </ul> <p>Excluding:</p> <ul style="list-style-type: none"> <li>i. normal remuneration for a specialist permanently employed by the EAP; or</li> <li>ii. fair remuneration for work performed in connection with that activity, application or environmental audit;</li> </ul>
Interested and Affected Party	Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.
Mitigation	To anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.
Pollution	Any change in the environment caused by substances, radioactive or other waves, or noise, odours, dust or heat, emitted from any activity where there is an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future. Furthermore, pollution can also be regarded as an

Term	Definition
	undesirable state of the natural environment being contaminated with harmful substances as a consequence of human activities.
Population	Population is defined as the total number of individuals of the species or taxon.
Registered Interested and Affected Party	In relation to an application, means an interested and affected party whose name is recorded in the register opened for that application in terms of regulation 42 of the 2014 EIA Regulations.
Riparian Habitat	The physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas.
Scoping	This refers to the process of determining the spatial and temporal boundaries (the extent) for the EIA and key issues to be addressed in an environmental assessment.
Significant Impact	An impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence.
Specialist	A person that is generally recognised within the scientific community as having the capability of undertaking, in conformance with generally recognised scientific principles, specialist studies or preparing specialist reports, including due diligence studies and socio-economic studies.
Species	A group of organisms that resemble each other to a greater degree than members of other groups and that form a reproductively isolated group that will not produce viable offspring if bred with members of another group.
Taxon (Taxa):	Any group of organisms considered to be sufficiently distinct from other such groups to be treated as a separate unit.
Urban Edge	Areas situated within the urban edge (as defined or adopted by the competent authority), or in instances where no urban edge or boundary has been defined or adopted, it refers to areas situated within the edge of built-up areas.
Vulnerable	A taxon is vulnerable when it is facing a medium risk of extinction in the wild in the medium-term future, defined as a 10% probability of extinction within 100 years.
Waste	Any substance, whether or not that substance can be reduced, re-used recycled and recovered – a) that is surplus, unwanted, rejected, discarded, abandoned or disposed of;

Term	Definition
	<p>b) which the generator has no further use of for the purposes of production;</p> <p>c) that must be treated or disposed of; and</p> <p>d) that is identified as a waste by the Minister by notice in the Gazette.</p> <p>It includes waste generated by the mining, medical, and other sector, but-</p> <p>i) a by-product is not considered waste; and</p> <p>ii) any portion of waste, once re-used, recycled and recovered, ceases to be waste.</p>
Watercourse	<p>The National Water Act (Act No. 36 of 1998) defines a watercourse as:</p> <p>a) A river or spring;</p> <p>b) A natural channel in which water flows regularly or intermittently; and</p> <p>c) a wetland, pan, lake or dam into which, or from which, water flows; and any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998).</p> <p>A reference to a watercourse includes, where relevant, its bed and banks;</p>
Wetland	<p>Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.</p>

## 1 DOCUMENT ROADMAP

This document serves as the Draft Scoping Report (DSR) for the proposed Emkhiweni Substation and 400KV Line from Emkhiweni Substation to Silimela. In order to provide clarity to the reader, a document roadmap is provided below. The document roadmap provides information on the requirements of the 2014 Environmental Impact Assessment (EIA) Regulations, as amended (07 April 2017), as stipulated in Appendix 2 of Government Notice (GN) No. R. 982. This is promulgated in terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998) as well as a guide on the content of each chapter. Please note that in some cases more information is provided than required in the EIA Regulations in which case there will be no correlating section to these EIA Regulations.

**Table 1: Document Roadmap**

Chapter	Title	Correlation with Appendix 2 of GN No. R. 982	
1.	Document Roadmap	-	-
2.	Purpose of this Document	-	-
3.	Environmental Assessment Practitioner (EAP)	2 (a)	Details of – i) the EAP who prepared the report; and ii) the expertise of the EAP, including a curriculum vitae.
4.	Project Background and Motivation	2 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity within the context of the preferred location.
5.	Project Location	2 (b)	The location of the activity including – i) The 21 digit Surveyor General code of each Cadastral land parcel; ii) Where available, the physical address and farm name; and iii) Where the required information in terms of (i) and (ii) is not available, the coordinates of the boundary of the property or properties.
		2 (c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or if it is – i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is undertaken; and

Chapter	Title	Correlation with Appendix 2 of GN No. R. 982	
			ii) On land where the property has not yet been defined, the coordinates within which the activity is to be undertaken.
6.	Project Alternatives	2 (h)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including:  i) Details of all alternatives considered; ix) The outcome of the site selection matrix; x) If no alternatives including alternative locations for the activity were investigated, the motivation for not considering such.
7.	Project Description	2 (d)	A description of the scope of the proposed activity, including –  i) All listed and specified activities triggered; and ii) A description of the activities to be undertaken, including associated structures and infrastructure.
8.	Legislation and Guidelines Considered	2 (e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.
9.	Scoping and EIA Process	-	-
10.	Assumptions and Limitations	-	-
11.	Need and Desirability	2 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity within the context of the preferred location.
12.	Profile of the Receiving Environment	2 (h)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including:  iv) The environment attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
13.	Public Participation	2 (h)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including:

Chapter	Title	Correlation with Appendix 2 of GN No. R. 982	
			<ul style="list-style-type: none"> <li>ii) Details of the public participation process undertaken in terms of regulation 41 of the Regulations including copies of supporting documents and inputs; and</li> <li>iii) A summary of the issues raised by IAPS and an indication of the manner in which the issues were incorporated or the reasons for not including them.</li> </ul>
14.	Environmental Issues	2 (h)	<p>A full description of the process followed to reach the proposed preferred activity, site and location within the site, including:</p> <ul style="list-style-type: none"> <li>v) The impacts and risks identified for each alternative including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources; and can be avoided, managed or mitigated;</li> <li>vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.</li> <li>viii) The possible mitigation measures that could be applied and level of residual risk.</li> </ul>
15.	Methodology to Assess the Identified Impacts	2 (h)	<p>A full description of the process followed to reach the proposed preferred activity, site and location within the site, including:</p> <ul style="list-style-type: none"> <li>vi) The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives.</li> </ul>
16.	Plan of Study for EIA	2 (i)	<p>A plan of study for undertaking the environmental impact assessment process to be undertaken including –</p> <ul style="list-style-type: none"> <li>i) A description of the alternatives to be considered and assessed within the preferred site including the option of not proceeding with the activity;</li> <li>ii) A description of the aspects to be assessed as part of the EIA process;</li> </ul>

Chapter	Title	Correlation with Appendix 2 of GN No. R. 982	
			<ul style="list-style-type: none"> <li>iii) Aspects to be assessed by specialists;</li> <li>iv) A description of the proposed method of assessing the environmental aspects including the proposed method for assessing the environmental aspects including aspects to be assessed by specialists;</li> <li>v) A description of the proposed method of assessing duration and significance;</li> <li>vi) An indication of the stages at which the competent authority will be consulted;</li> <li>vii) Particulars of the public participation process that will be conducted during the EIA Phase;</li> <li>viii) A description of the tasks that will be undertaken as part of the EIA Phase; and</li> <li>ix) Identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.</li> </ul>
17.	EAP Declaration and Conclusion	2 (h)	<p>A full description of the process followed to reach the proposed preferred activity, site and location within the site, including:</p> <ul style="list-style-type: none"> <li>xi) A concluding statement indicating the preferred alternative, including preferred location of the activity.</li> </ul>
		2 (j)	<p>An undertaking under oath or affirmation by the EAP in relation to:</p> <ul style="list-style-type: none"> <li>i) The correctness of the information provided in the report;</li> <li>ii) The inclusion of comments and inputs from stakeholders and IAPS; and</li> <li>iii) Any information provided by the EAP to IAPS and any responses by the EAP to comments or inputs made by IAPS.</li> </ul>
		2 (k)	<p>An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and IAPS on the Plan of Study for undertaking the EIA.</p>
-		2 (l)	Where applicable, any specific information required by the Competent Authority.
-		2 (m)	Any other matters required in terms of sections 24(4)(a) and (b) of the Act.

Note that the following sections of Appendix 2 of GN No. R. 982 (4 December 2014) will be investigated further and reported on in the EIA Report, following the execution of the relevant specialist studies and targeted public participation:

- Section 2(h)(v) - The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts-
  - a. can be reversed;
  - b. may cause irreplaceable loss of resources; and
  - c. can be avoided, managed or mitigated.
- Section 2(h)(vii) - Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.
- Section 2(h)(viii) - The possible mitigation measures that could be applied and level of residual risk.
- Section 2(h)(ix) - The outcome of the site selection matrix.
- Section 2(h)(xi) - A concluding statement indicating the preferred alternatives, including preferred location of the activity.

## 2 PURPOSE OF THIS DOCUMENT

The DSR is an important document as it is the first phase of the EIA Process and thus outlines the Scoping process to be followed for the proposed Emkhiweni Substation and 400KV Line from Emkhiweni Substation to Silimela which aims to:

1. Introduce the proposed project to all Interested and Affected Parties (IAPs);
2. Engage with IAPs to allow for participation in the process that is transparent, cooperative, informative and robust;
3. Allow for informed decision-making with regard to the EIA process;
4. Identify the significant issues and impacts to be investigated further during the execution of the EIA phase;
5. Consider suitable and feasible alternatives for achieving the project's objectives; and
6. Determine the scope of the ensuing EIA phase in terms of specialist studies, public participation, assessment of impacts and appraisal of alternatives.

Further, according to Appendix 2 of the 2014 EIA Regulations (GN No. R 982), as amended (07 April 2017), the objectives of the Scoping process are, through consultation, to:

- a. Identify the relevant policies and legislation relevant to the activity;
- b. Motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- c. Identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
- d. Identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- e. Identify the key issues to be addressed in the assessment phase;
- f. Agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
- g. Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

The Application Form for Environmental Authorisation (EA) will be submitted to the Competent Authority: Department of Environmental Affairs (DEA), at the same time the DSR is submitted to DEA. This report will be available for the public and authorities to review and provide comments on during the 30-Day review period. The comments received from registered IAPs during the DSR review period will be incorporated into the Final Scoping Report. The Final Scoping Report will be submitted to the DEA, as the 2014 EIA Regulations require that the Scoping Report be submitted within 44 days of receipt of the application by DEA which includes a 30-Day review period reflecting the incorporation of comments received. Comments received by IAPs will help shape the subsequent EIA Phase to ensure the relevant studies are in place to assess specific impacts.

### 3 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Nemai Consulting was appointed by Eskom Holdings SOC Ltd as the Independent Environmental Assessment Practitioner (EAP) to undertake the EIA for the proposed Emkhiweni Substation and Emkhiweni-Silimela 400kV line. In accordance with Section 2 (a) of Appendix 2 of GN No. R. 982, as amended (07 April 2017), this section provides an overview of Nemai Consulting and the company's experience with EIAs, as well as the details and experience of the EAPs that form part of the Scoping and EIA team.

Nemai Consulting is an independent, specialist environmental, social development and Occupational Health and Safety (OHS) consultancy, which was founded in December 1999. The company is directed by a team of experienced and capable environmental engineers, scientists, ecologists, sociologists, economists and analysts. The core members of Nemai Consulting that are involved with the Scoping and EIA Process for the proposed development are captured in **Table 2** below and their respective Curricula Vitae are contained in **Appendix 1**.

**Table 2: Scoping and EIA Core Team Members**

Name	Qualification	Responsibility
Mrs N. Naidoo	BSc – Eng (Chem)	Project Manager and Environmental Engineering
Ms K. Robertson	MSc – Environmental Sciences	Project Leader and EAP for EIA Process, Scoping & EIA Report, and Public Participation

## 4 PROJECT BACKGROUND AND MOTIVATION

Nemai Consulting was appointed by Eskom in 2009 to undertake the EIA as part of the 2006 EIA Regulations for the following projects:

1. Construction of the Rockdale B Substation (now referred to as Emkhiweni Substation), with 2x500MVA 400/132kV transformers; and
2. Construction of the Rockdale B to Wolwekraal 400kV line (now referred to as the Emkhiweni Substation to Silimela 400kV line).

The projects were authorised in May 2011 (Emkhiweni Substation) and July 2011 (Emkhiweni-Silimela 400kV line). Refer to **Appendix 2** for a copy of the previous authorisations. Eskom has decided to proceed with the construction of Emkhiweni-Silimela 400kV line (which is approximately 80kms) however the previous Record of Decision (RoD) has lapsed. Therefore Nemai Consulting are undertaking a new application for Environmental Authorisation (EA) as part of the 2014 EIA Regulations, as amended (07 April 2017). Eskom was not able to proceed with construction within the ROD timeframes as a result of the lack of funding for the project.

The proposed project is associated with the transmission network and its associated substations in the Mpumalanga and Limpopo Provinces.

#### **4.1 Transmission Network Status in Mpumalanga and Limpopo Provinces**

There are two transmission subsystems in the Mpumalanga and Limpopo Provinces, these are known as “Highveld North West” and “Lowveld North”. These subsystems are interconnected and are currently experiencing several problems:

- The lines in the study area are heavily loaded, i.e. if maintenance is required or there is a fault on the line the remaining lines may exceed their thermal limits, as a result load shedding would become necessary;
- The transfer capacity is insufficient;
- An existing substation called Rockdale reached its firm capacity in 2007;
- The distribution network supplied by the Vulcan substations is passing through a burning ground and the network is failing, therefore these lines need to be diverted to other supply sources;
- The distribution network in the Marble Hall area is experiencing low voltage problems; and
- The Proposed Steelpoort (Tubatse) Pumped Storage Scheme requires Transmission network strengthening.

To combat these problems, several phased projects for which environmental assessments have been authorised, have been undertaken and include:

- Mokopane to Wolwekraal 400kV power line and associated secondary infrastructure;
- Steelpoort to Wolwekraal 400kV power line and associated secondary infrastructure; and
- Wolwekraal substation and associated secondary infrastructure.

Once these projects are implemented the following would have been achieved:

- The network security will be improved;
- Capacity for future load increases would be created; and
- Eskom’s revenue would be increased.

#### **4.2 Emkhiweni Substation to Silimela 400kV line**

The distribution network in the Marble Hall area is supplied from the Simplon substation, this network is currently experiencing low voltage problems. In future the Simplon and Rockdale substations will supply additional power to the network, however this additional power cannot be supported by the existing network without violating its operational limits.

The Emkhiweni Substation to Silimela 400kV line provides the means to support the additional power supply within operational limits.

### 4.3 Emkhiweni Substation

Rockdale is an existing substation located to the southwest of Middleburg near the N11. The transmission lines that feed into it are the two Arnot – Rockdale 275kV lines. The firm capacity at the Rockdale substation is 500MVA and was exceeded in 2007. The new loads at the substation cannot be accommodated without violating the loading conditions of the transformers, which are 45 years old. The existing Rockdale substation also does not have the correct busbar arrangement. If a single transformer is lost, load shedding would be necessary. If a transformer needs to be maintained then this would also result in load shedding. Additional power demands are expected for the Rockdale substation, however due to the abovementioned problems these cannot be accommodated.

The proposed solution is the construction of a new substation near to the existing Rockdale substation. This proposed new substation would be known as Emkhiweni and it would serve the following purpose:

- De-load the Rockdale and Vulcan substations;
- Create capacity at the existing substations;
- Cater for new loads; and
- Improve the reliability in the Middleburg area.

## 5 PROJECT LOCATION

The proposed activity entails the construction of a 400kV power line from the Middelburg area in the south to the Marble Hall/Wolwekraal area in the north. The proposed line originates at the Wolwekraal Substation, which is situated approximately 13km to the southeast of Marble Hall (Limpopo Province) on the Farm Loskop Noord No. 12 JS and runs south-eastwards. The line terminates at the proposed Emkhiweni Substation within Mpumalanga. Refer to **Figures 1 and 2** for locality maps, and **Appendix 3** for A3 copies of these maps. The proposed development falls within the Steve Tshwete Local Municipality (LM), Elias Motsoaledi LM and Ephraim Mogale LM.

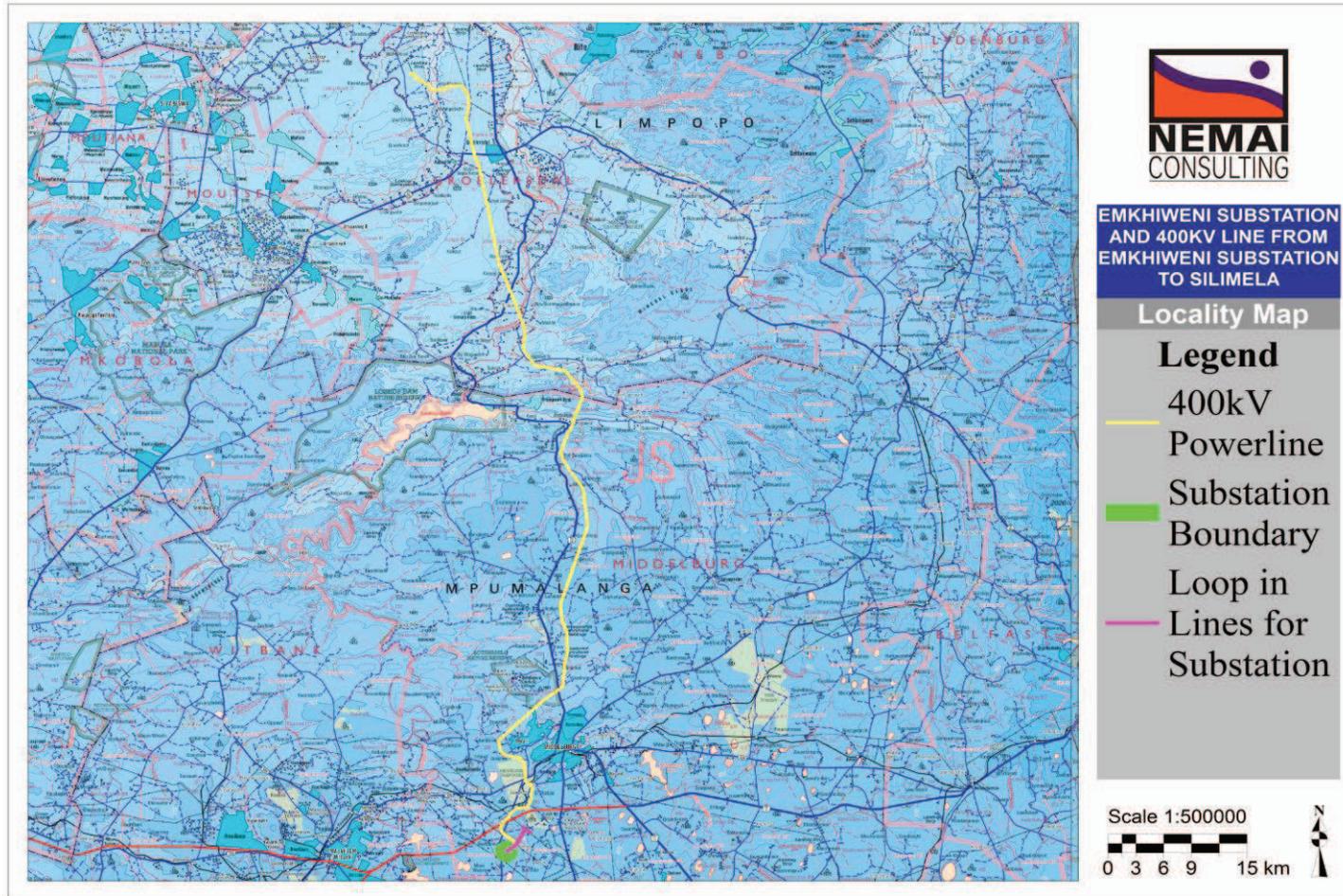


Figure 1: Topographical map (1:250 000)

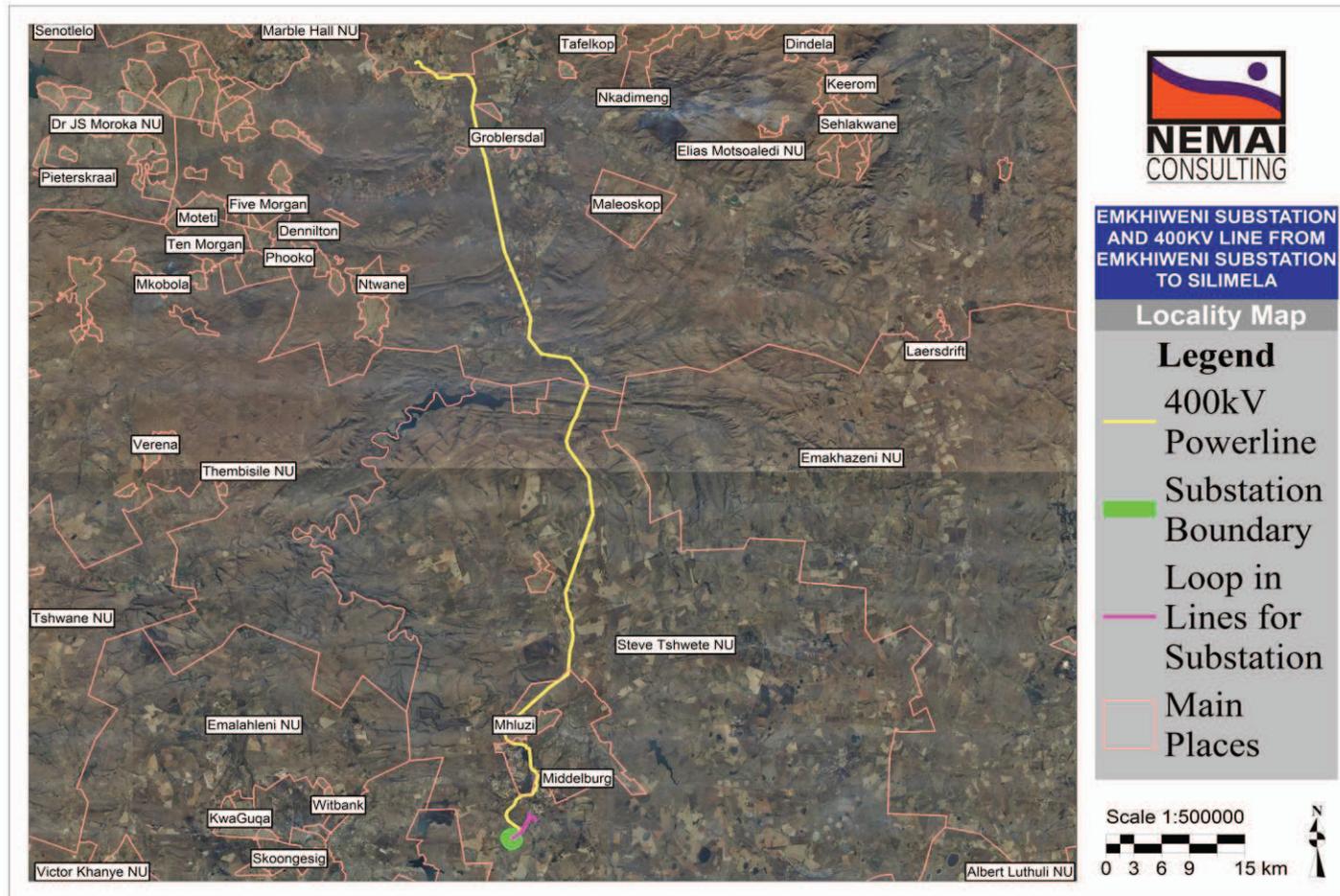


Figure 2: Locality map

The width of the powerline servitude upon completion would be 55m. In addition to the Specialist Studies, a walk-down survey of the previously authorised powerline route was undertaken to ensure that the final pylon placement has a minimal impact. Refer to **Appendix 4** for the coordinates of the tower positions along the proposed line. The coordinates of the proposed Emkhiweni Substation are 25°52'19.20"S; 29°23'60.00"E.

## 6 PROJECT ALTERNATIVES

The 2014 EIA Regulations, as amended (07 April 2017), require that feasible project specific alternatives are identified (including the “do nothing” option). The Regulations define alternatives as the following:

*Different means of meeting the general purpose and requirements of the activity, which may include alternatives to:*

- *Property on which or location where the activity is proposed to be undertaken;*
- *Type of activity to be undertaken;*
- *Design or layout of the activity;*
- *Technology to be used in the activity; or*
- *Operational aspects of the activity; and*
- *The option of not implementing the activity.*

In terms of the 2014 EIA Regulations under NEMA, the fundamental purpose of the Scoping exercise is the consideration of viable and reasonable alternative sites, processes, or technologies of achieving the objectives of the project. The sub-sections to follow discuss the project alternatives considered during the previous Scoping Process that was undertaken and authorised in 2011.

### 6.1 Route Alternatives for the Line

Two route alternatives were considered in the previous Scoping and EIA Report (2010), refer to **Figure 3** below. Alternative 1 was approved by DEA in the EA dated 28 July 2011. Eskom has purchased the land for the substation (also authorised in 2011) and Eskom has secured a 55m servitude for the line. Therefore Eskom has registered the servitude as a result of the previous Authorisation, which has now expired. Therefore no alternative routes will be considered as part of this Scoping and EIA Process.

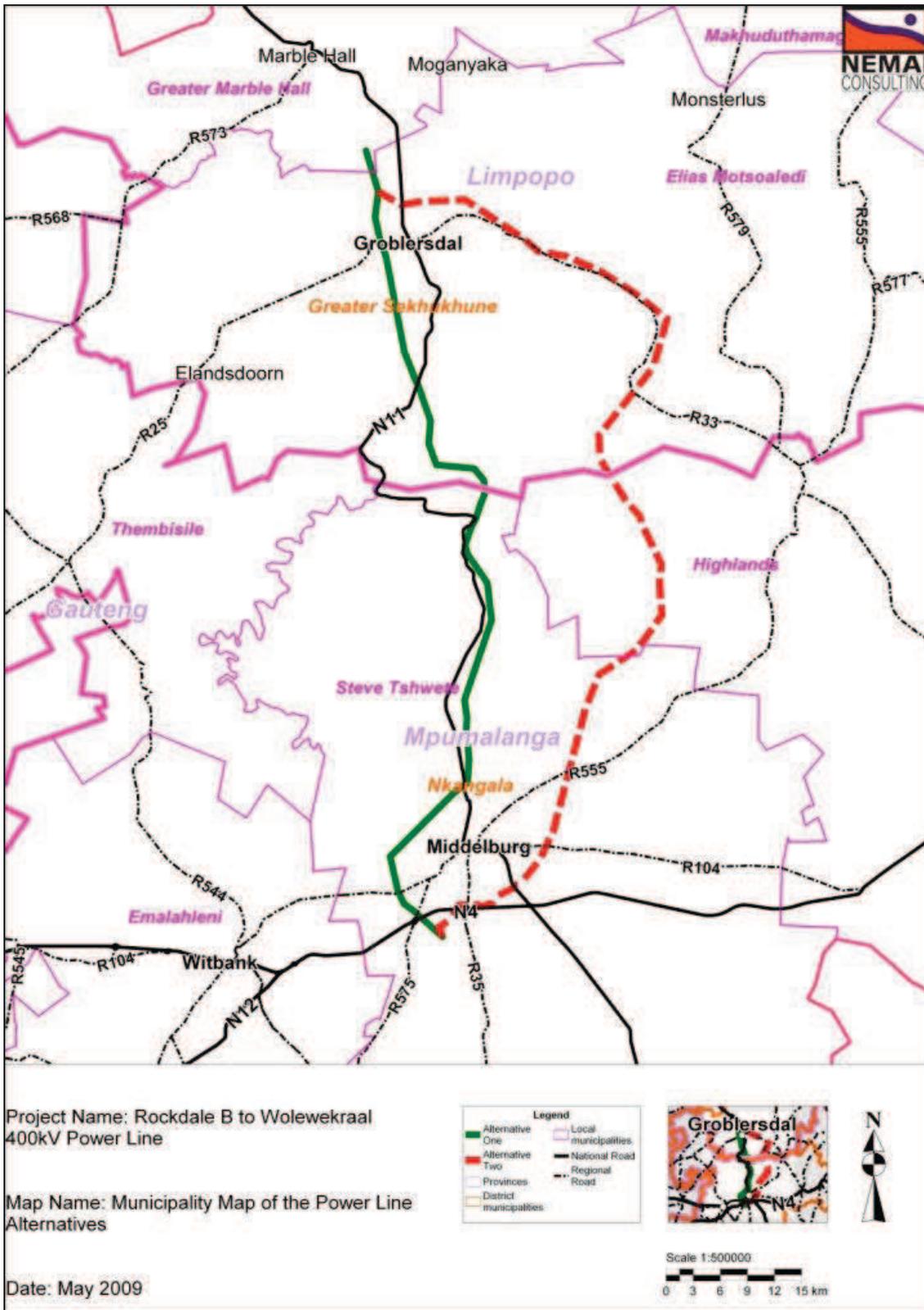
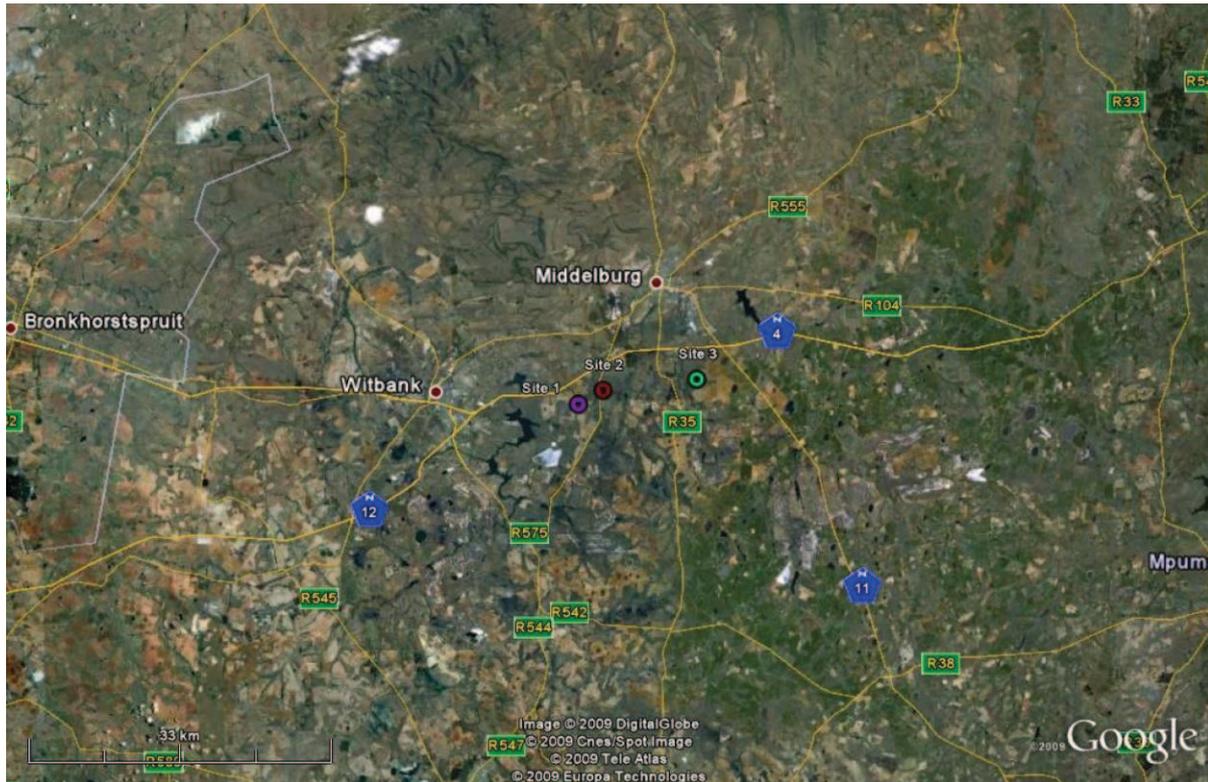


Figure 3: Alternative routes previously considered

## 6.2 Site Alternatives for the Substation

Three site alternatives were considered in the previous Scoping and EIA Report (2010), refer to **Figure 4** below. Alternative 2 was approved by DEA in the EA dated 28 July 2011. Eskom has purchased the land Eskom has purchased the land for the substation and Eskom has secured a 55m servitude for the line. Therefore no alternative sites will be considered as part of this Scoping and EIA Process.



*Figure 4: Regional map of the three alternative substation sites*

## 6.3 No-go alternative

The 'no-go' alternative refers to a situation where the proposed development is not built. This would mean that the area where the proposed Line and Substation are to be located would not change in any way and that the environmental conditions within the site would generally stay the same.

This would also mean that the two interconnected transmission sub-systems in the Mpumalanga and Limpopo Provinces would continue currently experiencing several problems, which consist of:

- The firm Transformation capacities at the Rockdale Substation, containing transformers with a capacity of 275/132kV and 132/88kV, were exceeded in 2007, which means that load shedding would have to occur should single transformer at the station be lost. Furthermore maintenance on transformers is not possible without undertaking load shedding. The 132/88kV transformers are already in excess of 45 years old, and is due for replacement;
- The distribution network supplied from the Vulcan Substation passes through a subsurface coal mining area, in which spontaneous combustion occur. The spontaneous combustion which occurs. This causes the network to fail and therefore lines needs to be diverted to other supply sources;
- The distribution network in the Marble Hall/Wolwekraal area, supplied from the Simplon Substation, is experiencing low voltage problems. New step loads are expected to be supplied from the Simplon and Rockdale Substation, however, with the current network status the load could not be accommodated without violating the network operation limits; and
- Electricity is required during the pumping of water at the Steelpoort Pumped Storage Scheme. Due to the loss of the Duvha Steelpoort line, the load required for pumping the water to the upper dam will exceed the capacity which could be supported by the current network.

Due to the above constraints Eskom proposed to undertake the Highveld North West Lowveld Strengthening Scheme project to alleviate the problems occurring and to strengthen the network. The proposed Emkhiweni Substation to Silimela 400kV powerline forms part of the Highveld North West Lowveld Strengthening Scheme, and is therefore forms a critical part in the strengthening of the network. Without the Emkhiweni Substation to Silimela powerline, the network cannot be strengthened and electricity supply problems will the affected areas will remain and will potentially worsen over time as electricity demands increase.

## 7 PROJECT DESCRIPTION

### 7.1 Scope of Work

The scope of work includes:

- Construction of the Emkhiweni Substation, with 2x500MVA 400/132kV transformers; and
- Construction of the Emkhiweni-Silimela 400kV line.

### 7.1.1 400kV Line

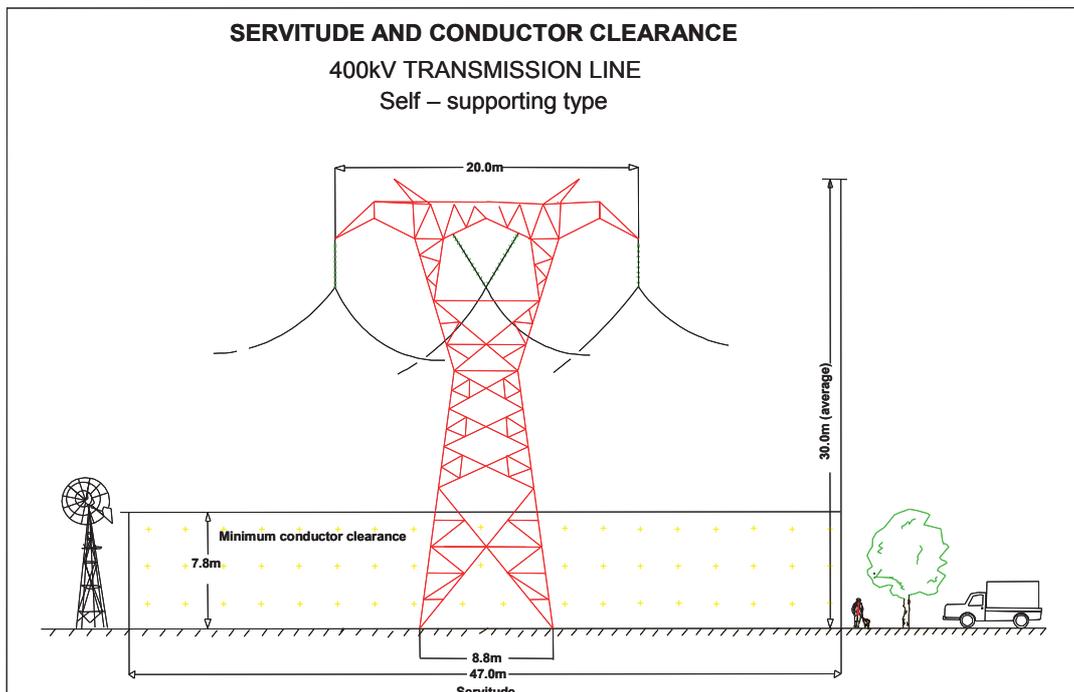
A power line typically consists of pylons, which are tower-like structures that support electrical cables above the ground. The distance between each pylon is dependent on the type of terrain the lines cross. The standard width of a servitude for a 400kV Transmission line is 55m (27.5m on either side of the power line).

In order for maintenance staff to access the lines and undertake routine maintenance or repair faults, it may be necessary to construct access roads. To protect the surrounding landscape from soil erosion stormwater infrastructure may be required.

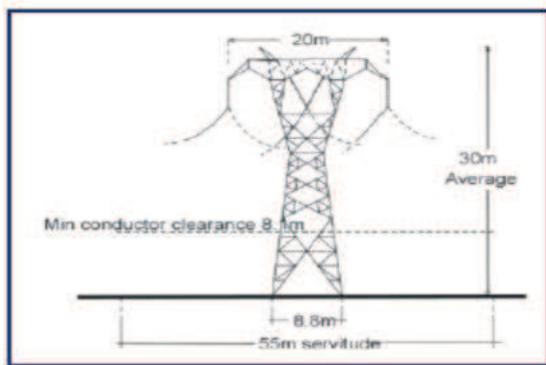
There are several types of towers/pylons. The types of pylons chosen for the project depend on several factors, these include:

- Terrain;
- Expense; and
- Recommendations from the visual specialist.

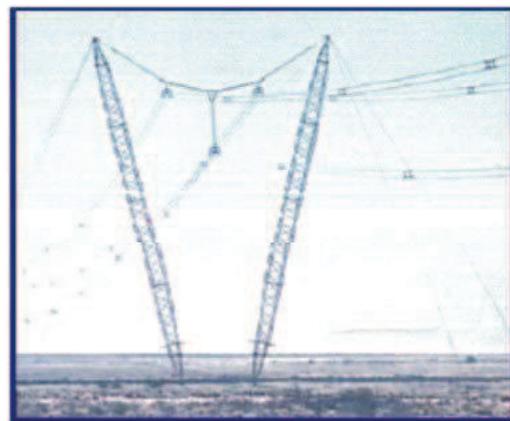
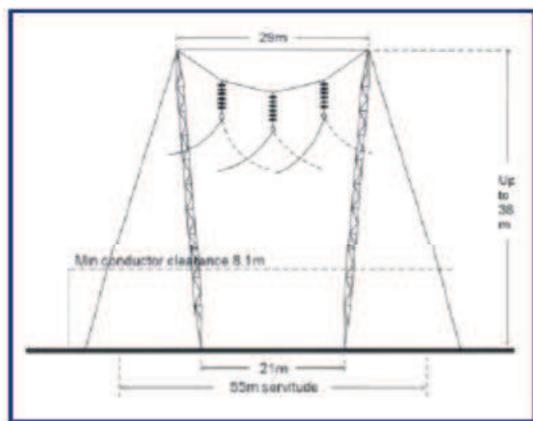
Eskom tries not to bind themselves to one tower/pylon type during the environmental assessment in case another type, based on the factors mentioned above, would be more suitable. Below are several examples of 400kV power line types, which might be used.



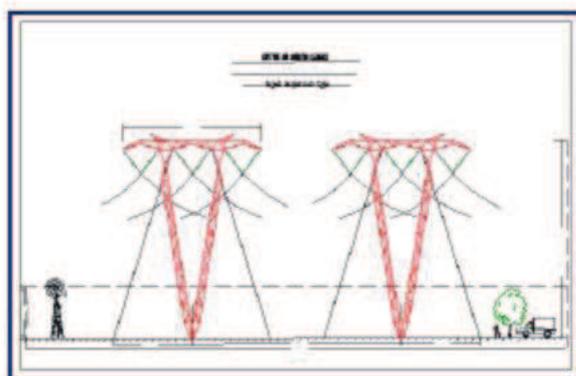
**Figure 5: Servitude and Conductor Clearance for a 400kV Transmission Line, Self – Supporting Type Tower/Pylon**



Strain Tower Lines



Cross Rope Suspension Lines



400kV GUYED V Tower Structures

Figure 6: Examples of Strain Tower Types, Cross Rope Suspension Lines and 400kV GUYED V Tower Structures

### 7.1.1 Associated Infrastructure for the 400kV Line

The Emkhiweni-Silimela 400kV powerline would link into the proposed Wolwekraal substation in the north and the proposed Emkhiweni substation in the south.

To link the substations to the power lines, loop-in lines are required. These loop-in lines do not form part of this power line application but are part of both of the substation applications. The location of the loop-in lines depend on which route alternative (for the power line) and locality alternative (for the substation) are the preferred alternatives. Determining a loop-in line route is therefore a lengthy process and for the Emkhiweni-Silimela 400kV powerline connection to the proposed Wolwekraal and Emkhiweni substation.

Very few new access roads may be required during installation of some sections of the towers and powerline; however, Eskom have advised that these access roads do not exceed any thresholds in terms of the EIA Regulations of 2014, as amended (07 April 2017).

### 7.1.2 Emkhiweni Substation

The proposed Emkhiweni Substation would support the existing Rockdale substation. The proposed Emkhiweni Substation would have a 1km x 1km footprint which would include the following:

- Two 400kV loop-in lines;
- Loop-in lines to the Arnot Vulcan power line;
- Offices and control rooms;
- Transformers;
- Breakers;
- Other equipment necessary for connecting the 400kV lines to the substation and the 132kV lines out of the substation; and
- Loop-in lines.

The loop-in lines (**Figure 7**) would traverse approximately 3km to loop into the existing Arnot - Vulcan 400kV line.

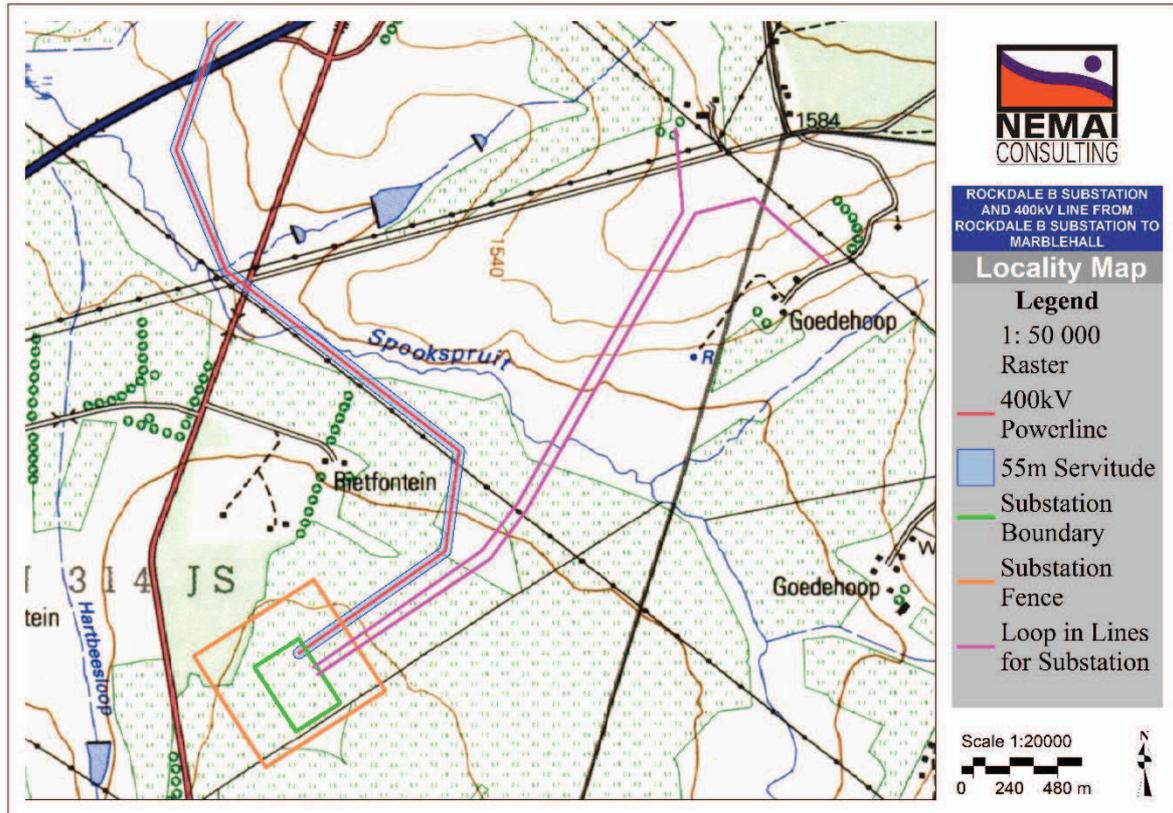


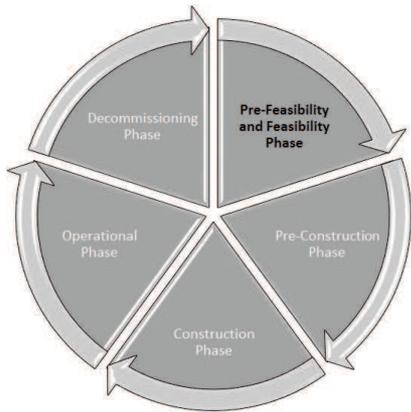
Figure 7: Loop-in Lines for the Emkhiweni Substation

## 7.2 Project Life-Cycle

To adequately consider the impacts associated with the proposed Emkhiweni Substation and Emkhiweni-Silimela 400kV powerline, the major activities during each phase of the project life-cycle are listed in the sub-sections to follow.

### 7.2.1 Feasibility Studies

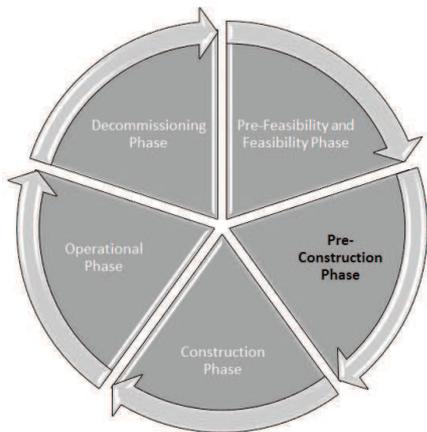
Major activities during the Pre-Feasibility and Feasibility Phases of the project include the following:



- A suitable location for the substation and buffer as well as a corridor for the line route has been selected based on the previous authorisation in 2011. Servitude negotiations have been undertaken.

**7.2.2 Pre-Construction**

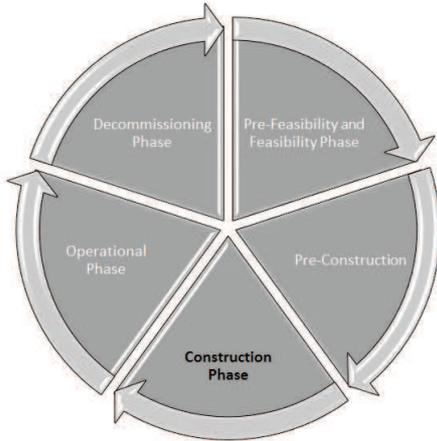
Major activities during the Pre-Construction Phase of the project include the following:



- Detailed geotechnical investigations;
- Because EA was previously obtained, the following was undertaken –
  - Aerial survey of the route;
  - Selection of the most appropriate structures;
  - Eskom and environmental specialists (e.g. ecologist, heritage) conducted a walk-down survey to determine the exact locations of the towers, based on sensitive environmental features and technical criteria; and
  - Preparation of relevant planning documentation, including technical and design documentation.

**7.2.3 Construction**

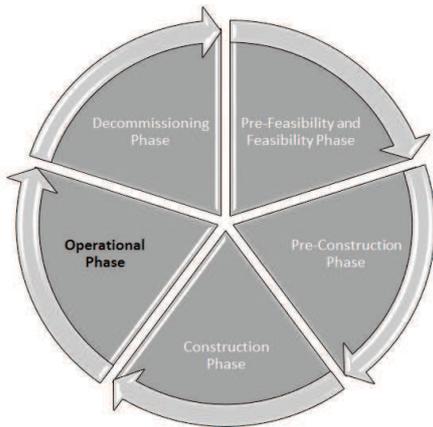
Major activities during the Construction Phase are as follows:



- Vegetation clearance;
- Tower pegging;
- Construction camp establishment;
- Gate installation;
- Access roads;
- Excavations for foundations;
- Foundations of steelwork;
- Concrete works;
- Erection of steel structures;
- Stringing of transmission cables;
- Rehabilitation; and
- Inaccessible Sites or Sensitive Areas.

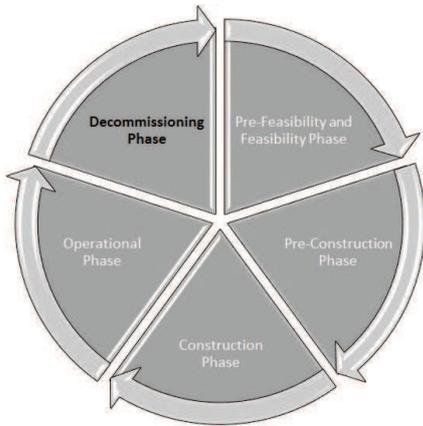
### 7.2.4 Operation

Major activities during the Operational Phase of the project include the following:



- During operations, Eskom needs to reach the servitude via access roads to perform maintenance of the line. Line inspections are undertaken on an average of 1 – 2 times per year, depending on the area;
- The servitude will need to be cleared occasionally to ensure that vegetation does not interfere with the operation of the line; and
- On-going consultation with directly affected parties.

**7.2.5 Decommissioning**



Post to the economic lifespan of the Emkhiweni Substation and Emkhiweni-Silimela 400kV powerline, decommissioning and rehabilitation will comply with the appropriate environmental legislation and best practices at that time.

**8 LEGISLATION AND GUIDELINES CONSIDERED**

**8.1 Overview of Legislation**

Some of the pertinent environmental legislation that has bearing on the proposed development is captured in **Table 3** below. More detailed information is provided in Section 7.2 to 7.15. This section aims to satisfy 2(e) of Appendix 2 of GN No. R. 982, as amended (07 April 2017): A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.

*Table 3: Environmental legislative framework*

Legislation	Relevance
Constitution of the Republic of South Africa (Act No. 108 of 1996)	Chapter 2 – Bill of Rights. Section 24 – environmental rights.
National Environmental Management Act (Act No. 107 of 1998)	Section 24 – EA (control of activities which may have a detrimental effect on the environment). Section 28 – Duty of care and remediation of environmental damage. Environmental management principles. <b>Authority – DEA.</b>
GN No. R. 982 of 04 December 2014 EIA Regulations, as amended (07 April 2017)	Process for undertaking Basic Assessment / Scoping and EIA process.

Legislation	Relevance
GNs No. R. 983, 984 and 985 of 04 December 2014 EIA Regulations, as amended (07 April 2017)	Activities that need to be assessed through a Scoping and EIA Process.
National Water Act (Act No. 36 of 1998)	Chapter 3 – Protection of water resources. Section 19 – Prevention and remedying effects of pollution. Section 20 – Control of emergency incidents. Chapter 4 – Water use. <b>Authority – DWS.</b>
National Environmental Management: Protected Areas Act (Act No. 57 of 2003)	Protection and conservation of ecologically viable areas representative of South Africa's biological diversity and natural landscapes. <b>Authority – DEA.</b>
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	Management and conservation of the country's biodiversity. Protection of species and ecosystems. <b>Authority – DEA.</b>
National Environmental Management: Air Quality Act (Act No. 39 of 2004)	Air quality management. Section 29 – pollution prevention plans (Notice 172 of 2014: Greenhouse gases as priority air pollutants) Section 32 – dust control. Section 34 – noise control. Section 35 – control of offensive odours. <b>Authority – DEA.</b>
National Environmental Management: Waste Act (Act No. 59 of 2008)	Chapter 4 – Waste management measures Chapter 5 – licensing requirements for listed waste activities. <b>Authority – DEA.</b>
Occupational Health & Safety Act (Act No. 85 of 1993)	Provisions for Occupational Health & Safety. Major Hazardous Installation Regulations. <b>Authority – Department of Labour.</b>
National Heritage Resources Act (Act No. 25 of 1999)	Section 34 – protection of structure older than 60 years. Section 35 – protection of heritage resources. Section 36 – protection of graves and burial grounds. Section 38 – Heritage Impact Assessment for linear development exceeding 300m in length; development exceeding 5 000m <sup>2</sup> in extent. <b>Authority – Mpumalanga Provincial Heritage Resources Authority (MPHRA).</b>
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	Control measures for erosion. Control measures for alien and invasive plant species. <b>Authority – Department of Agriculture, Forestry and Fisheries (DAFF).</b>

Legislation	Relevance
National Forestry Act (Act No. 84 of 1998)	Section 15 – authorisation required for impacts to protected trees. <b>Authority – DAFF.</b>
Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)	Permit required for borrow pits. <b>Authority – Department of Mineral Resources (DMR).</b>

## **8.2 Constitution of the Republic of South Africa (Act No. 108 of 1996)**

The Constitution of the Republic of South Africa (Act No. 108 of 1996) is the supreme law of the land and provides amongst others the legal framework for legislation regulating coastal management in general. It also emphasises the need for co-operative governance. In addition, the Environmental clause in Section 24 of the Constitution provides that:

*“Everyone has the right –*

- a) to an environment which is not harmful to their health or wellbeing;*
- b) to have the environment protected for the benefit of present and future generations through reasonable legislation and other measures that:
 
  - i. Prevent pollution and ecological degradation;*
  - ii. Promotes conservation;*
  - iii. Secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development”**

The Constitution provides the overarching framework for sustainable development.

## **8.3 National Environmental Management Act (Act No. 107 of 1998)**

The proposed Emkhiweni Substation and Emkhiweni-Silimela 400kV powerline requires authorisation in terms of the NEMA, and the EIA will be undertaken in accordance with the 2014 EIA Regulations, as amended (07 April 2017).

Important aspects of NEMA are sustainability principles such as the “Polluter Pays” and the “Precautionary Principle” which will also be taken into account in the assessment of the impacts of the proposed development.

### **8.3.1 EIA Regulations**

The 2014 EIA Regulations, as amended (07 April 2017) consist of the following:

- EIA procedures - GN No. R. 982;

- Listing Notice 1 - GN No. R. 983;
- Listing Notice 2 - GN No. R. 984; and
- Listing Notice 3 - GN No. R. 985.

The proposed Emkhiweni Substation and Emkhiweni-Silimela 400kV powerline triggered activities under Listing Notices 1, 2 and 3, and thus needs to be subjected to a Scoping and EIA Process. The listed activities are explained in the context of the project in **Table 4**.

**Table 4: EIA Listed Activities for the proposed Emkhiweni Substation and Emkhiweni-Silimela 400kV powerline**

GN No. R.	Activity	Description as per GN	Applicability to the Project
GN R. 983 of 04 December 2014, as amended (07 April 2017)	12(ii)	<p>The development of—</p> <p>(ii) infrastructure or structures with a physical footprint of 100 square metres or more;</p> <p>where such development occurs—</p> <p>(a) within a watercourse.</p> <p>excluding—</p> <p>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</p> <p>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</p> <p>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</p> <p>(dd) where such development occurs within an urban area;</p> <p>(ee) where such development occurs within existing roads, road reserves or railway line reserves; or</p> <p>(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.</p>	A few of the proposed tower structures will fall within watercourses and will have an overall footprint above 100 square metres, the exact footprint is to be determined in the EIA Phase.
GN R. 983 of 04 December 2014, as	14	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in	“Dangerous goods” that are likely to be associated with the greater project, are fuel stores during the construction phase

GN No. R.	Activity	Description as per GN	Applicability to the Project
amended (07 April 2017)		containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	or hazardous chemical substances at the substation during the operational phase. Threshold of 80 m <sup>3</sup> expected to be exceeded.
GN R. 983 of 04 December 2014, as amended (07 April 2017)	19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	A few of the proposed tower structures will fall within watercourses and will involve the removal of soil within a watercourse of more than 10 cubic metres.
GN R. 983 of 04 December 2014, as amended (07 April 2017)	27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	Clearance of large areas associated with the construction footprint of the substation.
GN R. 983 of 04 December 2014, as amended (07 April 2017)	28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;  excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	Footprint of project on agricultural land and game farms, outside of an urban area.
GN R. 984 of 04 December 2014, as amended (07 April 2017)	9	The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —	The project involves the proposed construction of a 400kV powerline (outside the urban edge).

GN No. R.	Activity	Description as per GN	Applicability to the Project
		(a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	
GN R. 985 of 04 December 2014, as amended (07 April 2017)	12 (a(ii))	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. e) Limpopo i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans; or iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning. f) Mpumalanga i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans; or iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning or proclamation in terms of NEMPAA.	The proposed development will require the clearance of more than 300 square metres within sensitive areas such as threatened ecosystems, CBAs and conservation areas.
GN R. 985 of 04 December 2014, as	14	The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse;	The proposed development will involve tower structures within watercourses which fall within or near sensitive areas

GN No. R.	Activity	Description as per GN	Applicability to the Project
amended (07 April 2017)		e) Limpopo i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.  f) Mpumalanga i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.	such as protected areas and CBAs.

#### 8.4 National Water Act (Act No. 36 of 1998)

The National Water Act (NWA) (Act No. 36 of 1998) regulates water resources of South Africa. Water is considered a scarce commodity and should therefore be adequately protected. Amongst others, the act deals with the protection of water sources, water uses, water management strategies and catchment management, dam safety and general powers and functions. The purpose of the act is to ensure that South Africa's water resources are protected, used, developed, conserved, managed and controlled. The NWA includes the definition of a Water Resource.

The NWA definition for a Water Resource includes:

1. A Watercourse;
2. Surface Water;
3. An Estuary; and

#### 4. An Aquifer.

The NWA defines a watercourse as follows:

- A river or spring;
- A natural channel in which water flows regularly or intermittently;
- A wetland, lake or dam into which, or from which, water flows; and
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse include, where relevant, its bed and banks.

The Act also specifies that a wetland is defined as land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil. Section 21 of the NWA provides information on what water uses require approval, i.e. a WULA. These include:

- a) Taking water from a water resource;
- b) Storing water;
- c) Impeding or diverting the flow of water in a watercourse;
- d) Engaging in a stream flow reduction activity;
- e) Engaging in a controlled activity;
- f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- g) Disposing of waste in a manner which may detrimentally impact on a water resource;
- h) Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- i) Altering the bed, banks, course or characteristics of a watercourse;
- j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- k) Using water for recreational purposes.

A WULA has been obtained from DWS for the project.

### **8.5 National Environmental Management: Protected Areas Act (Act No. 57 of 2003)**

The aim of the National Environmental Management: Protected Areas Act (Act No. 57 of 2003) is to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and natural seascapes. The purpose of a Protected Environment is amongst others to protect a specific ecosystem outside a special nature

reserve world heritage site or nature reserve and also to ensure the use of the natural resources in the area is sustainable.

The proposed development does not traverse any formally Protected Areas. However, the powerline route falls within a 10km radius of some formal Protected Areas according to the South African National Biodiversity Institute (SANBI).

#### **8.6 National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)**

The National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004) was promulgated for the management and conservation of South Africa's biodiversity through the protection of species and ecosystems and the sustainable use of indigenous biological resources.

The main implication of this Act is the protection of biodiversity. The potential flora and fauna of the proposed site will be discussed further in Section 12. This Act will be considered in the Terrestrial Ecological Assessment to be included in the EIA report.

#### **8.7 National Environmental Management: Air Quality Act (Act No. 39 of 2004)**

The National Environmental Management: Air Quality Act (NEM:AQA) (Act No. 39 of 2004) provides for the setting of national norms and standards for regulating air quality monitoring, management and control and describes specific air quality measures so as to protect the environment and human health or well-being by:

- Preventing pollution and ecological degradation; and
- Promoting sustainable development through reasonable resource use.

It also includes measures for the control of dust, noise and offensive odours that may be relevant to the construction.

#### **8.8 The National Environmental Management Waste Act (Act No. 59 of 2008)**

The National Environmental Management Waste Act (NEM:WA) (Act No. 59 of 2008) regulates waste management in order to protect the health and environment of South African citizens. This is achieved through pollution prevention, institutional arrangements and planning matters, national norms and standards and the licensing and control of waste management activities.

The latest list of waste management activities that have or are likely to have a detrimental effect (GN No. 921 of 29 November 2013) contains activities listed in Categories A and B that

would require licensing from the provincial or national authorities and activities contained in Category C which would require meeting the requirements of various Norms and Standards.

No authorisation will be required in terms of the NEM:WA (Act No. 59 of 2008), as the project will not include any of the listed waste management activities.

### **8.9 Occupational Health & Safety Act (Act No. 85 of 1993)**

The Occupational Health and Safety Act (Act No. 85 of 1993) provides for the health and safety of people at work as well as the health and safety of persons using plant and machinery.

In terms of the Major Hazard Installation (MHI) Regulations (GN R.692 of 30 July 2001), which were promulgated under the Occupational Health and Safety Act (Act No. 85 of 1993), a MHI means an installation:

- Where more than the prescribed quantity of any substance is or may be kept, whether permanently or temporarily; or
- Where any substance is produced, used, handled or stored in such a form and quantity that it has the potential to cause a major incident.

This Act will need to be taken into account should the proposed development be approved.

### **8.10 National Heritage Resources Act (Act No. 25 of 1999)**

The National Heritage Resources Act (Act No. 25 of 1999) was promulgated for the protection of National Heritage Resources and the empowerment of civil society to conserve their heritage resources.

The proposed development will trigger certain categories as listed below that require a Heritage Impact Assessment (HIA) in terms of Section 38 of the National Heritage Resources Act. These categories are:

- (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- (b) the construction of a bridge or similar structure exceeding 50m in length;
- (c) any development or other activity which will change the character of a site
  - (i) exceeding 5 000 m<sup>2</sup> in extent; or
  - (ii) involving three or more existing erven or subdivisions thereof; or
  - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the rezoning of a site exceeding 10 000 m<sup>2</sup> in extent; or

any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

Due to the size of the linear development, a Heritage Impact Assessment would need to be undertaken to assess if any heritage resources occur along the study area, and advise if any permits would be required from MPHRA or SAHRA.

### **8.11 Conservation of Agricultural Resources Act (Act No. 43 of 1983)**

The Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983) requires the maintenance of riparian vegetation and provides a list of invasive alien vegetation that must be controlled or eradicated.

Land Capability is discussed further in Section 12.

### **8.12 National Forestry Act (Act No. 84 of 1998)**

In terms of the National Forests Act (Act No. 84 of 1998), trees in natural forests or protected tree species (as listed in Government Gazette Notice 1012 of 27 August 2004) may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold - except under licence granted by the DAFF.

This Act will be considered during the Terrestrial Ecological Assessment if any Protected Trees are found on the proposed site.

### **8.13 Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)**

The Mineral and Petroleum Resources Development Act (MPRDA) (Act No. 28 of 2002) sets out the requirements with which applicants for prospecting rights, mining rights and mining permits must comply in Sections 16, 22 and 27 of the MPRDA.

A Mining Permit will not be required as there will be no material required from newly opened borrow pits for the proposed development.

## 8.14 Guidelines

- Integrated Environmental Management Information Series, in particular Series 2 – Scoping (DEAT, 2002);
- Guideline on Alternatives, EIA Guideline and Information Document Series (DEA&DP, 2010a);
- Guideline on Need and Desirability, EIA Guideline and Information Document Series (DEA&DP, 2010b);
- Integrated Environmental Management Guideline Series 5: Companion to the EIA Regulations 2010 (DEA, 2010a);
- Integrated Environmental Management Guideline Series 7: Public Participation in the EIA Process (DEA, 2010b); and
- Guidelines for Involving Specialists in the EIA Processes Series (Brownlie, 2005).

## 8.15 Regional Plans

The following regional plans were considered during the execution of the EIA (amongst others):

- Municipal Spatial Development Frameworks (SDF) (where available);
- Municipal Integrated Development Plans (IDP);
- Relevant provincial, district and local policies, strategies, plans and programmes;
- Environmental Management Frameworks (EMF); and
- Mpumalanga Biodiversity Conservation Plan; and
- Limpopo Conservation Plan.

# 9 SCOPING AND EIA PROCESS

## 9.1 EIA Listed Activities, as amended (07 April 2017)

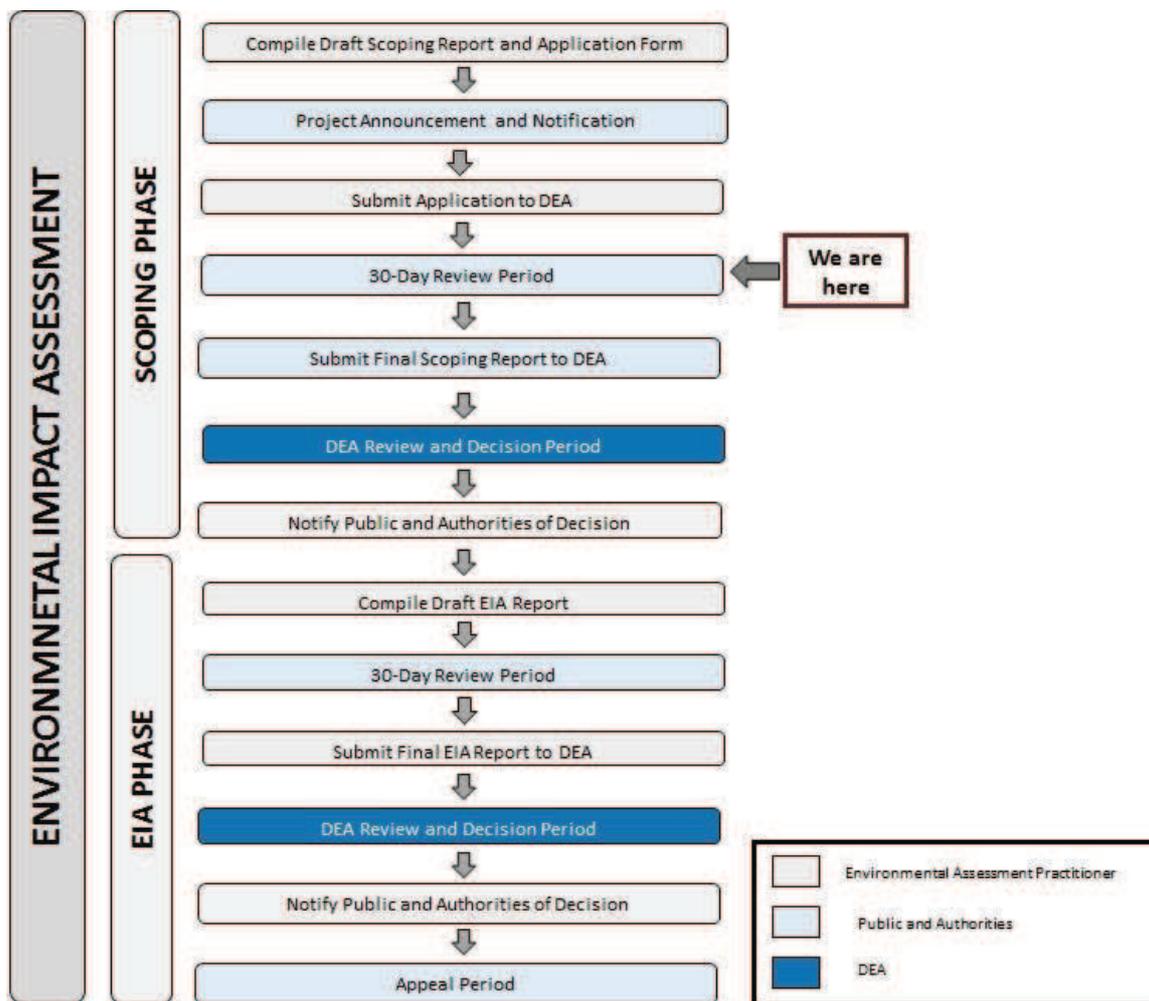
The proposed Emkhiweni Substation and Emkhiweni-Silimela 400kV Line entails certain activities that require authorisation in terms of NEMA. Refer to Section 8 for further discussion on the legal framework.

The process for seeking authorisation is undertaken in accordance with the EIA Regulations (GN No. R. 982, R. 983, R. 984 and R. 985), as amended (07 April 2017), promulgated in terms of Chapter 5 of NEMA.

Based on the types of activities involved which include activities listed in GN No. R. 983, R. 984 and R. 985, as amended (07 April 2017) (see **Table 4**); the requisite environmental assessment for the project is a Scoping and EIA Process.

### 9.2 Formal Process

The environmental assessment process is divided into two phases, namely: 1) Scoping and 2) EIA. An outline of the Scoping and EIA Process for the proposed development is provided in **Figure 8**.



*Figure 8: Scoping and EIA Process*

### 9.3 Competent Authority

In terms of the Regulations, the lead decision-making authority for the Scoping and EIA is the DEA as the project proponent is Eskom Holdings SOC Ltd.

### 9.4 Application Form

The Application for EA for the proposed development will be submitted to DEA at the same time as the DSR. The Acknowledgement Letter of the Application Form will be included in the Final Scoping Report. Refer to **Appendix 6** for a copy of the Application Form.

### 9.5 Scoping Phase

The purpose of Scoping, which constitutes the first phase of the formal EIA Process, is as follows:

1. Introduce the proposed project to all IAPs;
2. Engage with IAPs to allow for participation in the process that is transparent, cooperative, informative and robust;
3. Allow for informed decision-making with regard to the EIA Process;
4. Identify the significant issues and impacts to be investigated further during the execution of the EIA phase;
5. Consider suitable and feasible alternatives for achieving the project's objectives; and
6. Determine the scope of the ensuing EIA phase in terms of specialist studies, public participation, assessment of impacts and appraisal of alternatives.

In order to meet the above, the DSR provides the following information:

- Motivation on the Need and Desirability of the proposed development;
- Clarity on the roles and responsibilities of the various stakeholders in the project;
- Information on the Public Participation Process;
- Information on the Scoping and EIA processes;
- Description on how the proposed development will be undertaken (if approved);
- Information on the legislation that has been considered;
- Information on the Receiving Environment that could be affected by the proposed project;
- Information on Alternatives which are being considered;
- Proposed methodology of assessing the potential impacts during the EIA Phase;
- Findings on the type of Specialist Studies required in the pending EIA Phase; and
- Proposed Plan of Study for the pending EIA Phase of the project.

## 9.6 EIA Phase

The EIA phase, which constitutes the second phase of the formal EIA Process, serves to follow from the Scoping phase and will provide the following:

- A detailed description of the proposed development and location;
- A description of the environment that may be affected by the activity and the manner in which physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed development;
- The methodology of the stakeholder engagement process will be described;
- The Comments and Responses Report and Stakeholder Database will be provided as an appendix to the EIA Report;
- A description of the need and desirability of the proposed development and the identified potential alternatives to the proposed activity;
- A summary of the methodology used in determining the significance of potential impacts;
- A description and comparative assessment of the project alternatives;
- A summary of the findings of the specialist studies (Copies of all specialist reports appended to the EIA report);
- A detailed assessment of all identified potential impacts;
- A list of the assumptions, uncertainties and gaps in knowledge;
- An opinion by the consultant as to whether the development is suitable for approval within the proposed site;
- An Environmental Management Programme (EMPr) that complies with Appendix 4 of GN No. R. 982; and
- Any further information that will assist in decision making by the authorities.

## 9.7 Landowner Notification

The farms that may be affected by the proposed development have been included as part of the Interested and Affected Parties (IAPs) list in **Appendix 7**. Negotiations with the landowners have been completed by Eskom as the walk-down survey of the specialists has been completed.

# 10 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations apply to this Scoping exercise:

- In accordance with the purpose of Scoping, the report does not include detailed specialist investigations on the receiving environment, which will only form part of the EIA Phase. The environment in the project area was primarily assessed in the Scoping Phase through site visits, desktop screening, incorporating existing information from previous studies, and input received from IAPs;
- The GIS versions of data available for the public are assumed to be the latest information provided by the Custodians (such as SANBI); and
- As the design of the project components is still in the preliminary design stage, and due to the dynamic nature of the planning environment, the dimensions and layout of the infrastructure may change as the technical study advances.

## 11 NEED AND DESIRABILITY

In terms of 2 (f) of Appendix 2 of GN No. R. 982, as amended (07 April 2017), this section discusses the need and desirability of the project. The format contained in the Guideline on Need and Desirability (DEA&DP, 2009) has been used in **Table 5**.

**Table 5: Need and Desirability of the proposed Emkhiweni Substation and Emkhiweni-Silimela 400kV powerline**

No.	Question	Response
Need (Timing)		
1.	Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved Spatial Development Framework (SDF) agreed to by the relevant environmental authority? (i.e. is the proposed development in line with the projects and programmes identified as priorities within the IDP).	<p>The Transmission Development Plan (TDP) 2014 – 2023 indicated that Emkhiweni substation integration is required to be commissioned to support Rockdale substation. The TDP also mentioned that the existing Marble Hall and Wolwekraal 132 kV networks will not be capable of supplying the additional load growth beyond 2015 to 2017. This project forms part of the Highveld North-West and Lowveld North Reinforcement within the TDP.</p> <p>Electricity provision is one of the key development priorities of the IDPs for Steve Tshwete LM, Elias Motsoaledi LM and Ephraim Mogale LM.</p>
2.	Should development, or if applicable, expansion of the town/area concerned in terms of this land use (associated with the activity being applied for) occur here at this point in time?	The land in which the proposed Emkhiweni substation falls has already been purchased by Eskom, and is thus not in conflict with the desired state of the land. The proposed powerline is part of a much larger transmission

No.	Question	Response
		network and associated substations in the Mpumalanga and Limpopo Provinces.
3.	Does the community/area need the activity and the associated land use concerned (is it a societal priority)? This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate)	<p>The distribution network in the Marble Hall area is supplied from the Simplon substation, this network is currently experiencing low voltage problems. In future the Simplon and Rockdale substations will supply additional power to the network, however this additional power cannot be supported by the existing network without violating its operational limits. The Emkhiweni-Silimela 400kV powerline provides the means to support the additional power supply within operational limits.</p> <p>The firm capacity at the Rockdale substation is 500MVA and was exceeded in 2007. The new loads at the substation cannot be accommodated without violating the loading conditions of the transformers, which are 45 years old. The existing Rockdale substation also does not have the correct busbar arrangement. If a single transformer is lost, load shedding would be necessary. If a transformer needs to be maintained then this would also result in load shedding. Additional power demands are expected for the Rockdale substation, however due to the abovementioned problems these cannot be accommodated.</p> <p>The proposed solution is the construction of a new substation near to the existing Rockdale substation. This proposed new substation would be known as Emkhiweni and it would serve the following purpose:</p> <ul style="list-style-type: none"> <li>• De-load the Rockdale and Vulcan substations;</li> <li>• Create capacity at the existing substations;</li> <li>• Cater for new loads; and</li> <li>• Improve the reliability in the Middleburg area.</li> </ul>
4.	Are the necessary services with appropriate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?	Yes.
5.	Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services)?	Yes. See response to Item 1.

No.	Question	Response
6.	Is this project part of a national programme to address an issue of national concern or importance?	The development is intended to address Mpumalanga and Limpopo power requirements.
Desirability (Placing)		
7.	Is the development the best practicable environmental option (BPEO) for this land/site?	The EIA undertaken previously for the project (which has lapsed) recommended the proposed powerline route which was authorised by DEA in 2011. Therefore the route is still regarded as the BPEO.
8.	Would the approval of this application compromise the integrity of the existing approved municipal IDP and Spatial Development Framework (SDF) as agreed to by the relevant authorities?	It is not anticipated that the proposed project will contradict or be in conflict with the municipal IDPs and SDFs. See response to no. 2.
9.	Would the approval of this application compromise the integrity of the existing environmental management priorities for the area (e.g. as defined in EMFs), and if so, can it be justified in terms of sustainability considerations?	The compatibility of the project with the Mpumalanga and Limpopo Biodiversity Plan and other environmental management and planning tools will be considered in detail during the EIA phase.
10.	Do location factors favour this land use (associated with the activity applied for) at this place? (this relates to the contextualisation of the proposed land use on this site within its broader context).	Yes, as part of the technical analysis a number of locational factors were considered in selecting the site for the proposed Emkhiweni substation and associated Transmission loop-in lines. The specialist studies, as part of the EIA phase, will further investigate the location based on sensitive environmental features and receptors. See response to no. 7.
11.	How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?	See compilation of significant environmental issues associated with the proposed project contained in Section 14.2.
12.	How will the development impact on people's health and wellbeing (e.g. i.t.o. noise, odours, visual character and sense of place, etc)?	
13.	Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?	Opportunity costs, which are associated with the net benefits forgone for the development, will be considered in the Socio- Economic Study during EIA phase. The affected land is rural in nature and primarily used for agricultural purposes.
14.	Will the proposed land use result in unacceptable cumulative impacts?	Cumulative impacts, as considered in Section 14.3, will be evaluated in the EIA Phase.

## 12 PROFILE OF THE RECEIVING ENVIRONMENT

This section provides a general description of the status quo of the receiving environment in the project area. This serves to provide the context within which the Scoping exercise was conducted. It also allows for an appreciation of sensitive environmental features and possible receptors of the effects of the proposed Emkhiweni Substation and Emkhiweni-Silimela 400kV powerline.

The study area includes the entire footprint of the project components within the identified site boundary. Where necessary, the regional context of the environmental features is also explained, with an ensuing focus on the local surrounding environment. More in-depth discussions on the receiving environment will be provided in the EIA Report, where the findings of the requisite Specialist Studies will be incorporated into the document.

A brief overview is also provided of the manner in which the environmental features may be affected (positively or negatively) by the proposed Emkhiweni Substation and Emkhiweni-Silimela 400kV powerline during the project life-cycle. Key environmental issues are discussed further in Section 14. These preliminary effects are only discussed concisely on a qualitative level, as part of the Scoping phase. The EIA Report will provide a comprehensive evaluation of the potential impacts, and will quantify the effects to the environment based on the methodology presented in Section 15.

The following environmental features have been considered:

1. Climate
2. Geology
3. Soil
4. Topography
5. Surface Water
6. Flora
7. Fauna
8. Land Use
9. Agricultural Land
10. Heritage
11. Air Quality
12. Noise
13. Traffic
14. Visual Quality
15. Socio-Economic Environment

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## 12.1 Climate

### 12.1.1 Status Quo

Climate data was obtained from the South African Weather Service (SAWS) for two weather stations within the project area. Climate data was obtained for Marble Hall for the period 1961 – 1990. The second weather station is called Oudestad and is near Groblersdal, information from this weather station was available for the 1975 – 1990 period. These were the only two weather stations used as they were the only two stations within the project area with the relevant information.

**Tables 6 and 7** show the information provided by SAWS. This information includes air temperature, precipitation and fog, dry and wet bulb temperatures, relative humidity and cloud cover. Both weather stations show warm summers with mild winters. June and July shared the lowest average minimum temperature of 3.8 °C for the Groblersdal station. For the Marble Hall station the lowest average minimum temperature was 2.7 °C in July. The highest temperature recorded at the Groblersdal weather station was 39.7 °C in November 1981. The highest temperature recorded at the Marble Hall station was 41.2 °C in January 1969. The lowest temperature recorded at Marble Hall was –6.6 °C in June 1964. For Groblersdal the lowest temperature was –2.3 °C in June 1980.

The average number of days with fog is very low. The Marble Hall weather station has the highest average number of fog days, for the recorded period, which was 1.7 days in April. The Oudestad weather station does not have any information on snow, the Marble Hall weather station however shows that on average no snow fall occurs in the area. Hail at both weather stations is infrequent. Cloud cover at both stations is low. The dry bulb and wet bulb temperatures are highest in summer and lowest in December.

Table 6: Climate Data from the Marble Hall Weather Station (SAWS 1961 - 1990)

φ = 24°59' S      λ = 29°17' E      HT: 915 m      Period: 1961-1990

AIR TEMPERATURE IN DEGREES CELSIUS																													
AVERAGE OF DAILY				MAXIMUM (TX) P = 23 Years												MINIMUM (TN) P = 23 Years													
MONTH	MAX	MIN	MEAN	RANGE	HIGHEST (TX)			AVERAGE NUMBER OF DAYS WITH TX					LOWEST (TX)				HIGHEST (TN)			AVERAGE NUMBER OF DAYS WITH TN					LOWEST (TN)				
					TX	YY/DD	MEAN	>=35	>=30	>=25	>=20	>=15	<10	MEAN	MIN	YY/DD	MAX	YY/DD	MEAN	>=20	<15	<10	<5	<0	<-5	MEAN	MIN	YY/DD	
J	31,9	18,9	25,4	13,0	41,2	69/14	36,8	5,2	23,8	30,0	30,8	31,0	0,0	25,6	18,5	72/23	25,0	66/17	22,4	10,9	1,5	0,0	0,0	0,0	0,0	15,1	10,0	61/30	J
F	31,7	18,4	25,0	13,2	39,5	84/15	36,1	3,5	20,0	27,5	28,1	28,1	0,1	25,4	21,0	90/08	24,2	77/22	21,8	7,5	1,7	0,0	0,0	0,0	0,0	14,1	10,0	76/21	F
M	30,4	16,9	23,7	13,5	38,1	70/01	34,9	1,5	18,7	30,0	30,9	31,0	0,0	24,5	18,5	75/18	23,3	88/02	20,8	3,4	6,9	0,2	0,0	0,0	0,0	12,4	8,5	67/22	M
A	27,7	12,8	20,2	14,9	36,8	87/08	32,6	0,3	7,8	24,7	29,3	30,0	0,0	20,7	17,0	89/27	21,5	87/09	17,8	0,1	21,7	5,5	0,4	0,0	0,0	7,7	2,5	65/28	A
M	25,4	7,1	16,2	18,3	33,0	87/14	29,6	0,0	1,3	19,1	30,2	31,0	0,0	20,0	16,0	74/17	17,0	88/20	13,2	0,0	30,6	24,6	7,4	0,3	0,0	1,9	-1,3	66/25	M
J	22,4	3,1	12,7	19,3	29,4	66/12	27,1	0,0	0,0	5,1	25,0	29,8	0,0	17,4	12,5	64/18	12,0	89/04	9,5	0,0	30,0	28,9	22,5	5,4	0,1	-1,2	-6,6	64/28	J
J	22,9	2,7	12,8	20,2	32,0	68/28	27,2	0,0	0,1	6,6	28,0	30,8	0,0	18,0	7,0	84/22	13,8	68/29	8,5	0,0	30,9	30,4	23,8	6,0	0,0	-1,1	-4,0	64/06	J
A	25,7	5,8	15,7	19,9	34,7	61/31	31,4	0,0	3,2	18,8	29,5	31,0	0,0	19,3	14,5	83/08	17,5	86/29	13,1	0,0	30,8	27,3	12,0	1,6	0,0	0,5	-4,2	72/03	A
S	29,4	10,9	20,1	18,5	37,5	78/29	35,4	2,7	16,1	25,4	29,3	29,8	0,0	20,4	12,0	74/04	20,8	66/15	17,6	0,1	26,3	11,7	1,4	0,0	0,0	4,8	1,0	78/02	S
O	30,5	14,8	22,6	15,6	40,1	62/17	36,6	5,3	18,0	28,0	30,6	31,0	0,0	21,6	15,8	73/16	23,1	90/07	20,1	1,1	14,6	1,9	0,0	0,0	0,0	8,8	5,0	83/18	O
N	30,2	16,9	23,5	13,2	39,8	66/27	36,4	3,7	17,1	27,1	29,4	29,9	0,0	21,5	14,0	68/17	24,9	85/01	21,3	3,2	5,8	0,1	0,0	0,0	0,0	12,1	8,5	83/10	N
D	31,4	18,2	24,8	13,2	40,0	65/28	36,4	4,7	21,7	29,6	30,9	31,0	0,0	23,6	18,5	66/17	24,5	85/15	21,8	6,8	1,9	0,0	0,0	0,0	0,0	14,1	7,9	70/07	D
YR	28,3	12,2	20,2	16,1	41,2	69/14	38,3	2,7	14,8	27,2	35,2	36,4	0	15,6	7,0	84/22	25,0	66/17	23,1	3,3	20,3	13,1	6,6	1,3	0	-2,2	-6,6	64/28	YR

PRECIPITATION (and FOG)										DRY- AND WETBULB TEMPERATURES,										RELATIVE HUMIDITY and CLOUD COVER											
MONTH		24 HOUR MAX		PRECIPITATION (R mm) P = 24 Years				AVERAGE NO. OF DAYS WITH R (mm) >=				P = 16 Years				TEMPERATURE (°C)						REL. HUM. (%)				CLOUD					
TOT	RXX	YY/DD	MAX	YEAR	MIN	YEAR	AVE				TH	HA	SN	FOG	DRY BULB P = 19 Years			WET BULB P = 19 Years			P = 0 Years				IN EIGHTHS P = 16						
							1	5	10	30					°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C			
J	81	66	62/20	240	1972	27	1984	9,5	18	4	7,8	4,4	2,8	0,4	2,6	0,1	0,0	0,0	23,5	30,7	20,3	22,6							3,8	4,4	J
F	75	81	85/08	182	1975	1	1988	7,4	14	1	6,4	3,4	2,4	0,8	1,8	0,1	0,0	0,0	22,4	30,3	19,6	22,3							3,5	4,2	F
M	49	70	64/14	107	1990	7	1965	6,1	13	1	4,8	2,8	1,5	0,2	1,8	0,2	0,0	0,1	20,9	29,6	18,3	21,4							3,1	3,8	M
A	38	47	74/02	101	1973	0	1987	5,0	13	0	3,9	2,1	1,4	0,2	0,9	0,1	0,0	1,7	16,9	26,8	14,9	19,3							2,8	3,6	A
M	8	21	90/10	57	1985	0	1989	2,3	8	0	1,6	0,6	0,2	0,0	0,5	0,0	0,0	0,4	11,3	24,4	9,3	16,6							1,3	1,8	M
J	5	26	63/12	46	1963	0	1990	1,3	6	0	0,9	0,3	0,1	0,0	0,3	0,0	0,0	1,1	6,7	21,5	4,7	14,3							1,1	1,4	J
J	1	14	63/02	18	1963	0	1989	0,5	3	0	0,3	0,1	0,0	0,0	0,2	0,0	0,0	0,1	6,4	22,3	4,1	13,9							0,8	1,0	J
A	4	20	70/26	20	1970	0	1990	0,8	3	0	0,5	0,2	0,1	0,0	0,3	0,0	0,0	0,1	10,8	25,2	7,6	15,9							0,9	1,1	A
S	17	30	73/28	90	1987	0	1990	1,8	5	0	1,4	0,9	0,7	0,0	0,7	0,1	0,0	0,0	17,1	29,2	13,1	18,3							1,3	1,6	S
O	44	43	64/27	107	1988	9	1965	5,9	11	1	5,0	2,8	1,5	0,2	2,2	0,1	0,0	0,0	21,0	30,2	16,7	19,9							2,7	3,2	O
N	89	60	84/02	145	1983	26	1988	10,3	17	3	8,8	5,5	3,3	0,5	3,2	0,2	0,0	0,0	22,3	29,1	18,7	21,6							3,8	4,5	N
D	105	86	61/01	200	1969	0	1984	9,5	16	0	8,1	5,2	3,3	0,7	2,9	0,0	0,0	0,0	23,4	29,8	19,9	21,8							3,8	3,9	D
YR	516	86	61/01	793	1969	195	1984	6,0	8,7	2,4	4,9	2,8	1,7	3	1,7	1	0	4	16,9	27,4	13,9	19,0							2,4	2,9	YR

Period = years covering the data for all the columns of both tables. P = Average number of years covering the data in the columns concerned. TX = Average maximum, TN = Average minimum air temperature  
 DXX = Highest maximum, MAX = highest in P years. TXN = Lowest maximum, MIN = lowest in P years. TNX = Highest minimum, MAX = highest in P years. TNN = Lowest minimum, MIN = lowest in P years.  
 - = MEAN = AVE = AVERAGE e.g. 08, 14, 20 = MEANS of observations which were made on these hours (SAST). YY/DD = Year/Day of occurrence of the extreme in the previous column.  
 (Number of days (NOD) with TX >= 10) = (NOD in the month - NOD with TX < 10). TH = Thunder, HA = Hail, SN = Snow, FOG = fog. > signifies greater than, >= signifies greater than or equal to.  
 (Number of days (NOD) with TN < 20) = (NOD in the month - NOD with TN >= 20). < signifies less than, <= signifies less than or equal to.



**Table 7: Climate Data from the Oudestad Weather Station in Groblersdal (SAWS, 1975 - 1990)**

AIR TEMPERATURE IN DEGREES CELSIUS																														
	AVERAGE OF DAILY				MAXIMUM (TX) P = 15 Years														MINIMUM (TN) P = 15 Years											
	MAX	MIN	MEAN	RANGE	HIGHEST (TX)			AVERAGE NUMBER OF DAYS WITH TX							LOWEST (TX)				HIGHEST (TN)			AVERAGE NUMBER OF DAYS WITH TN						LOWEST (TN)		
	TX	TX	(TX+TN)/2	TX - TN	MAX	YY/DD	MEAN	>=15	>=20	>=25	>=30	>=35	<10	MEAN	MIN	YY/DD	MAX	YY/DD	MEAN	>=25	<15	<10	<5	<0	<-5	MEAN	MIN	YY/DD		
J	30,6	17,9	24,2	12,7	37,2	83/11	35,2	1,7	18,9	30,1	30,9	31,0	0,0	24,6	20,8	80/23	22,1	83/12	20,9	3,8	1,6	0,0	0,0	0,0	14,5	12,1	77/02	J		
F	30,3	17,4	23,8	12,9	38,0	83/27	34,6	0,9	16,3	27,3	28,2	28,2	0,0	23,8	19,6	76/12	22,7	83/28	20,6	2,2	2,9	0,0	0,0	0,0	13,7	12,4	76/13	F		
M	29,3	15,8	22,6	13,4	36,2	84/02	33,5	0,3	13,3	28,8	30,9	31,0	0,0	23,6	19,4	77/12	21,1	87/17	19,6	0,6	10,5	0,1	0,0	0,0	11,7	9,7	86/27	M		
A	27,4	11,9	19,7	15,5	35,7	87/04	31,8	0,1	5,8	25,2	29,3	30,0	0,0	21,2	16,4	89/27	19,2	87/10	16,8	0,0	25,7	6,9	0,3	0,0	0,0	7,1	2,3	85/08	A	
M	24,9	7,3	16,1	17,6	32,6	87/14	29,4	0,0	0,7	14,8	29,7	31,0	0,0	18,8	15,2	89/29	16,0	79/05	13,1	0,0	30,9	26,1	0,0	0,0	3,2	1,4	77/23	M		
J	21,8	3,8	12,8	18,0	28,3	88/07	26,3	0,0	0,0	3,1	23,3	29,9	0,0	17,1	14,4	84/14	12,2	89/04	9,0	0,0	30,0	29,3	21,5	1,2	0,0	-0,2	-2,3	80/30	J	
J	21,9	3,8	12,8	18,2	27,1	79/20	26,2	0,0	0,0	2,9	25,2	30,7	0,0	17,0	11,0	84/22	11,3	90/19	9,1	0,0	31,0	30,6	23,4	0,3	0,0	0,3	-1,8	89/19	J	
A	24,5	6,5	15,5	18,0	31,7	86/26	30,1	0,0	1,1	14,4	28,3	30,9	0,0	18,8	13,3	77/24	16,5	89/28	11,8	0,0	30,9	27,3	9,2	0,1	0,0	1,4	-0,7	76/13	A	
S	27,4	10,6	19,0	16,8	36,7	78/29	34,4	0,2	9,5	21,4	28,7	29,9	0,0	18,3	13,7	87/28	20,9	76/21	17,0	0,1	27,7	12,2	1,5	0,0	0,0	4,6	0,8	81/02	S	
O	28,6	14,0	21,3	14,6	35,7	89/02	34,5	0,6	12,3	25,7	30,3	31,0	0,0	20,3	17,2	80/30	22,0	83/31	19,5	0,4	19,3	2,2	0,0	0,0	8,8	5,4	75/07	O		
N	29,3	16,2	22,8	13,1	39,7	81/06	35,7	1,8	13,4	26,1	29,4	30,0	0,0	20,8	16,7	76/05	22,4	90/13	20,1	1,2	8,2	0,1	0,0	0,0	11,8	9,4	88/19	N		
D	30,4	17,4	23,9	12,9	37,2	82/18	35,4	1,4	18,6	29,4	30,9	30,9	0,0	23,8	20,4	81/09	22,6	77/08	20,9	2,8	2,3	0,0	0,0	0,0	13,8	11,0	84/26	D		
YR	27,2	11,9	19,5	15,3	39,7	81/06	36,7	7	110	249	345	364	0	15,0	11,0	84/22	22,7	83/28	21,5	11	221	135	62	2	0	-0,5	-2,3	80/30	YR	

PRECIPITATION (and FOG)														DRY- AND WETBULB TEMPERATURES, RELATIVE HUMIDITY and CLOUD COVER																		
MONTH	PRECIPITATION (R mm) P = 14 Years						P = 11 Years				TEMPERATURE (°C)						REL. HUM. (%)				CLOUD											
	24 HOUR MAX		TOTAL PER MONTH / YEAR				AVERAGE NO. OF DAYS WITH R (mm) >=				AVE. NO. OF DAYS WITH		DRY BULB P = 13 Years			WET BULB P = 13 Years			P = 13 Years				IN EIGHTHS P = 13									
	TOT	RXX	YY/DD	MAX	YEAR	MIN	YEAR	0.1	1	5	10	30	TH	HA	SN	FOG	05	14	20	05	14	20	05	10	20	MAX	MIN	05	14	20		
J	89	61	83/13	154	1978	26	1990	12,0	18	7	9,5	4,9	2,8	0,4	9,9	0,2	0,2	22,5	29,1	24,7	19,2	21,1	19,9	76	49	61	96	30	3,7	4,2	3,9	J
F	73	114	76/11	189	1978	11	1988	9,3	15	5	6,7	3,5	1,5	0,5	6,9	0,1	0,2	21,8	28,8	24,1	19,0	21,0	19,7	79	49	62	96	30	3,3	4,3	3,7	F
M	74	70	90/04	133	1984	27	1986	9,1	14	4	7,2	3,7	2,4	0,5	7,6	0,2	0,3	19,9	28,0	22,6	17,8	20,4	18,8	85	48	64	97	29	3,2	4,0	3,2	M
A	22	26	90/25	48	1990	0	1985	5,0	10	0	3,1	1,4	0,8	0,0	2,5	0,0	0,1	16,5	26,6	19,8	14,3	18,1	15,6	85	42	59	97	25	2,0	3,0	2,3	A
M	6	12	85/02	27	1985	0	1986	2,4	8	0	1,5	0,4	0,1	0,0	1,5	0,0	0,0	11,6	24,2	16,1	9,6	15,5	12,0	83	38	55	97	22	1,1	1,7	1,3	M
J	5	11	89/04	24	1989	0	1990	1,5	7	0	1,0	0,5	0,1	0,0	0,5	0,0	0,1	7,7	21,1	12,6	5,8	12,8	8,7	81	38	53	97	21	0,9	1,1	0,8	J
J	3	7	83/25	21	1984	0	1989	0,9	6	0	0,7	0,1	0,0	0,0	0,5	0,0	0,2	7,6	21,1	13,0	5,6	12,9	9,0	79	38	50	97	21	0,8	1,1	0,7	J
A	9	21	77/23	33	1979	0	1986	1,9	7	0	1,4	0,5	0,3	0,0	1,4	0,2	0,0	11,0	23,6	16,2	8,4	14,6	10,9	76	37	45	97	20	1,2	1,5	0,9	A
S	23	43	81/10	92	1987	0	1989	3,3	8	0	2,3	1,3	0,6	0,1	3,8	0,1	0,2	16,1	26,4	19,9	12,5	16,3	13,8	72	37	45	94	17	1,8	2,3	1,8	S
O	65	75	78/12	117	1987	11	1980	8,7	13	4	6,5	3,7	2,2	0,4	6,6	0,5	0,0	19,8	27,6	21,7	15,5	17,8	15,8	68	41	52	96	18	2,8	3,6	3,2	O
N	110	59	86/28	188	1987	43	1982	12,2	19	8	10,2	6,7	3,9	0,5	9,6	0,6	0,0	21,4	28,0	22,9	17,5	19,3	17,8	71	46	59	96	25	3,6	4,1	3,7	N
D	96	71	84/19	192	1977	23	1978	11,9	18	3	9,2	5,0	3,2	0,7	7,7	0,0	0,1	22,3	28,8	23,8	18,7	20,5	19,3	73	47	61	96	27	3,8	4,2	4,0	D
YR	575	114	76/11	674	1987	470	1979	78	95	57	59	32	18	3	59	2	1	16,5	26,1	19,8	13,7	17,5	15,1	78	43	56	96	12	2,4	2,9	2,5	YR

Period = years covering the data for all the columns of both tables. P = Average number of years covering the data in the columns concerned. TX = Average maximum, TN = Average minimum air temperature  
 TXX = Highest maximum, MAX = highest in P years. TXN = Lowest maximum, MIN = lowest in P years. TNX = Highest minimum, MAX = highest in P years. TNN = Lowest minimum, MIN = lowest in P years.  
 -- = MEAN = AVE = AVERAGE e.g. 05, 14, 20 = MEANS of observations which were made on these hours (SAST). YY/DD = Year/Day of occurrence of the extreme in the previous column.  
 (Number of days (NOD) with TX >= 10) = (NOD in the month - NOD with TX < 10). TH = Thunder, HA = Hail, SN = Snow. FOG = fog. > signifies greater than, >= signifies greater than or equal to.  
 (Number of days (NOD) with TN < 20) = (NOD in the month - NOD with TN >= 20). < signifies less than, <= signifies less than or equal to.



### 12.1.2 Potential Impacts/Implications

Greenhouse gases will be emitted during the construction and operational phase primarily from fuel emissions from trucks.

### 12.1.3 Specialist Studies Required

No Specialist Studies are triggered.

## 12.2 Geology

### 12.2.1 Status Quo

The project area falls within the Transvaal Supergroup. This Supergroup overlies the Archaean basement rocks as well as the Witwatersrand and Ventersdorp Supergroups. The Transvaal Supergroup has extensive and well-preserved stromatolites as well as an excellent record of cyanobacteria and bacterial evolution (Johnson *et al.* 2006). This Supergroup has successive carbonate layers overlain by the banded iron formation (BIF). This formation is economically important as it contains some of the world's largest iron and asbestos deposits (Johnson *et al.* 2006).

The project area contains the Black Reef Formation that consists predominantly of relatively mature quartz arenites with lesser conglomerates and subordinate mudrocks (Johnson *et al.* 2006). The project area falls within the Bushveld Complex. This Complex is composed of mafic and felsic rocks and contains the world's largest ore reserves of platinum-group elements, chromium and vanadium.

Within the Bushveld Complex the following suites are found within the project area:

- Rustenburg Layered Suite;
- Lebowa Granite Suite; and
- Rooiberg Group.

The Rooiberg Group occurs mainly above the Rustenburg Layered Suite and is generally composed of siliceous volcanic rocks (Johnson *et al.* 2006). The Rustenburg Layered Suite is composed of the intrusive igneous rock known as diorite (Johnson *et al.* 2006). The Lebowa Granite Suite consists of granitic rocks known as the Nebo Granite. The Nebo Granite is two to three kilometres thick, coarse grained and pink to grey in colour. The minerals consist of alkali feldspar, quartz, hornblende and biotite (Johnson *et al.* 2006).

Within the Emkhiweni-Silimela 400kV Powerline project area there are rocks of the Wilge River Formation of the Waterberg Group as well as the Loskop Formation (Johnson *et al.* 2006). The Wilge River Formation overlies the Loskop Formation. The maximum thickness of the formation is approximately 2 500m. Sandstones dominate this formation and there are

conglomerate interbeds (Johnson *et al.* 2006). The Loskop Formation is up to 1 000m thick to the north of Middelburg. The formation is predominately made up of argillaceous clastic sedimentary rocks with lesser coarse rocks (Johnson *et al.* 2006).

### **12.2.2 Potential Impacts/Implications**

The substation requires the construction of foundations. The depth of the foundations will be determined by the underlying geology and in order to lay the foundations drilling and excavations would be required.

Each power line has four “legs” and each leg has a concrete foundation. The depth of the foundations is determined by the underlying geology. In order to lay these foundations excavations and drilling would be required.

Significant impacts to geology are not expected, however if a pylon needs to be replaced or a pylon foundation needs to be replaced or repaired then the associated drilling and excavations would have a local effect.

### **12.2.3 Specialist Studies Required**

A Geotechnical Study will be required prior to construction commencing so as to inform detailed design.

## **12.3 Soil**

### **12.3.1 Status Quo**

The soil types and depths vary between and along the proposed line. There are areas of rocky outcrops with shallow apedal soils as well as moderately deep to deep soils.

### **12.3.2 Potential Impacts/Implications**

Prior to commencement of construction activities Eskom will undertake the following:

- The servitude will be surveyed and demarcated. The servitude will be cleared. The location of the construction camp, materials lay down areas, and construction roads will be determined and demarcated.
- Vegetation clearing will leave soil bare and susceptible to erosion.

During the construction phase the following activities will be undertaken which may impact on soil:

- Construction material (Pylons, cables, conductors, bird flappers, concrete, etc) will be placed at various locations along the route, at demarcated materials lay down areas. Vegetation cover within this demarcated materials lay down area will be damaged, which could leave soil bare and susceptible to erosion;

- Vehicles travelling on the construction roads, as well as materials stored in the lay down area will cause compaction of soil, which decreases soil fertility;
- Oil or fuel leakages from construction equipment will contaminate soils;
- Accidental spillages of grease and oils used during the construction phase may pollute soils.

Maintenance activities during the operational phase will include:

- Annual / bi-annual inspection of the power line by an Eskom technician;
- Replacement of conductors when necessary;
- Annual burning of the servitude / Bush clearing within servitude in natural veld areas.
  - Burning of vegetation in the servitude should be done shortly prior to the commencement of the rainy season to ensure re-establishment of vegetation cover;
  - No soil impacts are expected during routine maintenance; however, should any repairs be required, impacts as described during the construction phase above will apply.

### **12.3.3 Specialist Studies Required**

The EMPr will contain measures to mitigate against impacts to soil, for example the management of topsoil, preventing soil contamination during construction, etc. A Geotechnical Study will be required prior to construction commencing so as to inform detailed design.

## **12.4 Topography**

### **12.4.1 Status Quo**

Closer to Middelburg the terrain is more flat with gentle slopes. As the routes move north towards Marble Hall the terrain becomes mountainous, refer to **Figures 9** and **10** below.



*Figure 9: Terrain near to and to the north of Middelburg*



*Figure 10: Terrain closer to Marble Hall*

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### 12.4.2 Potential Impacts/Implications

During construction, only the pylon foundations will result in a hard impact footprint which will require excavations and drilling. Surface topography will not be altered as a result and drainage patterns will also not be altered. There are no foreseen impacts to topography during the operational phase.

### 12.4.3 Specialist Studies Required

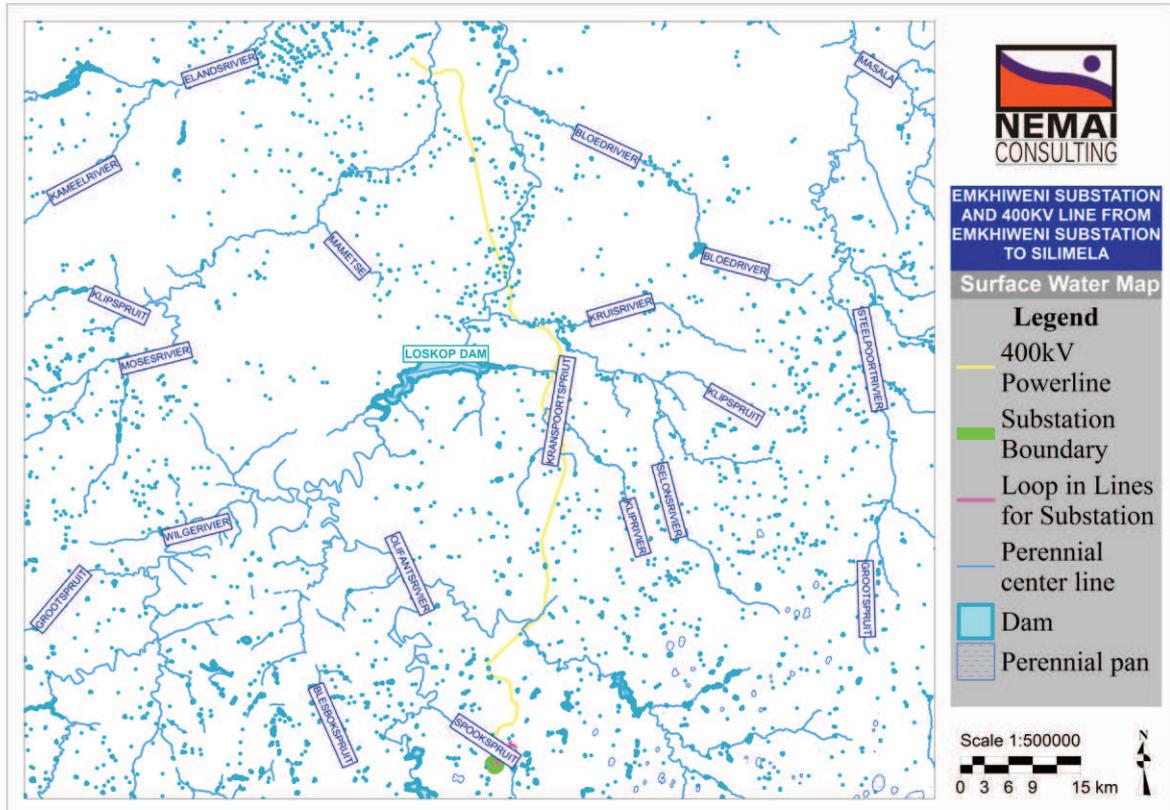
A Visual Impact Assessment will be undertaken.

## 12.5 Surface Water

### 12.5.1 Status Quo

There are several watercourses within the study area (**Figure 11**). The proposed line crosses several of these, which include two unknown rivers that are crossed twice each, the Kliprivier which is also crossed twice, the Selonsrivier which is crossed once and Olifantsrivier which is crossed once.

Note: Pylons should not be placed within the 1:100 year floodline of any watercourse or within wetlands and their buffer zones. So that this would not occur, the walk-down completed by the specialists will map the watercourses, including wetlands and their buffer zones and designate these as no go zones. If it is found that there is no alternative but to place pylons within the 1:100 year floodline a Water Use License will be applied for.



**Figure 11: Surface water**

### 12.5.2 Potential Impacts/Implications

During Pre-Construction and Construction the following impacts may occur:

- Water may be illegally abstracted from water bodies for construction activities such as dust suppression;
- Construction workers may use local rivers for washing their clothes;
- Servitude clearing would increase surface water runoff;
- Vegetation clearing of the substation and loop-on line construction footprint would increase surface water runoff;
- Soil erosion from servitude clearing and the construction of the access roads would increase sedimentation in local rivers;
- Spillages of construction related material such as fuel, oil, paint and grease and leaks from construction vehicles may pollute both ground and surface water;
- Construction materials including any waste may be dumped in or near waterbodies. The contractor must supply suitable litter receptacles and chemical toilets; and

- When stringing pylons across rivers the construction crew may take a “shortcut”: instead of driving to either side of the riverbank across established access roads, the crew may drive through a low-lying river. This must be strongly discouraged.

During routine maintenance water may be impacted by the following:

- Herbicide runoff from servitude clearing (including spraying for alien weeds) would lead to water quality deterioration;
- Servitude clearing would increase surface water runoff and sedimentation in local waterbodies;
- Fuel leaks from maintenance vehicles or spills of materials such as oil during maintenance would result in a local decrease in water quality; and
- Waste or maintenance material may be dumped in local waterbodies.

### 12.5.3 Specialist Studies Required

A River Health Impact Assessment and Wetland/Riparian Habitat Delineation will be undertaken.

## 12.6 Flora

### 12.6.1 Status Quo

The Emkhiweni Substation and Emkhiweni-Silimela 400kV powerline falls into two of South Africa’s nine biomes, the Savanna and Grassland biomes. According to Mucina and Rutherford the Savanna and Grassland biomes are the two largest biomes in South Africa. Thirty three percent of the vegetation in South Africa is part of the Savanna biome and 27.9% is Grassland (Mucina and Rutherford, 2006).

The Savanna Biome consists of 87 different vegetation units and the Grassland Biome consists of 72. The following vegetation units have been identified for the project area:

- Rand Highveld Grassland (Grassland biome);
- Central Sandy Bushveld (Savanna biome);
- Loskop Mountain Bushveld (Savanna biome); and
- Loskop Thornveld (Savanna biome) (Mucina and Rutherford, 2006).

These vegetation units are described in more detail below.

#### Rand Highveld Grassland

This vegetation unit is widely distributed and occurs in the Mpumalanga, Gauteng, the North West and Free State Provinces. The altitude occupied by the vegetation unit ranges between 1 300 – 1 635 meters above mean sea level (mamsl) but may reach as much as 1 760m in

places (Mucina and Rutherford, 2006). The quality of the soils of this unit varies. The geology includes quartzite ridges of the Witwatersrand Supergroup and the Pretoria Group and the Selons River Formation of the Rooiberg Group (Mucina and Rutherford, 2006).

The landscape of this vegetation unit is highly variable. It consists of extensive sloping plains and a series of ridges that are slightly elevated over the undulating surrounding plains (Mucina and Rutherford, 2006). This vegetation unit is species rich. Wiry sour grassland alternates with low, sour shrubland on rocky outcrops and steeper slopes (Mucina and Rutherford, 2006). The unit receives summer rainfall and the winters are very dry. Frost does occur in this unit, the number of days per year with frost is higher in the west (30 – 40 days) than in the east (10 – 35 days) (Mucina and Rutherford, 2006).

The vegetation unit is considered endangered, of a targeted 24%, only one percent is conserved. Small patches of the unit are conserved in the statutory reserves of Kwaggavoetpad, Van Riebeeck Park, Bronkhorstspuit and Boskop Dam Nature Reserve, as well as in private conservation areas such as Doornkop, Zemvelo, Rhenosterpoort and Mpopomeni. Almost half of this unit has been transformed, predominantly by plantations, urbanisation or dam building (Mucina and Rutherford, 2006). Approximately seven percent of the vegetation unit has scattered aliens, the main alien species is *Acacia mearnsii* (Mucina and Rutherford, 2006). Approximately seven percent of the unit has been subjected to moderate to high erosion levels (Mucina and Rutherford, 2006).

#### Central Sandy Bushveld

This vegetation unit can be found in the Limpopo, Gauteng, North West and Mpumalanga Provinces. The altitude of the vegetation unit ranges between 850 – 1 450 mamsl (Mucina and Rutherford, 2006). The landscape features of this unit consist of low undulating areas, sometimes between mountains, sandy plains and catenas (Mucina and Rutherford, 2006). The southern and eastern parts of this area are underlain by granite of the Lebowa Granite Suite as well as some granophyre of the Rashedoop Granophyre Suite, both of which are part of the Bushveld Complex. In the north are sedimentary rocks of the Waterberg Group (Mucina and Rutherford, 2006). This vegetation unit receives summer rainfall and has very dry winters. Frost in the unit is infrequent (Mucina and Rutherford, 2006).

The vegetation unit is considered vulnerable, of a targeted 19%, less than three percent is statutorily conserved. An additional two percent is conserved in a grouping of private game reserves and the Wallmansthal South African National Defence Force (SANDF) property (Mucina and Rutherford, 2006). Approximately 24% of the vegetation unit has been transformed, this includes nineteen percent from cultivation and four percent for urban and other built up uses (Mucina and Rutherford, 2006). There are several alien plants scattered at a low density throughout the unit. These aliens include; *Cereus jamacaru*, *Eucalyptus* spp.,

*Lantana camara*, *Melia azedarach*, *Opuntia ficus-indica* and *Sesbania punicea* (Mucina and Rutherford, 2006).

#### Loskop Mountain Bushveld

This vegetation unit is distributed within the Mpumalanga, Gauteng and Limpopo Provinces (Mucina and Rutherford, 2006). The typical landscape features of this vegetation unit are low mountains and ridges (Mucina and Rutherford, 2006). Rhyolite of the Selons River Formation (Rooiberg Group, Transvaal Supergroup) and sandstone with conglomerate and minor shale from the Wilge River Formation (Mokolian Waterberg Group) form part of the geology of the vegetation unit (Mucina and Rutherford, 2006). The unit falls within a summer rainfall area with very dry winters. Frost in this vegetation unit is infrequent (Mucina and Rutherford, 2006).

The conservation status of this vegetation unit has been determined to be least threatened. A target to conserve 24% of the unit was not achieved. Fifteen percent of the unit is conserved by the State, predominately in the Loskop Dam and Mabusa Nature Reserves. An additional 20% is conserved in other reserves. Less than three percent of the unit has been transformed. The main causes of transformation are cultivation and for urban and built up uses (Mucina and Rutherford, 2006). Erosion in the unit is very low to low (Mucina and Rutherford, 2006).

#### Loskop Thornveld

This thornveld is distributed primarily in Mpumalanga Province and marginally in Limpopo Province. The unit is distributed mainly over the valleys and plains of part of the upper Olifants River Catchment. The altitude of this unit ranges between 950 – 1 300 mamsl (Mucina and Rutherford, 2006). The geology of the unit includes the Rustenburg Layered Suite, Bushveld Igneous Complex and the Transvaal Supergroup (Mucina and Rutherford, 2006). The Loskop Thornveld vegetation unit falls within a summer rainfall area that has very dry winters. Frost in this vegetation unit is infrequent (Mucina and Rutherford, 2006).

The vegetation unit is considered vulnerable. The conservation target of this unit is 19%, however eleven percent is conserved in the Loskop Dam Nature Reserve (Mucina and Rutherford, 2006). The most common cause of transformation in this unit is for crops such as maize, citrus, cotton, grapes and wheat (Mucina and Rutherford, 2006). There are alien species within this vegetation unit and these include *Cereus jamacaru*, *Opuntia ficus-indica*, *Melia azedarach*, *Lantana camara* and *Solanum seafortianum* (Mucina and Rutherford, 2006).

#### Red Data Plant Species

There are red data plant species within Limpopo and Mpumalanga. These have been provided in **Tables 8** and **9** below. The probability of these species occurring within the study area will be provided by the specialist flora assessment that will be included within the Environmental Impact Assessment Report.

**Table 8: Red Data Plant Species for Limpopo (Victor, 2002)**

Extinct and Threatened Plant Species	Lower Risk Plant Species	Data Deficient
<i>Aloe monotropa</i>	<i>Aloe vryheidensis</i>	<i>Aloe vogtsii</i>
<i>Aloe petrophila</i>	<i>Angraecum chamaenanthus</i>	<i>Oberonia disticha</i>
<i>Aloe soutpansbergensis</i>	<i>Ansellia Africana</i>	
<i>Aloe thompsoniae</i>	<i>Bonatea speciosa</i>	
<i>Aloe vossii</i>	<i>Brachystelma gemmeum</i>	
<i>Ceropegia cimiciodora</i>	<i>Brachystelma inconspicuum</i>	
<i>Ceropegia insignis</i>	<i>Brachystelma minor</i>	
<i>Raphionacme chimanimaniana</i>	<i>Brachystelma pilosum</i>	
<i>Aster nubimontis</i>	<i>Calanthe sylvatica</i>	
<i>Felicia fruticosa</i> subspecies <i>brev,</i> <i>pedunculata</i>	<i>Ceropegia stentiae</i>	
<i>Inezia speciosa</i>	<i>Ceropegia turricula</i>	
<i>Phymaspermum argenteum</i>	<i>Costularia natalensis</i>	
<i>Cucumis humifructus</i>	<i>Cuscuta kilimanjari</i>	
<i>Angraecum stella-africae</i>	<i>Disa extinctoria</i>	
<i>Bonatea saundersiae</i>	<i>Disa rhodantha</i>	
<i>Dispersis virginalis</i>	<i>Disa stachyoides</i>	
<i>Eulophia coddii</i>	<i>Disa welwitschii</i>	
<i>Eulophia leachii</i>	<i>Disa woodii</i>	
<i>Holothrix randii</i>	<i>Eulophia cooperi</i>	
	<i>Habenaria humilior</i>	
	<i>Habenaria kraenzliniana</i>	
	<i>Inula paniculata</i>	
	<i>Ipomoea stenosphon</i>	
	<i>Jumellea walleri</i>	
	<i>Lobelia erinus</i>	
	<i>Neobolusia tysonii</i>	
	<i>Nervilia bicarinata</i>	
	<i>Oreosyce africana</i>	
	<i>Paralepistemon shirensis</i>	

Extinct and Threatened Plant Species	Lower Risk Plant Species	Data Deficient
	<i>Pentatrichia alata</i>	
	<i>Polystachya albescens</i>	
	<i>Schizochilus cecillii</i>	
	<i>Schizochilus zeyheri</i>	
	<i>Schoenoxiphium lehmannii</i>	
	<i>Scirpus varius</i>	

**Table 9: Red Data Plant Species for Mpumalanga (Victor, 2002)**

Extinct and Threatened Plant Species	Lower Risk Plant Species	Data Deficient
<i>Aloe albida</i>	<i>Aloe affinis</i>	<i>Aloe modesta</i>
<i>Aloe fouriei</i>	<i>Aloe vryheidensis</i>	<i>Cyphia bolusii</i>
<i>Aloe hardyi</i>	<i>Angraecum chamaenthus</i>	<i>Schizochilus lilacinus</i>
<i>Aloe nubigena</i>	<i>Ansellia Africana</i>	
<i>Aloe reitzii</i>	<i>Bonatea speciosa</i>	
<i>Aloe simii</i>	<i>Brachystelma gemmeum</i>	
<i>Aloe thorncroftii</i>	<i>Brachystelma longifolium</i>	
<i>Brachystelma discoideum</i>	<i>Bracystelma parvulum</i>	
<i>Brachystelma dyeri</i>	<i>Brownleea recurvata</i>	
<i>Disa amoena</i>	<i>Calanthe sylvatica</i>	
<i>Disa clavicornis</i>	<i>Ceropegia turricula</i>	
<i>Disa maculomarronina</i>	<i>Costularia natalensis</i>	
<i>Helichrysum aureum</i> variety <i>argenteum</i>	<i>Cyrtanthus bicolor</i>	
<i>Holothrix culveri</i>	<i>Cyrtanthus epiphyticus</i>	
<i>Hypoxis patula</i>	<i>Disa extinctoria</i>	
<i>Lobelia stricklandae</i>	<i>Disa nervosa</i>	
<i>Lobelia trullifolia</i> subspecies <i>delicatula</i>	<i>Disa rhodantha</i>	
<i>Nerine gracilis</i>	<i>Disa stachyoides</i>	
<i>Senecio eminens</i>	<i>Disa thodei</i>	
	<i>Disa woodii</i>	
	<i>Disa zuluensis</i>	

Extinct and Threatened Plant Species	Lower Risk Plant Species	Data Deficient
	<i>Dispersis concinna</i>	
	<i>Dispersis cooperi</i>	
	<i>Dispersis tysonii</i>	
	<i>Dispersis wealei</i>	
	<i>Eulophia cooperi</i>	
	<i>Eulophia zeyherianca</i>	
	<i>Haemanthus paucifolius</i>	
	<i>Helichrysum mariepsopicum</i>	
	<i>Helichrysum milleri</i>	
	<i>Inula paniculata</i>	
	<i>Lobelia erinus</i>	
	<i>Monopsis kowynensis</i>	
	<i>Neobolusia tysonii</i>	
	<i>Nerine pancratioides</i>	
	<i>Nervilia bicarinata</i>	
	<i>Nervilia kotschyi</i>	
	<i>Pentatrachia alata</i>	
	<i>Polystachya albescens</i>	
	<i>Satyrium microrrhynchum</i>	
	<i>Schizochilus cecilii</i>	
	<i>Schizochilus crenulatus</i>	
	<i>Schizochilus flexuosus</i>	
	<i>Schizochilus zeyheri</i>	
	<i>Schoenoxiphium lehmannii</i>	
	<i>Scirpus varius</i>	
	<i>Senecio medley-woodii</i>	

## Vegetation and Powerlines

There are several ways in which vegetation can affect power line functioning, these are:

- Trees growing into the safe clearance zone may cause flashovers;
- Large trees falling on overhead lines can cause a short circuit; and
- Fires that cause structural damage to pylons are rare. A more likely impact would be where the fuel loads are amenable to the creation of thick smoke. This can short circuit the lines and result in faults and interruptions.

Power lines on the other hand can affect the vegetation in several ways, such as:

- The clearing of vegetation within the servitude. The clearing, combined with controlled burning to keep the fuel loads within the servitude low may result in a change of the community structure and affect the overall ecological integrity of the vegetation; and
- The soil disturbance and change in vegetation structure would allow the encroachment of alien vegetation.

### **12.6.2 Potential Impacts/Implications**

There are several direct impacts that would occur during the construction phase. One of these impacts is habitat destruction with the removal and damage of vegetation through soil stripping. Red Data List species may be directly removed from the servitude either through servitude clearance or theft by construction crews. Floral communities may be impacted through vegetation removal and site disturbances leading to shifts in floral community and habitat unit structures, the indiscriminate collecting and harvesting of floral species by construction teams and through construction activities that will destroy various floral species.

The movement of heavy machinery will result in soil compaction that will modify habitats, destroy vegetation and inhibit re-vegetation. Pollution of soils due to oil/fuel leaks and wastes that will affect floral species. Erosion of stockpiled topsoil and the disturbance of soils due to vegetation stripping will lead to habitat inundation and potential smothering of wetland species and other vegetation.

Other construction activities would negatively impact the flora along this line alternative. For example the proposed expansion of the mines near Middelburg would occur within an endangered vegetation type.

A power line project may affect biodiversity through the encroachment of exotic vegetation following soil disturbance, in addition the maintenance of the servitude would disturb naturalised species within the re-established habitat type of the servitude. Combined with the existing power line and road servitudes, the degree of alien encroachment within the region is increased.

### 12.6.3 Specialist Studies Required

The Terrestrial Ecological Impact Assessment will assess the status of the sensitive ecological features. Areas to be affected by project activities and infrastructure have been surveyed to identify sensitive and significant floral species. Suitable mitigation measures will be identified and recommendations will be made to address potential impacts.

## 12.7 Fauna

### 12.7.1 Status Quo

A search of the South African National Biodiversity Institute (SANBI) database did not reveal any records of endangered species within the vegetation units mentioned above. The database does however have endangered species for the Limpopo and Mpumalanga Provinces. As faunal species have the potential to disperse the species in **Table 10** and **11** should be considered during a specialist assessment.

*Table 10: Red Data Fauna Species for Limpopo (SANBI, 2008)*

Critically Endangered		Endangered	
Scientific Name	Common Name	Scientific Name	Common Name
No record of Critically Endangered species in Limpopo		<i>Anthropoides paradiseus</i>	Blue Crane
		<i>Damaliscus lunatus lunatus</i>	Tsessebe
		<i>Ephippiorhynchus senegalensis</i>	Saddlebilled Stork
		<i>Gyps coprotheres</i>	Cape Vulture
		<i>Lycaon pictus</i>	African Wild Dog
		<i>Neamblysomus gunningi</i>	Gunning's Golden Mole
		<i>Petrodomus tetradactylus</i>	Four-toed Elephant Shrew
		<i>Scotopelia pelia</i>	Pel's Fishing Owl

Protected		Vulnerable	
Scientific Name	Common Name	Scientific Name	Common Name

Critically Endangered		Endangered	
Scientific Name	Common Name	Scientific Name	Common Name
<i>Aonyx capensis</i>	African clawless Otter	<i>Acinonyx jubatus</i>	Cheetah
<i>Aterlerix frontalis</i>	South African Hedgehog	<i>Aegypius occipitalis</i>	Whiteheaded Vulture
<i>Ceratotherium simum</i>	Southern White Rhinoceros	<i>Ceropithecus mitis</i>	Samango Monkey
<i>Circus ranivorus</i>	African Marsh Harrier	<i>Ciconia nigra</i>	Black Stork
<i>Connochaetes gnou</i>	White-tailed gnou	<i>Cricetomys gambianus</i>	Giant Rat
<i>Crocuta crocuta</i>	Spotted Hyena	<i>Hippotragus equinus</i>	Roan Antelope
<i>Hyaena brunnea</i>	Brown Hyena	<i>Manis temmenckii</i>	Pangolin
<i>Loxodonta africana</i>	Elephant	<i>Neamblysomus julianae</i>	Juliana's Golden Mole
<i>Lutra maculicollis</i>	Spotted-necked Otter	<i>Neotragus moschatus zuluensis</i>	Livingstone's Antelope
<i>Raphicerus sharpie</i>	Sharp's Grysback	<i>Panthera leo</i>	Lion
<i>Redunca arundinum</i>	Southern Reedbuck	<i>Panthera pardus</i>	Leopard
<i>Vulpes cama</i>	Cape Fox	<i>Tyto capensis</i>	African Grass-Owl

Table 11: Red Data Fauna Species for Mpumalanga (SANBI, 2008)

Critically Endangered		Endangered	
Scientific Name	Common Name	Scientific Name	Common Name
<i>Chrysopalax villosus</i>	Rough-haired Golden Mole	<i>Amblysomus robustus</i>	Robus Golden Mole
<i>Hirundo atrocaerulea</i>	Blue Swallow	<i>Anthropoides paradiseus</i>	Blue Crane
		<i>Damaliscus lunatus lunatus</i>	Tsessebe
		<i>Ephippiorhynchus senegalensis</i>	Saddlebilled Stork

Critically Endangered		Endangered	
Scientific Name	Common Name	Scientific Name	Common Name
		<i>Gyps africanus</i>	White-backed Vulture
		<i>Gyps coprotheres</i>	Cape Vulture
		<i>Lycaon pictus</i>	African Wild Dog
		<i>Ourebia ourebi</i>	Oribi
		<i>Scotopelia peli</i>	Pel's Fishing-owl

Protected		Vulnerable	
Scientific Name	Common Name	Scientific Name	Common Name
<i>Aonyx capensis</i>	African clawless Otter	<i>Acinonyx jubatus</i>	Cheetah
<i>Aterlerix frontalis</i>	South African Hedgehog	<i>Aegyptius occipitalis</i>	Whiteheaded Vulture
<i>Cannochaetes gnou</i>	Black Wildebeest	<i>Ceropithecus mitis</i>	Samango Monkey
<i>Ceratotherium simum</i>	Southern White Rhinoceros	<i>Ciconia nigra</i>	Black Stork
<i>Circus ranivorus</i>	African Marsh Harrier	<i>Eupodotis caerulea</i>	Blue Korhaan
<i>Crocuta crocuta</i>	Spotted Hyena	<i>Hippotragus equinus</i>	Roan Antelope
<i>Felix nigripes</i>	Black-footed Cat	<i>Manis temmenckii</i>	Pangolin
<i>Hyaena brunnea</i>	Brown Hyena	<i>Neamblysomus julianae</i>	Juliana's Golden Mole
<i>Leptailurus serval</i>	Serval	<i>Panthera leo</i>	Lion
<i>Loxodonta africana</i>	Elephant	<i>Panthera pardus</i>	Leopard
<i>Lutra maculicollis</i>	Spotted-necked Otter	<i>Tyto capensis</i>	African Grass-Owl
<i>Neotis denhami</i>	Stanley's Bustard		
<i>Raphicerus sharpie</i>	Sharp's Grysback		
<i>Redunca arundinum</i>	Southern Reedbuck		
<i>Redunca arundinum</i>	Common Reedbuck		
<i>Vulpes cama</i>	Cape Fox		

### 12.7.2 Potential Impacts/Implications

The following potential impacts may occur:

- Vegetation removal and soil and rock removal from the construction of access roads, the clearing of the servitude and the establishment of construction camps and material lay-down areas would lead to habitat loss;
- The inclusion of RDL species in vegetation removal or habitat destruction leading to RDL species displacement;
- The destruction of nests when vegetation is being cleared;
- Vegetation removal and site disturbances leading to shifts in floral community and habitat unit structures. This would shift the faunal communities dependent on the habitat;
- Depletion of biodiversity through indiscriminate collecting and hunting by construction teams;
- Disturbances through construction activities that will displace various faunal species;
- Movement of heavy machinery leading to soil compaction that will modify habitat and subsequently affect soil-dwelling organisms;
- Pollution of soils due to oil/fuel leaks and wastes that will affect soil-dwelling organisms as well as potential contamination of nearby watercourses and wetlands;
- Erosion of stockpiled topsoil and disturbance of soils due to vegetation stripping leading to erosion and habitat inundation and potential siltation on wetland and aquatic habitats; and
- Construction activities altering soil conditions, hydrological features and topography from the movement of heavy machinery, leading to loss of wetland functionality. This will affect wetland-dependent faunal species.

Impacts to avifauna from construction activities would include the following:

- Vegetation removal and associated habitat destruction would lead to habitat loss;
- The inclusion of RDL species nesting sites in vegetation removal or habitat destruction leading to RDL species displacement;
- The destruction of nests when vegetation is being cleared;
- Vegetation removal and site disturbances leading to shifts in floral community and habitat unit structures. This would shift the avifaunal communities dependent on the habitat;
- Depletion of avifaunal biodiversity through indiscriminate collecting and hunting by construction teams; and
- Disturbances through construction activities that will displace various avifaunal species.

Fauna impacts during Operation include:

- Exotic vegetation encroachment following soil disturbances leading to the displacement of habitat specialists;
- The collision of avifaunal species with overhead lines;
- The maintenance of the servitude will further disturb naturalized species within the re-established habitat type of the servitude; and
- Livestock may wander through open servitude gates.

There are several potential avifauna impacts during the Operation phase, these include:

- Exotic vegetation encroachment following soil disturbances may lead to the displacement of habitat specialists;
- The collision of avifaunal species with overhead lines; and
- The maintenance of the servitude may further disturb naturalized species within the re-established habitat type of the servitude.

### **12.7.3 Specialist Studies Required**

The Terrestrial Ecological Impact Assessment and Avifauna Impact Assessment will assess the status of the sensitive ecological features. Areas to be affected by project activities and infrastructure have been surveyed to identify sensitive and significant floral species. Suitable mitigation measures will be identified and recommendations will be made to address potential impacts.

## **12.8 Land Use**

### **12.8.1 Status Quo**

The powerline passes over a range of different land uses. The line starts in Middelburg and ends in Marble Hall. These towns have all the associated land uses, i.e. residential, parks, businesses, etc. Between the towns the land is primarily used for agricultural purposes and as game farms.

The proposed site for the Emkhiweni Substation is used for agricultural purposes.

### **12.8.2 Potential Impacts/Implications**

During construction there would be the temporary loss of land to construction camps along the servitude. During construction there would be the temporary loss of land to construction camps along the loop-in lines and the substation.

During the operation of the power line and loop-in line, development is not allowed within 55m of the servitude therefore this places a constraint on future developments within the vicinity of the power line. Developments that may be constrained include the expansion of residential

areas, the expansion of hunting camps and irrigation infrastructure. The power lines would interfere with hunting activities using helicopter. The operation of the substation would result in the permanent loss of land for the substation site (agricultural fields).

Routine maintenance is not expected to have an impact on the land use.

### **12.8.3 Specialist Studies Required**

An Agricultural Impact Assessment will be undertaken.

## **12.9 Agricultural Land**

### **12.9.1 Status Quo**

The land along the power line route is used for various agricultural activities, these include, but are not limited to:

- Maize;
- Sunflowers;
- Cotton;
- Tobacco;
- Wheat; and
- Citrus.

During previous public participation for the project, the potential impact of the power line on livestock, game and crops were raised. A report was compiled by Empetus Close Corporation in 2006 for Eskom Holdings Ltd. with the aim of assessing the potential impact of Electro Magnetic Fields (EMF) on flora and fauna. This report found that studies on behaviour, reproduction, health, and milk and meat production showed minimal or no effects of EMF on animals. With regard to plant growth, crop production and seed germination, Empetus Close Corporation could not find recent studies of plants growing near transmission lines, however past studies showed that there was no significant effect on plants growing near transmission lines. Calculations of electric and magnetic field levels created by overhead power lines have shown that areas where members of the public may be exposed (at the servitude boundary and further away from the line) are well within the International Commission for Non- Ionising Radiation Protection (ICNIRP) guidelines. The ICNIRP is endorsed by the Department of Health.

### **12.9.2 Potential Impacts/Implications**

During construction, access to the servitude would, in places, need to be through private property. In these circumstances property gates must be closed to prevent game or livestock leaving the property.

During construction there would be the temporary loss of agricultural land as the pylon locations need to be cleared and material lay down areas are needed.

The construction activities have several impacts on soil that affect its fertility and consequently agricultural yield, these include:

- Soil compaction by construction vehicles and material lay down areas;
- Soil contamination from fuel and oil leaks and oil and grease spills; and
- The removal of topsoil and subsequent improper reinstatement during rehabilitation.

The presence of construction machinery and workers may disturb livestock and game. In areas where this may occur, the lay down areas and construction material must be fenced and the construction workers restricted to the construction footprint. Construction workers must be prohibited from interfering with stock and game animals. The construction workers may steal stock animals, game animals or agricultural produce. This must be strictly prohibited, any complaints from landowners must be documented and followed up.

Servitude access is necessary for routine maintenance. Access gates must always be kept closed to ensure game and livestock do not escape.

The power line is a point impact development and most forms of agriculture can occur beneath the pylons and lines. The exception is crops that require irrigation infrastructure such as pivots as irrigation infrastructure is not allowed beneath the power lines. Therefore for the life of the power line, irrigation infrastructure cannot be installed or operated within the servitude.

The disturbance to the soil during construction and improper rehabilitation may allow the introduction of invasive weed species into the disturbed areas. These must be identified during the routine maintenance inspections and removed so that they do not spread to natural areas or areas under agriculture.

Game farming by helicopter would be negatively impacted as game flushed across the power line servitudes cannot be properly followed. This is because the helicopter descends to spot and flush the game and then flies over the power line to re-descend to hunt the game. In addition tourists would prefer to hunt in a pristine area rather than one with a power line servitude.

Arcing across power line infrastructure may interfere with electrical equipment such as Global Positioning Systems (GPS's) and radio's (other equipment not used for agriculture that may be impacted includes televisions and internet services). Arcing is primarily the result of broken, improperly installed or loose hardware. Reports of interference with electrical equipment must be treated seriously by Eskom and investigated promptly.

### **12.9.3 Specialist Studies Required**

An Agricultural Impact Assessment will be undertaken.

## **12.10 Heritage**

### **12.10.1 Status Quo**

The South African Heritage Resources Agency (SAHRA) has developed a guideline document identifying heritage resources within the country. There are several provincial heritage sites within the project area (SAHRA, 2007). These include:

- The cycad in Bankfontein;
- Fort Merensky and the Botshabelo Mission Station;
- Mapoch's Caves in Roos Senekal;
- Dutch Reformed Church in Joubert Street, Middelburg;
- Meyer Bridge, Middelburg;
- NZASM Station, Middelburg; and
- Merensky Reef, Sekhukhune District.

None of the above would be directly impacted by the powerline.

### **12.10.2 Potential Impacts/Implications**

During construction historical resources may be impacted through inadvertent destruction or damage, this includes the excavation of sub-surface graves. This report recommends that a heritage specialist participate in the walk-down survey in order to identify and demarcate artefacts of historical or archaeological importance. These will either, at the recommendation of the specialist, be avoided (moving the pylon location) or sent to a museum. An archaeologist will be put on stand-by for the possibility of uncovering sub-surface graves.

### **12.10.3 Specialist Studies Required**

Due to the size and length of the proposed development for the area to be transformed for the development, a Phase 1 HIA will be required as the development triggers Section 38 (1) of the National Heritage Act (Act No. 25 of 1999).

## **12.11 Air Quality**

### **12.11.1 Status Quo**

There are several sources of air pollution in Mpumalanga and these include: industry, agriculture, veld fires, mining, power generation and vehicle use (Mpumalanga Department of Agriculture, Conservation and Environment, 2003). In terms of the Air Quality Act (Act 39 of 2004) the Highveld Priority Area was declared a national pollution hotspot in November 2007. This priority area includes the towns of Middleburg and Witbank and therefore part of the power line route of both alternatives.

Air quality measurements taken at three sites in Limpopo – Polokwane, Phalaborwa and Lephalale show that the Limpopo Province currently does not have an air quality problem (Limpopo DFED, 2003). The air quality of the area between Witbank/Middelburg and Polokwane is unknown, however the power line route is not expected to contribute to air quality pollution during operation.

During construction there may be air pollution from construction vehicles using the dirt roads, blasting for the pylons and dust may be caused by wind blowing away stockpiled soil.

### **12.11.2 Potential Impacts/Implications**

Air quality may be negatively impacted from the generation of dust during construction, dust sources include:

- The clearing of the servitude and construction of access roads would expose soil;
- Construction vehicles travelling along access roads;
- Excavation of the pylon foundations; and
- Wind erosion of stockpiled topsoil.

### **12.11.3 Specialist Studies Required**

No air quality study will be undertaken as it is not deemed necessary for the type of activities associated with the project. Mitigation measures will be included in the EMP to ensure that the air quality impacts during the construction phase are suitably managed and that regulated thresholds are not exceeded.

## **12.12 Noise**

### **12.12.1 Status Quo**

The noise levels along the proposed line and at the proposed substation site can be considered low. The areas concerned are primarily agricultural land and part of private game farms. The noisiest part of the routes would be within Marble Hall and Middelburg.

### **12.12.2 Potential Impacts/Implications**

Noise is expected during construction from the construction vehicles and workers. This impact is expected to be low and restricted to day-time periods.

The power line, substation and loop-in line would not contribute directly to noise during normal operation. There may be an increase in noise from maintenance crews, however this will only happen occasionally and the noise will not be continuous.

### **12.12.3 Specialist Studies Required**

Noise that emanates from construction activities will be addressed through targeted best practices for noise monitoring and management in the EMPr.

## **12.13 Traffic**

### **12.13.1 Status Quo**

The main road in the study area is the N11, this road runs in a north – south direction to the west of the proposed line. Except within the towns of Middelburg, Groblersdal and Marble Hall, the roads are primarily dirt roads, the quality of which differs. During the rainy season some areas along both routes would only be accessible with a 4x4 vehicle.

Access to the routes is difficult, there are few places where the power lines intercept roads. There may therefore be the need to construct access roads for routine maintenance and repair.

The power line servitude would traverse private land, adequate notification of and permission from landowners would be required in order to access the lines.

To get to the substation site, dirt roads must be used and the remainder of the distance walked. Access roads may need to be built in order for construction vehicles to access the sites and later for maintenance crews to access the substation.

### **12.13.2 Potential Impacts/Implications**

Construction vehicles may disrupt traffic by not adhering to the speed limit. These vehicles may either be speeding or they may be travelling slowly as a result of their load.

Access roads may be degraded through their use by construction vehicles.

Operational traffic would be limited to the use of the road by Eskom maintenance crews.

### **12.13.3 Specialist Studies Required**

A Traffic Impact Assessment will be conducted to determine the impact of the proposed development on traffic.

## **12.14 Visual Quality**

### **12.14.1 Status Quo**

The impact the power line would have on the proposed route varies along its length. In places such as Middelburg and Marble Hall, the lines start and end point, the lines would have an impact on the people within the town, as they would be exposed to the line daily. Along the

routes fewer people would be exposed to the line, however the area is scenic in places and the lines would therefore have an impact on the scenic quality of the area.

#### **12.14.2 Potential Impacts/Implications**

The Pre-Construction and Construction activities will have a negative impact on the aesthetics of the region for the following reasons:

- During pre-construction the servitude, loop-in servitude and substation footprint would be cleared and consequently soil would be exposed; and
- The materials lay down areas would cause unsightly views.

The power line, loop-in line and substation servitude will have a negative visual impact on residents, tourists and motorists. The annual bush clearing or burning of the servitude would reinforce the negative visual impact as the servitude would be more evident. If replacement of a pylon/s is necessary during operation then the same impacts as those for Pre-Construction and Construction would apply.

#### **12.14.3 Specialist Studies Required**

A Visual Impact Assessment will be undertaken.

### **12.15 Socio-Economic Environment**

#### **12.15.1 Status Quo**

The socio-economic information was obtained from the Census 2001 data.

Greater Sekhukhune District Municipality: Epharim Mogale Local Municipality

(Greater Marble Hall Local Municipality)

The dominant population group within the Greater Marble Hall Local municipal area is that of black Africans, the second largest population group is whites and the third largest population group is coloured. The most common language in the Municipality is Sepedi.

There are more females than males within this Municipality. In 2001 the age group with the most number of people within it was the 15 – 34 year olds. The second largest age group was the 5 – 14 year olds. In 2001 there were 21 711 people over the age of twenty who did not have any schooling. Of the people over twenty in the Municipality 7 175 people had completed Grade 12 and 2 456 people had a higher education degree. During 2001, 15 665 people in the Greater Marble Hall Local Municipality were employed. There were 12 734 people in the municipal area in 2001 that were unemployed, a further 38 494 were not economically active. For those people that were employed, most earned a salary between R401.00 – R800.00 or less.

The main employment industries were the agricultural, forestry and fishing industries. Most employed people had an elementary position within their industry. The majority of people lived within a formal dwelling and had access to electricity for their lighting needs. The majority of people used a pit latrine, their access to water was from a standpipe in their yard and they had their own refuse dump.

Greater Sekhukhune District Municipality: Elias Motsoaledi Local Municipality

The majority of people within this Municipality are black Africans (218 292 people), the second largest population group is whites (2 129 people) and the third largest coloureds (205 people). The most spoken language in the Municipality is Sepedi.

There are more females (122 050) than males (98 699) in this municipality. The age group with the most people is the 15 – 34 year olds with 74 948 people. The second largest age group is the 5 – 14 year olds with 62 191 people. There are 46 194 people within this Municipality over twenty years old that have not received formal schooling. Those that have completed Grade 12 total 12 386 and those that have a higher degree total 4 684 people.

In 2001 there were 75 261 people that were not economically active. A further 23 918 people were unemployed. The number of employed people within the Municipality was 20 166 people. Those people that were employed likely earned between R401.00 – R800.00 per month. The dominant employment industries were the agriculture, forestry and fishing industries, followed by the community and social industries. Most people surveyed held an elementary position within their company. Most people had access to electricity for their lighting needs. The dwelling type for most people was formal, however access to water was from the yard, pit latrines were used and people had their own dumps.

Nkangala District Municipality: Steve Tshwete Local Municipality:

The most common population group within this Municipality is black Africans (114 371 people) followed by whites (23 541 people) and coloureds (3 547 people). IsiZulu is the most common language in the Municipality.

There were more females (72 179 people) than males (70 594) within the Municipality. The age group with the most people is the 15 – 34 year olds with 54 557 people, followed by the 35 – 64 year olds with 41 163 people. In 2001 15 281 people over twenty years old had not received a formal education. Twenty thousand nine hundred and forty two people had received their Grade 12 and 7 474 people had a higher degree. In 2001 22 798 people were unemployed and an additional 31 619 people were not economically active. There were 41 678 people employed in the Municipality in 2001. The main industries employing people were the mining and quarrying industries followed by the community, social and personal industries. The main job position held was an elementary position with a monthly income of R401.00 – R800.00.

The majority of people lived within a formal dwelling and had access to electricity for their lighting needs. The Municipality collected their refuse on a weekly basis. The majority of people had flush toilets. For most people water was accessed from inside their dwelling or their yards.

Nkangala District Municipality: Highlands Local Municipality:

The dominant population group within the Local Municipality is black African (38 313 people) followed by whites (4 123 people) and coloureds (466 people). SiSwati is the most common language in the Municipality.

There were slightly more females (21 870 people) than males (21 136 people) in the Municipality. The age group with the most people is the 15 – 34 year olds with 16 114 people. The second largest age group is the 35 – 64 year olds with 11 192 people. In 2001 there were 6 553 people over twenty years old who had not received formal schooling. Four thousand and fifty eight people had received their Grade 12 and 1 388 had a higher degree. In 2001 10 758 people were not economically active, an additional 5 021 people were unemployed. There were 11 716 people employed. The main employment industry was the agricultural, forestry and fishing industries. The job position held by most people was an elementary position with a monthly income of R401.00 – R800.00.

Most people lived in a formal dwelling with access to electricity for their lighting needs. Refuse was removed on a weekly basis by the Municipality. Water was accessed within the house or the yard. Most people had flush toilets.

### **12.15.2 Potential Impacts/Implications**

A positive social impact is the creation of temporary job opportunities from the sourcing of unskilled labour from the local communities.

Negative impacts include the potential theft and trespass by construction workers.

During the Scoping phase IAPs mentioned that the power line would have a negative impact on tourism as it would be unsightly. The decrease in tourism would decrease the income of those involved in the tourism industry.

### **12.15.3 Specialist Studies Required**

A Social Impact Assessment and Economic Study will be undertaken.

## 13 PUBLIC PARTICIPATION

The purpose of the public participation process for the proposed development includes:

- Providing IAPs with an opportunity to obtain information about the project;
- Allowing IAPs to express their views, issues and concerns with regard to the project;
- Granting IAPs an opportunity to recommend measures to avoid or reduce adverse impacts and enhance positive impacts associated with the project; and
- Enabling the project team to incorporate the needs, concerns and recommendations of IAPs into the project, where feasible.

The public participation process that was followed for the proposed project is governed by NEMA and GN No. R. 982, as amended (07 April 2017).

### 13.1 Landowner Notification

The farms that may be affected by the proposed development have been included as part of the Interested and Affected Parties (IAPs) list in **Appendix 7**. Negotiations with the landowners have been completed by Eskom as the walk-down survey of the specialists has been completed.

### 13.2 Identification of IAPs and Compilation of IAP Database

IAPs were identified based on regulatory requirements and the specific site/project requirements. However, in summary, the database includes the following:

- Directly Adjacent Landowners/Occupiers.
- Relevant Organs of State/Authorities, including:
  - DEA
  - Limpopo Department of Economic Development, Environment and Tourism (LEDET)
  - Mpumalanga Department of Economic Development, Environment and Tourism
  - Department of Roads and Transport (Mpumalanga and Limpopo)
  - DAFF – Mpumalanga and Limpopo Regional Office
  - DWS – Mpumalanga and Limpopo Regional Office
  - South African Heritage Resource Authority (SAHRA)
  - Provincial Heritage Resources Authority - Mpumalanga and Limpopo
  - Steve Tshwete, Elias Motsoaledi and Ephraim Mogale LM's
    - Mayor and City Manager

- Roads and Stormwater
- Electricity
- Environmental
- Ward Councillors
- Other Organs of State that may bear interest in the project
- Stakeholders and the affected service providers affected by the development
- Game Farms in the surrounding area
- Businesses in the surrounding area

A copy of the IAP database to date is available in **Appendix 7**.

### **13.3 Previous Public Participation Undertaken**

Previous notification of the project was undertaken during the initial Scoping and EIA Process for the projects in 2009. However, as part of the 2014 EIA Regulations, as amended (07 April 2017), a full public participation process is required for the new application.

### **13.4 Project Announcement and Review Period of DSR**

The notification process undertaken is detailed in the sections to follow:

#### **13.4.1 Background Information Document (BID)**

BIDs (**Appendix 8**), which included a Reply Form, were distributed by email or hand delivered to IAPs contained in the IAP Database. BIDs contained a brief background and description of the project, as well as the EIA Process, and listed the details for submitting comments regarding the proposed development. The BID served to notify IAPs of the project and the details on how to register as an IAP.

Notification of the proposed development took place in April 2018. Proof of notification will be provided in **Appendix 11** of the Final Scoping Report.

#### **13.4.2 Site Notices**

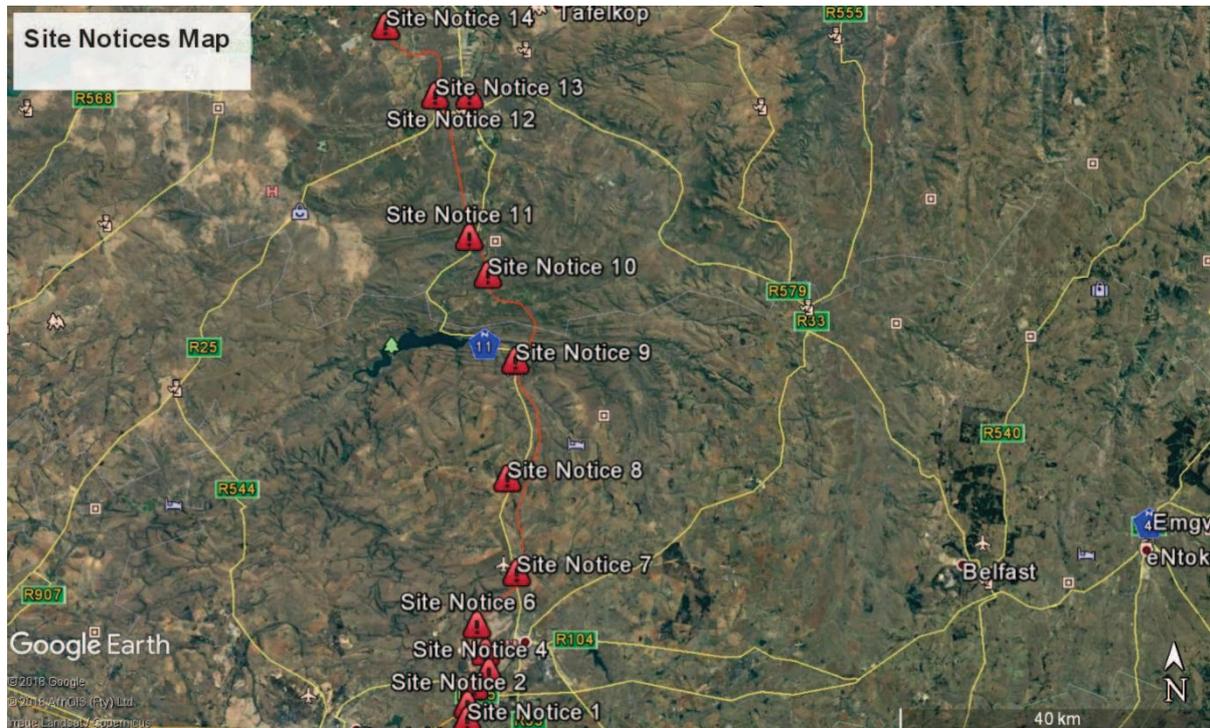
Site notices were placed at strategic points around the site (**Table 12**).

*Table 12: Locations of site notices*

Number	Coordinates	Description
1	25°52'50.51"S; 29°23'41.99"E	Intersection of R575 and unnamed road
2	25°51'47.12"S; 29°23'43.18"E	Intersection of R575 and unnamed road
3	25°50'31.16"S; 29°24'14.25"E	Intersection of R575 and N4
4	25°49'32.76"S; 29°25'20.70"E	Intersection of Keiskamma Drive and unnamed road

Number	Coordinates	Description
5	25°48'10.42"S; 29°25'5.62"E	Intersection of R575 and R555
6	25°46'18.61"S; 29°24'26.59"E	Corner President Krug Street
7	25°42'45.32"S; 29°27'26.56"E	Intersection of N11 and unnamed road
8	25°36'17.97"S; 29°26'45.35"E	Intersection of N11 and unnamed road into Lammerkop and Doornkop
9	25°28'15.07"S; 29°27'21.89"E	Intersection of N11 and unnamed road
10	25°22'21.81"S; 29°25'16.29"E	Intersection near existing substation
11	25°19'46.27"S; 29°23'52.09"E	Intersection of N11 and Kameeldoorn
12	25°10'3.17"S; 29°23'53.14"E	Corner of Hereford Street and R25
13	25°10'2.38"S; 29°21'18.03"E	Intersection of R25
14	25° 5'14.97"S; 29°17'33.91"E	Corner of unnamed roads

**Figure 12** provides the locations of each site notice in relation to the site. Notices were placed in April 2018. Proof of site notices will be provided in **Appendix 9** of the Final Scoping Report. The notices included a brief background and description of the project, as well as the EIA Process, and listed the details for submitting comments regarding the proposed development.



**Figure 12: Location of site notices**

### 13.4.3 Newspaper Notice

Newspaper notices were placed in April 2018. The notices included a brief background and description of the project, as well as the EIA Process, and listed the details for submitting comments regarding the proposed development. A copy of the newspaper notices will be provided in **Appendix 10** of the Final Scoping Report.

**Table 13: Newspapers for advertisements**

Number	Regional or Local	Name	Language
1	Regional	The Star	English
2	Regional	The Citizen	English
3	Regional	Die Beeld	Afrikaans
4	Regional	The Sowetan	English
5	Local	Middelburg Observer	English
6	Local	Die Daller	English
7	Local	Polokwane Observer	English

#### 13.4.4 Update of IAP Database

The IAP Database is updated throughout the Scoping and EIA Process.

#### 13.4.5 Public Review

In accordance with GN. No. R. 982, as amended (07 April 2017), IAPs are granted an opportunity to review and comment on the DSR. Hard copies of the document will be placed at the venues listed below (**Table 14**). An electronic copy of the report will also be available on the Nema Consulting website.

**Table 14: Location of DSR for review**

Venue	Address	Contact Details
Eastdene Public Library	Verdoorn St, Middelburg, 1050	013 249 7275
Groblersdal Public Library	2 Grobler Street, Legolaneng, Groblersdal, Limpopo	013 262 3056

The public review of the DSR will occur for a 30-Day review period from **16 April 2018 to 17 May 2018**.

#### 13.4.6 Authority Review

Hard/Electronic copies of the document will also be provided to the following key regulatory and commenting authorities.

The authority review of the DSR will occur for a 30-Day review period from **16 April 2018 to 17 May 2018**.

#### 13.4.7 Public Meeting

As public participation has previously been undertaken for this project, a public meeting will only be organised on request by an IAP.

### **13.4.8 Comments and Responses Report**

The Comments and Responses Report summarises the correspondence received by IAPs and Organs of State completed via the Reply Forms, Comments Sheets, letters, faxes and emails. Refer to **Appendix 12**. This report captures all the significant issues and queries raised, any statements that were made, and a record of all IAPs that registered. This report also attempts to address every comment through responses and input provided by the project team.

### **13.5 Public Participation – EIA Phase**

The Comments and Responses Report is continuously updated throughout the process and thus registered IAPs will have a chance to review this Comments and Responses Report during the 30-Day public and authority review period of the Draft EIA Report. Again, DEA will take the Comments and Responses Report into consideration when making the decision to grant EA or not.

## **14 ENVIRONMENTAL ISSUES**

In accordance with the purpose of the Scoping exercise as part of the overall environmental assessment, this section aims to identify potentially significant environmental issues for further consideration and prioritisation during the EIA stage. This allows for a more efficient and focused impact assessment in the ensuing EIA Phase, where the analysis is largely limited to significant issues and reasonable alternatives.

### **14.1 Approach**

#### **14.1.1 Predicting Significant Environmental Issues**

The potential environmental issues associated with the proposed Emkhiweni Substation and Emkhiweni-Silimela 400kV powerline were identified during the Scoping Phase through an appraisal of the following:

- Project-related components and infrastructure (see Section 7);
- Activities associated with the project life-cycle (i.e. pre-construction, construction, operation and decommissioning) (see Section 7);
- Nature and profile of the receiving environment and potential sensitive environmental features and attributes (see Section 12), which included a desktop evaluation (via

literature review, GIS, topographical maps and aerial photography) and site investigations; and

- Legal and policy context (see Section 8).

The two main categories of environmental impacts of the proposed project are those which are inherent to construction (including site clearing, camp establishment and construction of the powerline and substation) and operation (provision of electricity and maintenance of infrastructure).

Apart from explaining the receiving environment, Section 12 discusses possible impacts during primarily the construction and operational phases of the project. The significant environmental issues were distilled from the aforementioned section and are summarised in Section 14.2. Cumulative impacts are briefly explained in Section 14.3.

#### **14.1.2 Mitigation of Impacts**

During the EIA stage, a detailed assessment will be conducted to evaluate all potential impacts (paying particular attention to the significant issues listed in the Scoping Report), with input from the project team and requisite Specialist Studies and through the application of the impact assessment methodology contained in Section 15.

Suitable mitigation measures will be identified to manage the environmental impacts according to the following hierarchy:

- Initial efforts should strive to prevent the occurrence of the impact;
- If this is not possible, mitigation should include measures that reduce or minimise the significance of the impact to an acceptable level;
- Remediation and rehabilitation should take place if measures cannot suitably prevent or reduce the impacts, or to address the residual impacts; and
- As a last measure, compensation should be employed as a form of mitigating the impacts associated with a project.

The mitigation measures will be incorporated into the EMPr, which will form part of the EIA Report. This deliverable, together with the EA, can act as a standalone document that can be used inter alia to monitor against compliance of the project with its pre-determined objectives, targets and management actions.

#### **14.2 Summary of Environmental Issues**

Pertinent environmental issues, which will receive specific attention during the EIA Phase, are listed in **Tables 15** and **16** which follow, as well as the Specialist Studies or resolutions to determine the extent of the impact and the propose mitigation measures:

**Table 15: Pertinent issues (Construction Phase) for prioritisation during the EIA Phase**

Environmental Feature	Potential Impacts/Implications	Specialist Study Required/Proposed Resolution
Geology and Soil	<ul style="list-style-type: none"> <li>• Unsuitable geological conditions</li> <li>• Blasting (if required)</li> <li>• Soil erosion and contamination</li> </ul>	<ul style="list-style-type: none"> <li>• Geotechnical Study</li> <li>• EMPr</li> </ul>
Surface Water	<ul style="list-style-type: none"> <li>• Surface water pollution due to spillages and poor construction practices</li> <li>• Encroachment of construction activities into riparian zones / wetlands</li> <li>• Impacts where access roads and lines cross watercourses, such as: <ul style="list-style-type: none"> <li>○ Loss of riparian and instream vegetation within construction domain</li> <li>○ Destabilisation of banks of watercourses</li> <li>○ Sedimentation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Riparian Habitat and Wetland Delineation Impact Assessment</li> <li>• Floodline Analysis</li> <li>• EMPr</li> </ul>
Flora	<ul style="list-style-type: none"> <li>• Loss of sensitive vegetation and habitat</li> <li>• Vegetation and habitat disturbance due to accidental introduction of alien species</li> <li>• Potential loss of significant flora species</li> </ul>	<ul style="list-style-type: none"> <li>• Terrestrial Ecological Assessment</li> <li>• Search, Rescue and Relocation Plan of Flora/Fauna, if necessary</li> <li>• EMPr</li> </ul>
Fauna	<ul style="list-style-type: none"> <li>• Loss of habitat through site clearing and construction</li> <li>• Potential loss of significant fauna species</li> </ul>	<ul style="list-style-type: none"> <li>• Terrestrial Ecological Assessment</li> <li>• Avifauna Impact Assessment</li> <li>• Search, Rescue and Relocation Plan of Flora/Fauna, if necessary</li> <li>• EMPr</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>• Loss of land used for agriculture</li> <li>• Sterilisation of land</li> <li>• Servitude restrictions</li> </ul>	<ul style="list-style-type: none"> <li>• Agricultural Impact Assessment</li> <li>• Socio-economic Impact Assessment</li> <li>• EMPr</li> </ul>
Agricultural Land	<ul style="list-style-type: none"> <li>• Loss of cultivated land within construction domain</li> <li>• Loss of grazing land within construction domain</li> <li>• Risk to livestock from construction activities</li> <li>• Disruptions to farming operations</li> <li>• Loss of fertile soil through land clearance</li> </ul>	<ul style="list-style-type: none"> <li>• Agricultural Impact Assessment</li> <li>• Socio-economic Impact Assessment</li> <li>• EMPr</li> </ul>
Heritage	<ul style="list-style-type: none"> <li>• Possible disturbance and destruction of heritage resources</li> </ul>	<ul style="list-style-type: none"> <li>• Phase 1 HIA</li> <li>• EMPr</li> </ul>

Environmental Feature	Potential Impacts/Implications	Specialist Study Required/Proposed Resolution
Air Quality	<ul style="list-style-type: none"> <li>Increased dust generation</li> </ul>	<ul style="list-style-type: none"> <li>EMPr</li> </ul>
Noise	<ul style="list-style-type: none"> <li>Localised noise increase</li> </ul>	<ul style="list-style-type: none"> <li>EMPr</li> </ul>
Traffic	<ul style="list-style-type: none"> <li>Increase in traffic on the local road network</li> <li>Develop access roads</li> <li>Risks to road users</li> </ul>	<ul style="list-style-type: none"> <li>EMPr</li> </ul>
Visual Quality	<ul style="list-style-type: none"> <li>Visual impacts from temporary construction activities</li> </ul>	<ul style="list-style-type: none"> <li>EMPr</li> </ul>
Socio-Economic Environment	<ul style="list-style-type: none"> <li>Loss of land within construction domain</li> <li>Risk to livestock from construction activities</li> <li>Nuisance from dust and noise</li> <li>Influx of people seeking employment and associated impacts (e.g. foreign workforce, cultural conflicts, squatting, demographic changes, anti-social behaviour, and incidence of HIV/AIDS)</li> <li>Safety and security</li> <li>Use of local road network</li> <li>Light pollution (substation)</li> </ul>	<ul style="list-style-type: none"> <li>Socio-economic Impact Assessment</li> <li>EMPr</li> </ul>

**Table 16: Pertinent issues (Operational Phase) for prioritisation during the EIA Phase**

Environmental Feature	Potential Impacts/Implications	Specialist Study Required/Proposed Resolution
Geology and Soil	<ul style="list-style-type: none"> <li>Unsuitable geological conditions – risks to structural integrity of substation and towers</li> <li>Soil erosion at areas that were not suitably reinstated and rehabilitated</li> <li>Soil contamination from improper handling of hazardous substances at the substation</li> </ul>	<ul style="list-style-type: none"> <li>Geotechnical Study</li> <li>EMPr</li> </ul>
Surface Water	<ul style="list-style-type: none"> <li>Inadequate stormwater management at substation and along access roads</li> <li>Damage to substation and towers from major flood events</li> <li>Impacts to characteristics of riparian zones and wetlands at</li> </ul>	<ul style="list-style-type: none"> <li>Riparian Habitat and Wetland Delineation Impact Assessment</li> <li>Floodline Analysis</li> <li>EMPr</li> </ul>

Environmental Feature	Potential Impacts/Implications	Specialist Study Required/Proposed Resolution
	areas where they are encroached upon by the project footprint	
Flora	<ul style="list-style-type: none"> <li>Encroachment by exotic species through inadequate eradication programme</li> <li>Clearing of vegetation along servitude and maintenance road</li> </ul>	<ul style="list-style-type: none"> <li>Terrestrial Ecological Assessment</li> <li>EMPr</li> </ul>
Fauna	<ul style="list-style-type: none"> <li>Risk to birds from collision with infrastructure and from electrocution</li> </ul>	<ul style="list-style-type: none"> <li>Terrestrial Ecological Assessment</li> <li>Avifauna Impact Assessment</li> <li>EMPr</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>Loss of land used for agriculture</li> <li>Sterilisation of land</li> <li>Servitude restrictions</li> </ul>	<ul style="list-style-type: none"> <li>Agricultural Impact Assessment</li> <li>Socio-economic Impact Assessment</li> <li>EMPr</li> </ul>
Agricultural Land	<ul style="list-style-type: none"> <li>Permanent loss of cultivated and grazing land within project footprint</li> <li>Loss of livestock through improper access control</li> </ul>	<ul style="list-style-type: none"> <li>Agricultural Impact Assessment</li> <li>Socio-economic Impact Assessment</li> <li>EMPr</li> </ul>
Heritage	<ul style="list-style-type: none"> <li>Possible disturbance and destruction of heritage resources</li> </ul>	<ul style="list-style-type: none"> <li>Phase 1 HIA</li> <li>EMPr</li> </ul>
Traffic	<ul style="list-style-type: none"> <li>Use of permanent access and maintenance roads</li> </ul>	<ul style="list-style-type: none"> <li>EMPr</li> </ul>
Visual Quality	<ul style="list-style-type: none"> <li>Permanent structure will have a visual impact</li> </ul>	<ul style="list-style-type: none"> <li>EMPr</li> </ul>
Socio-Economic Environment	<ul style="list-style-type: none"> <li>Use of local road network for operation and maintenance purposes</li> <li>Light pollution</li> <li>Safety and security issues through improper access control during inspections and maintenance activities</li> <li>Threats to human and animal health from EMF</li> </ul>	<ul style="list-style-type: none"> <li>EMPr</li> </ul>

Although impacts in the decommissioning phase are not included, it will nonetheless receive appropriate attention in the impact assessment during the EIA Phase.

### 14.3 Cumulative Impacts

According to GN No. R. 982, as amended (07 April 2017), a “cumulative impact”, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may

not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

Cumulative impacts can be identified by combining the potential environmental implications of the proposed project with the impacts of projects and activities that have occurred in the past, are currently occurring, or are proposed in the future within the project area.

The following potential cumulative impacts will be considered as part of the EIA:

- The construction period may cause traffic-related impacts in terms of the local road network, which will be associated with heavy vehicle construction traffic for the delivery of material and the transportation of construction workers. This may compound traffic impacts if other large scale projects are planned during the same period.
- Land clearing activities and other construction-related disturbances could lead to the proliferation of exotic vegetation. The associated cumulative impact in relation to other activities in the affected areas, such as livestock grazing and farming, will need to be considered further.
- Threats to agricultural land in the region include the expansion of mining, industrial and urban areas. The proposed substation will have a relatively large footprint, which will lead to the permanent loss of land currently used for agricultural purposes.
- The Terrestrial Ecological Impact Assessment will need to identify species of conservation significance that could be adversely affected by the project activities. This study will need to consider the existing local impacts to the biodiversity and the incremental loss of conservation-worthy species, within the context of the provincial conservation goals and targets.
- The proposed line crosses over properties that are already traversed by existing linear infrastructure. These properties will thus have a network of infrastructure with the associated servitude restrictions.

The project was initiated to strengthen the local power network based on future demands and current constraints of the existing electrical infrastructure. In turn, this will have a positive impact on the macro socio-economic environment.

## 15 METHODOLOGY TO ASSESS THE IDENTIFIED IMPACTS

Information provided by specialists will be used to calculate an overall impact score by multiplying the product of the nature, magnitude and the significance of the impact by the sum of the extent, duration and probability based on the following equation:

$$\text{Overall Score} = (N \times M \times S) \times (E + D + P)$$

Where: N = Nature  
E = Extent  
M = Magnitude  
D = Duration  
P= Probability  
S = Significance

**Table 17: Impact Methodology Table**

Nature				
Negative		Neutral		Positive
-1		0		+1
Extent				
Local	Regional	National	International	
1	2	3	4	
Magnitude				
Low		Medium	High	
1		2	3	
Duration				
Short Term (0-5yrs)	Medium Term (5-11yrs)	Long Term	Permanent	
1	2	3	4	
Probability				
Rare/Remote	Unlikely	Moderate	Likely	Almost Certain
1	2	3	4	5
Significance				
No Impact/None	No Impact Mitigation/Low	After Residual Impact Mitigation/Medium	After Impact Cannot be Mitigated/High	
0	1	2	3	

For example, the worst possible impact score of -117 would be achieved based on the following ratings:

N = Nature = -1  
M = Magnitude = 3  
S = Significance = 3  
E = Extent = 4

D = Duration = 4

P= Probability = 5

Worst impact score =  $(-1 \times 3 \times 3) \times (4+4+5) = -117$

On the other hand, if the nature of an impact is 0 (neutral or no change) or the significance is 0 (no impact), then the impact will be 0.

Impact Scores will therefore be ranked in the following way:

**Table 18: Ranking of Overall Impact Score**

Impact Rating	Low/Acceptable impact	Medium	High	Very High
Score	0 to -30	-31 to -60	-61 to -90	-91 to -117

## 16 PLAN OF STUDY FOR EIA

This Plan of Study, which explains the approach to be adopted to conduct the EIA for the proposed development, was prepared in accordance with 2(i) of Appendix 2 of GN No. R. 982, as amended (07 April 2017).

### 16.1 Key Environmental Issues Identified During Scoping Phase

The Scoping exercise aims to identify and qualitatively predict significant environmental issues for further consideration and prioritisation during the EIA stage. These include issues raised by IAPs to date. Further comments from IAPs during the Scoping Phase will also guide the identification of significant issues.

During the EIA stage, a detailed quantitative impact assessment will be conducted via contributions from the project team and requisite Specialist Studies, and through the application of the impact assessment methodology contained in Section 15. Suitable mitigation measures will be identified to manage (i.e. prevent, reduce, rehabilitate and/or compensate) the environmental impacts, and will be included in an EMP.

Key environmental issues identified during Scoping, which will receive specific attention during the EIA Phase are listed in **Table 15** (construction phase) and **Table 16** (operation phase).

## **16.2 Environmental Specialist Studies**

According to Münster (2005), a 'trigger' is "*a particular characteristic of either the receiving environment or the proposed project which indicates that there is likely to be an issue and/or potentially significant impact associated with that proposed development that may require specialist input*".

Further, the 2014 EIA Regulations define a specialist as: "*A person that is generally recognised within the scientific community as having the capability of undertaking, in conformance with generally recognised scientific principles, specialist studies or preparing specialist reports, including due diligence studies and socio-economic studies.*"

The requisite specialist studies 'triggered' by the findings of the Scoping process, aimed at addressing the key issues and compliance with legal obligations, include:

- Terrestrial Ecological Impact Assessment;
- Avifauna Impact Assessment;
- Visual Impact Assessment;
- Agricultural Impact Assessment;
- River Health Impact Assessment and Wetland/Riparian Habitat Delineation;
- Socio-Economic Impact Assessment; and
- Phase 1 Heritage Impact Assessment.

The Terms of Reference (ToR), both general and specific, for the abovementioned specialist studies follow in the sub-sections below. Amongst others, the Guideline for determining the scope of specialist involvement in EIA processes (Münster, 2005) was used in compiling the general Terms of Reference for the Specialist Studies. The following guidelines were also employed to prepare the specific ToR for the respective specialists (where appropriate):

- Guideline for involving biodiversity specialists in EIA processes (Brownlie, 2005);
- Guideline for involving social assessment specialists in EIA processes (Barbour, 2007); and
- Guideline for involving heritage specialists in EIA processes (Winter & Baumann, 2005).

In addition to the above guidelines, the relevant specialists need to satisfy specific requirements stipulated by the following key environmental authorities.

For the inclusion of the findings of the Specialist Studies into the EIA report, the following guideline will be used: Guideline for the review of specialist input in EIA processes (Keatimilwe & Ashton, 2005). Key considerations will include:

- Ensuring that the specialists have adequately addressed IAPs' issues and specific requirements prescribed by environmental authorities;
- Ensuring that the specialists' input is relevant, appropriate and unambiguous; and
- Verifying that information regarding the receiving ecological, social and economic environment has been accurately reflected and considered.

### 16.2.1 General Terms of Reference

1. Address all triggers for the specialist studies contained in the subsequent specific ToR.
2. Address issues raised by IAPs, as contained in the Comments and Responses Report, and conduct an assessment of all potentially significant impacts.
3. Ensure that the requirements of the environmental authorities that have specific jurisdiction over the various disciplines and environmental features are satisfied.
4. Approach to include desktop study and site visits, as deemed necessary, to understand the affected environment and to adequately investigate and evaluate salient issues. Indigenous knowledge (i.e. targeted consultation) should also be regarded as a potential information resource.
5. Assess the impacts (direct, indirect and cumulative) in terms of their significance (using suitable evaluation criteria) and suggest suitable mitigation measures. In accordance with the mitigation hierarchy, negative impacts should be avoided, minimised, rehabilitated (or reinstated) or compensated for (i.e. offsets), whereas positive impacts should be enhanced. A risk-averse and cautious approach should be adopted under conditions of uncertainty.
6. Consider time boundaries, including short to long-term implications of impacts for project life-cycle (i.e. pre-construction, construction, operation and decommissioning).
7. Consider spatial boundaries, including:
  - a. Broad context of the proposed project (i.e. beyond the boundaries of the specific site);
  - b. Off-site impacts; and
  - c. Local, regional, national or global context.
8. The provision of a statement of impact significance for each issue, which specifies whether or not a pre-determined threshold of significance (i.e. changes in effects to the environment which would change a significance rating) has been exceeded, and whether or not the impact presents a potential fatal flaw or not. This statement of significance should be provided for anticipated project impacts both before and after application of impact management actions.
9. Recommend a monitoring programme to implement mitigation measures and measure performance. List indicators to be used during monitoring.
10. Appraisal of alternatives (including the No-Go option) by identifying the Best Practicable Environmental Option (BPEO) with suitable justification.

11. Advise on the need for additional specialists to investigate specific components and the scope and extent of the information required from such studies.
12. Engage with other specialists whose studies may have bearing on your specific investigation.
13. Information provided to the EAP needs to be signed off and a Specialist Declaration form of Independence will need to be signed.
14. The appointed specialists must take into account the policy framework and legislation relevant to their particular studies.
15. Present findings at the public meeting.
16. All specialist reports must adhere to Appendix 6 of GN No. R. 982, as amended (07 April 2017).

### **16.3 Technical Specialist Studies**

The following Specialist Studies will form part of the Technical Studies, and the findings will be incorporated into the EIA Report:

- Geotechnical Study;
- Design Reports; and
- Technical Designs.

### **16.4 Public Participation – EIA Phase**

#### **16.4.1 Notification – Approval of Scoping Report and Notification of Public Review of Draft EIA Report**

IAPs will be notified of the approval of the Scoping Report and the public review period of the Draft EIA Report at the same time.

Registered IAPs will be notified of the approval and review period by emails or SMS. These notices will also include information on the public meeting for the EIA Phase.

#### **16.4.2 EIA Public Meeting**

The public meeting details during the EIA Phase will be available in the Draft EIA.

All registered IAPs will be invited to attend the public meeting.

#### **16.4.3 Review of Draft EIA Report**

A 30-day review period will be provided to registered IAPs and authorities to review the Draft EIA Report, and details of the venues will be available in the Draft EIA.

All comments received from IAPs and the responses thereto will be included in the Final EIA Report for submission to DEA.

#### **16.4.4 Updating of IAP Database and Comments and Responses Report**

The IAP Database and Comments and Responses Report is continuously updated throughout the process and thus registered IAPs will have a chance to review this Comments and Responses Report during the 30-Day public and authority review period of the Draft EIA Report. Again, DEA will take the Comments and Responses Report into consideration when making the decision to grant EA or not.

#### **16.4.5 Notification of DEAs Decision**

All registered IAPs will be notified via email or SMS after having received written notice from DEA on the final decision. Advertisements will also be placed in local and regional newspapers regarding the Department's decision. These notifications will include the appeal procedure to the decision.

### **16.5 Proposed Timeframes**

The proposed timeframes for the Scoping and EIA Phase is provided in **Table 19**.

**Table 19: Scoping and EIA timeframes**

Scoping Phase	Proposed Timeframe
Public Notification	April 2018
Submit Application Form to DEA	13 April 2018
Draft DSR Review Period	16 April 2018 to 17 May 2018
Submit Final Scoping Report to DEA	24 May 2018
DEA Decision on Scoping Report	25 May 2018 – 06 July 2018
Draft EIA Report Review Period	30 July 2018 – 29 August 2018
Submit Final EIA Report to DEA	05 September 2018
DEA Decision on Authorisation	11 January 2019
Notify Registered IAPs of DEA Decision	14 January 2019
Allow Appeal Period	14 January 2019 – 29 January 2019

**17 OATH OF THE EAP AND DECLARATION OF INDEPENDENCE**

I (name and surname) KRISTY ROBERTSON  
At (address) 147 BRAM FISCHER DRIVE, FERNDALE  
ID No. 8910110148089

Hereby make an oath and state that:

In Accordance with Appendix 2 of G.N. R. 982, as amended (07 April 2017), this serves as an affirmation by the Environmental Assessment Practitioner (EAP) in relation to:

Section 2(j)

- i. The correctness of the information provided in this report;
  - ii. The inclusion of comments and inputs from stakeholders and interested and affected parties (IAPs);
  - iii. The inclusion of inputs and recommendations from the Specialist Reports where relevant; and
  - iv. Any information provided by the EAP to IAPs and any responses by the EAP to comments or inputs made by IAPs.
1. I know and understand the contents of this declaration.
  2. I do not have any objection in taking the prescribed oath.
  3. I consider the prescribed oath to be binding on my conscience.

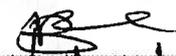
Signature  Date 03/04/2018

I certify the deponent has acknowledged that he/she knows and understands the contents of the statement and the deponent signature was placed there in my presence.

<u></u>	<u>BRENDA PERUMAL</u>	<u>FINANCIAL MANAGER</u>
Commissioner of Oath	Full name	Designation

CERTIFIED A TRUE COPY OF THE ORIGINAL DOCUMENT  
GESKIED OOR OOR IN WARE AFSKRIF VAN  
GOESPROKLUDE DOKUMENT  
**BRENDA PERUMAL**  
MALANI PALAYACHILLI PRAKASA ENGINEERING PRIVATE LTD  
REC No: 1097/00951/07  
JOHANNESBURG NORTH MAGISTERIAL DISTRICT  
April 2018  
REF No: 12/04/2018  
EX OFFICIO COMMISSIONER OF OATHS



SIGNED/TEKEN   
DATE/DATUM 04/04/18